JEE SYLLABUS

2027

Complete Unit-Wise Syllabus — Physics · Chemistry · Mathematics

Compiled for JEE Main aspirants, based on the latest official NTA syllabus (Class 11 & 12 NCERT curriculum). This document is structured for daily revision, chapter tracking and mock-test planning.

Prepared by Physics Point

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1. Important Notes & How to Use This Syllabus

Status of the official 2027 syllabus: As of now, the National Testing Agency (NTA) has not published a separate, official JEE Main 2027 syllabus document. Historically, NTA releases the syllabus for an exam year along with the official Information Bulletin, typically a few months before the January session — so the 2027 bulletin is expected around late 2026 / early 2027.

This document has therefore been compiled using the **latest available official NTA syllabus pattern** (the framework used for recent JEE Main sessions), which is expected to continue largely unchanged for 2027. It is organised subject-wise and unit-wise so students can begin structured preparation immediately.

Please note: Once NTA releases the official 2027 Information Bulletin, students should cross-check this syllabus against the official version at **jeemain.nta.nic.in** and update their preparation for any additions or deletions.

Quick Legend

Each subject is broken into **Units** (matching the standard NTA numbering) with the **Key Topics** you need to cover under each one. Use the checkbox-style unit numbers to track your progress as you revise.

2. JEE Main 2027 — Exam Pattern Snapshot

Parameter	Details
Exam Conducting Body	National Testing Agency (NTA)
Subjects	Physics, Chemistry, Mathematics
Mode of Exam	Computer Based Test (CBT), online
Sessions	Typically two sessions — January & April
Marks per Subject (Paper 1)	100 marks (approx., equal weightage across subjects)
Question Type	Multiple Choice Questions + Numerical Value based questions
Basis of Syllabus	NCERT Class 11 & 12 curriculum

Note: Exact marking scheme, number of questions and session dates are confirmed by NTA in the official Information Bulletin each year — figures above reflect the recent, established pattern.

3. Physics Syllabus

Physics covers **20 units** spanning Class 11 & 12 mechanics, thermal physics, electricity & magnetism, optics and modern physics, plus a dedicated experimental-skills unit.

#	Unit	Key Topics
1	**Physical World & Measurement**	Units, dimensions, dimensional analysis, errors in measurement, significant figures, accuracy & precision of instruments.
2	**Kinematics**	Motion in a straight line & a plane, relative velocity, projectile motion, uniform circular motion.
3	**Laws of Motion**	Newton's laws, friction, dynamics of uniform circular motion, conservation of momentum, equilibrium of forces.
4	**Work, Energy & Power**	Work-energy theorem, conservative & non-conservative forces, potential energy, collisions (elastic & inelastic).
5	**Rotational Motion**	Centre of mass, moment of inertia, torque, angular momentum, rolling motion, theorems of parallel & perpendicular axes.
6	**Gravitation**	Kepler's laws, universal law of gravitation, gravitational potential & field, escape velocity, orbital velocity, satellites.
7	**Properties of Solids & Liquids**	Elasticity, Hooke's law, surface tension, viscosity, Bernoulli's theorem, thermal expansion, calorimetry, heat transfer.
8	**Thermodynamics**	Zeroth, first & second laws, isothermal & adiabatic processes, heat engines, refrigerators, entropy (qualitative).
9	**Kinetic Theory of Gases**	Kinetic theory postulates, gas laws, degrees of freedom, law of equipartition of energy, mean free path.
10	**Oscillations & Waves**	SHM, damped & forced oscillations, resonance, wave motion, superposition, Doppler effect, standing waves.
11	**Electrostatics**	Coulomb's law, electric field & potential, Gauss's law, capacitors & dielectrics, electric dipole.
12	**Current Electricity**	Ohm's law, resistivity, Kirchhoff's laws, Wheatstone bridge, potentiometer, cells & EMF, heating effects.
13	**Magnetic Effects of Current & Magnetism**	Biot-Savart law, Ampere's law, force on a moving charge, torque on a current loop, magnetic materials.
14	**EM Induction & Alternating Currents**	Faraday's & Lenz's laws, self & mutual inductance, AC circuits, LCR circuits, transformers.
15	**Electromagnetic Waves**	Displacement current, characteristics of EM waves, electromagnetic spectrum and its applications.
16	**Optics**	Reflection & refraction, lenses & mirrors, optical instruments, wave optics — interference, diffraction, polarisation.

#	Unit	Key Topics
17	**Dual Nature of Matter & Radiation**	Photoelectric effect, Einstein's equation, matter waves, de Broglie wavelength, Davisson-Germer experiment.
18	**Atoms & Nuclei**	Bohr model, atomic spectra, nuclear structure, radioactivity, mass-energy relation, nuclear fission & fusion.
19	**Electronic Devices**	Semiconductors, p-n junction diode, rectifiers, transistors, logic gates, basic communication systems.
20	**Experimental Skills**	Vernier calipers, screw gauge, simple pendulum, resistance measurement, characteristic curves and standard lab experiments.

4. Chemistry — Physical Chemistry

#	Unit	Key Topics
1	**Some Basic Concepts in Chemistry**	Mole concept, stoichiometry, laws of chemical combination, equivalent & molar mass, concentration terms.
2	**Atomic Structure**	Bohr model, quantum numbers, Aufbau principle, Hund's rule, electronic configuration, de Broglie relation.
3	**Chemical Bonding & Molecular Structure**	Ionic & covalent bonding, VSEPR theory, hybridisation, molecular orbital theory, hydrogen bonding.
4	**Chemical Thermodynamics**	First & second laws, enthalpy, entropy, Gibbs free energy, Hess's law, spontaneity of reactions.
5	**Solutions**	Types of solutions, concentration units, Raoult's law, colligative properties, van't Hoff factor.
6	**Equilibrium**	Chemical & ionic equilibrium, Le Chatelier's principle, acids & bases, pH, buffer solutions, solubility product.
7	**Redox Reactions & Electrochemistry**	Oxidation numbers, balancing redox equations, electrochemical cells, Nernst equation, conductance, electrolysis.
8	**Chemical Kinetics**	Rate of reaction, order & molecularity, rate law, integrated rate equations, Arrhenius equation, collision theory.

5. Chemistry — Inorganic Chemistry

#	Unit	Key Topics
1	**Classification of Elements & Periodicity**	Modern periodic law, periodic trends — atomic radius, ionisation energy, electron affinity, electronegativity.
2	**p-Block Elements**	Group 13–18 elements: trends, compounds and their properties, anomalous behaviour of first members.
3	**d- and f-Block Elements**	Transition elements — general properties, oxidation states; lanthanoids & actinoids.
4	**Co-ordination Compounds**	Werner's theory, IUPAC nomenclature, isomerism, bonding theories (VBT, CFT), applications.
5	**General Principles & Isolation of Metals**	Concentration of ores, extraction principles (reduction, electrolytic, thermodynamic), refining methods.
6	**Hydrogen**	Position in periodic table, isotopes, preparation & properties of hydrogen, hydrides, hydrogen peroxide, heavy water.
7	**s-Block Elements**	Alkali & alkaline earth metals — trends, compounds, and biological importance.

6. Chemistry — Organic Chemistry

#	Unit	Key Topics
1	**Purification & Characterisation of Organic Compounds**	Methods of purification, qualitative & quantitative analysis of organic compounds.
2	**Basic Principles of Organic Chemistry**	IUPAC nomenclature, isomerism, electronic effects (inductive, resonance, hyperconjugation), reaction intermediates.
3	**Hydrocarbons**	Alkanes, alkenes, alkynes, aromatic hydrocarbons — preparation, properties & reactions.
4	**Organic Compounds Containing Halogens**	Preparation, properties and reactions of haloalkanes & haloarenes.
5	**Organic Compounds Containing Oxygen**	Alcohols, phenols, ethers, aldehydes, ketones and carboxylic acids — preparation and reactions.
6	**Organic Compounds Containing Nitrogen**	Amines, diazonium salts — preparation, properties and important name reactions.
7	**Biomolecules**	Carbohydrates, proteins, enzymes, vitamins, nucleic acids — structure and biological role.
8	**Principles Related to Practical Chemistry**	Detection of elements & functional groups, chemistry involved in common titrations and preparations.

Note: States of Matter, Surface Chemistry, Environmental Chemistry and Polymers have been removed from the NTA-rationalised JEE Main syllabus in recent years and are not included above.

7. Mathematics Syllabus

Mathematics covers **14 units** built on Class 11 & 12 NCERT concepts — algebra, calculus, coordinate & vector geometry, and statistics/probability.

#	Unit	Key Topics
1	**Sets, Relations & Functions**	Set operations, types of relations, functions — domain, range, composition, types of functions.
2	**Complex Numbers & Quadratic Equations**	Algebra of complex numbers, Argand plane, modulus-argument form, nature of roots, relations between roots & coefficients.
3	**Matrices & Determinants**	Algebra of matrices, types of matrices, properties of determinants, adjoint & inverse, solving linear equations.
4	**Permutations & Combinations**	Fundamental principle of counting, permutations & combinations and their applications.
5	**Binomial Theorem**	Binomial theorem for positive integral index, general & middle terms, properties of binomial coefficients.
6	**Sequence & Series**	Arithmetic & geometric progressions, arithmetic-geometric series, sum of special series.
7	**Limit, Continuity & Differentiability**	Limits, continuity, differentiability, derivatives of standard functions, L'Hospital's rule, Rolle's & Lagrange's theorems.
8	**Integral Calculus**	Indefinite & definite integrals, methods of integration, properties of definite integrals, area under curves.
9	**Differential Equations**	Order & degree, formation of differential equations, solutions of first-order first-degree equations.
10	**Coordinate Geometry**	Straight lines, circles, conic sections (parabola, ellipse, hyperbola) — standard forms and properties.
11	**Three-Dimensional Geometry**	Direction cosines/ratios, equations of lines & planes, angle & distance between lines and planes.
12	**Vector Algebra**	Vector addition, scalar & vector products, scalar triple product and geometric applications.
13	**Statistics & Probability**	Measures of dispersion, mean, variance, probability distributions, Bayes' theorem, conditional probability.
14	**Trigonometry**	Trigonometric identities & equations, inverse trigonometric functions, properties of triangles, heights & distances.

8. Preparation Tips & Revision Checklist

- **Start with NCERT** — Build every concept on NCERT Class 11 & 12 textbooks first — a large share of questions map directly to NCERT content, especially in Chemistry.
- **Prioritise high-weightage units** — In Physics focus on Mechanics, Electrodynamics and Modern Physics; in Chemistry, Physical Chemistry and Organic reactions; in Maths, Calculus and Coordinate Geometry.
- **Practice previous years' papers** — Solve at least the last 5–10 years of official JEE Main papers to understand question difficulty and recurring themes.
- **Track chapters, not just subjects** — Use the unit numbers in this document as a checklist — mark each unit complete only after solving practice questions from it.
- **Take timed mock tests** — Simulate exam conditions regularly to build speed and accuracy under the CBT format.
- **Revise formula sheets weekly** — Maintain compact formula/reaction sheets for Physics and Chemistry, and revisit them every week.
- **Recheck against the official bulletin** — Once NTA releases the 2027 Information Bulletin, verify this syllabus for any additions or deletions.
