CUCET 2025 Physics Syllabus

Unit	Topics
Unit 1: 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, Zero vector, Scalar and Vector products, Unit vector, Resolution of a vector, Relative velocity, Motion in a plane, Projectile motion, Uniform circular motion.
Unit 2: Laws of Motion	Force and Inertia, Newton's First Law of motion, Momentum, Newton's Second Law of motion, Impulse, 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.
Unit 3: Work, Energy, and Power	Work done by a constant and variable force, Kinetic and potential energies, Work-energy theorem, Power, Potential energy of a spring, Conservation of mechanical energy, Conservative and non-conservative forces, Elastic and inelastic collisions in one and two dimensions.
Unit 4: Rotational Motion	Centre of mass of a two-particle system, Centre of 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.
Unit 5: Gravitation	Universal law of gravitation, Acceleration due to gravity and its variation with altitude and depth, Kepler's laws of planetary motion, Gravitational potential energy, Gravitational potential, Escape velocity, Orbital velocity of a satellite, Geo-stationary satellites.
Unit 6: Thermodynamics	Thermal equilibrium, Zeroth law of thermodynamics, Concept of temperature, Heat, Work and internal energy, First law of thermodynamics, Second law of thermodynamics, Reversible and irreversible processes, Carnot engine and its efficiency.
Unit 7: Kinetic Theory of Gases	Equation of state of a perfect gas, Work done on compressing a gas, Kinetic theory of gases - assumptions, Concept of pressure, Kinetic energy and temperature, RMS speed of gas molecules, Degrees of freedom, Law of equipartition of energy, Applications to specific heat capacities of gases, Mean free path, Avogadro's number.
Unit 8: Oscillations and Waves	Periodic motion - 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, Free, forced, and damped oscillations, Resonance, Wave motion, Longitudinal and transverse waves, Speed of a 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, Doppler effect in sound.
Unit 9: Electrostatics	Electric charges: Conservation of charge, Coulomb's law, Superposition principle, Electric field, Electric field due to a point charge, Electric field lines, Electric dipole, Torque on a dipole, Electric flux, Gauss's law and its applications, Electric potential and its calculation, Equipotential surfaces, Electrical potential energy, Conductors and insulators, Dielectrics and electric polarization, Capacitor, Combination of capacitors, Capacitance of a parallel plate capacitor, Energy stored in a capacitor.
Unit 10: Current Electricity	Electric current, Drift velocity, Ohm's law, Electrical resistance, V-I characteristics of conductors, Electrical energy and power, Electrical resistivity, Colour code for resistors, Series and parallel combinations of resistors, Temperature dependence of resistance, Electric Cell and its internal resistance, Potential difference and EMF of a cell, Combination of cells, Kirchhoff's laws, Wheatstone bridge, Metre bridge, Potentiometer - principle and applications.
Unit 11: Magnetic Effects of Current and Magnetism	Biot-Savart law, Ampere's law, Force on a moving charge in magnetic and electric fields, Cyclotron, Force on a current-carrying conductor, Torque on a current loop, Moving coil galvanometer, Current loop as a magnetic dipole, Bar magnet as an equivalent solenoid, Earth's magnetic field, Magnetic substances (Para-, Dia-, Ferro-), Magnetic susceptibility and permeability, Hysteresis, Electromagnets and permanent magnets.
Unit 12: Electromagnetic Waves	Electromagnetic waves and their characteristics, Transverse nature of electromagnetic waves, Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays), Applications of electromagnetic waves.
Unit 13: Optics	Reflection and refraction of light, Mirror formula, Total internal reflection, Dispersion of light by a prism, Lens formula, Magnification, Power of a lens, Combination of thin lenses, Microscope and Astronomical Telescope, Wave optics, Wave front and Huygens' principle, Interference, Young's double slit experiment, Diffraction, Resolving power, Polarisation, Brewster's law, Polaroids.
Unit 14: Dual Nature of Matter and Radiation	Dual nature of radiation, Photoelectric effect, Einstein's photoelectric equation, Matter waves, de Broglie relation, Davisson-Germer experiment.
Unit 15: Atoms and Nuclei	Alpha-particle scattering experiment, Rutherford's model, Bohr model, Hydrogen spectrum, Composition of nucleus, Atomic masses, Isotopes, Isobars, Isotones, Radioactivity (alpha, beta, gamma), Radioactive decay law, Mass-energy relation, Mass defect, Binding energy, Nuclear fission and fusion.

CUCET 2025 ChemistrySyllabus

Branch of Chemistry	Unit No.	Unit Name	Key Topics
Physical Chemistry	1	Some Basic Concepts in Chemistry	Matter, Dalton's theory, atoms, molecules, measurements, significant figures, SI units, laws of chemical combination, mole concept, molar mass.
	2	States of Matter	Gaseous state (gas laws, kinetic theory, ideal/real gases), solid state (classification, Bragg's Law, unit cells, imperfections, properties).
	3	Atomic Structure	Atomic models, electromagnetic radiation, photoelectric effect, Bohr model, dual nature, de-Broglie, Heisenberg, quantum mechanics, quantum numbers, orbitals, electron configurations.
	4	Chemical Bonding and Molecular Structure	Ionic and covalent bonds, lattice enthalpy, electronegativity, Fajan's rule, dipole moment, VSEPR theory, hybridization, resonance, molecular orbital theory.
	5	Chemical Thermodynamics	Thermodynamics fundamentals, first law, work, heat, enthalpy, Hess's law.
	6	Solutions	Concentration terms, Raoult's law, ideal/non-ideal solutions, colligative properties, Van't Hoff factor.
	7	Electrochemistry	Electrochemical cells, electrode potentials, Nernst equation, Gibbs energy, fuel cells.
	8	Chemical Kinetics	Reaction rates, factors, order, molecularity, rate law, rate constant, Arrhenius theory, activation energy.
Inorganic Chemistry	9	Classification of Elements	Periodic law, periodic table, s, p, d, f blocks, trends in properties.
	10	Hydrogen	Position, isotopes, properties, uses, water, heavy water.
	11	S-Block Elements	Group 1 & 2 elements, trends, properties, compounds (Na, K, Mg, Ca).
	12	P-Block Elements	Group 13-18 elements, trends, properties, compounds (B, Al, C, Si, N, P, O, S, halogens, noble gases).
	13	D and F-Block Elements	Transition elements (trends, properties, compounds like $K_2Cr_2O_7$, $KMnO_4$), lanthanoids, actinoids.
	14	Coordination Compounds	Werner's theory, ligands, nomenclature, isomerism, bonding (VBT, CFT), importance.
Organic Chemistry	15	Purification and Characterization of Organic Compounds	Qualitative and quantitative analysis (detection and estimation).

Branch of Chemistry	Unit No.	Unit Name	Key Topics
	16	Some Basic Principles of Organic Chemistry	Tetravalency, hybridization, classification, isomerism, nomenclature, bond fission, electronic effects.
	17	Hydrocarbons	Alkanes, alkenes, alkynes, aromatic hydrocarbons (preparation, properties, reactions).
	18	Organic Compounds Containing Halogens	Classification, isomerism, nomenclature, preparation, properties, reactions.
	19	Organic Compounds Containing Oxygen	Alcohols, phenols, ethers, aldehydes, ketones, carboxylic acids (preparation, properties, reactions).
	20	Organic Compounds Containing Nitrogen	Amines, diazonium salts (preparation, properties, reactions).
	21	Chemistry in Everyday Life	Chemicals in medicines, food, cleansing agents.

CUCET 2025 Mathematics Syllabus

Unit No.	Chapter	Topics
1	Sets, Relations And Functions	Sets and their representation; Union, intersection, and complement of sets and their algebraic properties; Power set; Relation, Types of relations, equivalence relations, functions; one, into and onto functions, the composition of functions.
2	Complex Numbers And Quadratic Equations	Complex numbers as ordered pairs of reals, Representation of complex numbers in the form a+ib and their representation in a plane, Argand diagram, algebra of complex numbers, modulus and argument (or amplitude) of a complex number, square root of a complex number.
3	Matrices And Determinants	Matrices, algebra of matrices, types of matrices, determinants and matrices of order two and three. Properties of determinants, evaluation of determinants, area of triangles using determinants. Adjoint and evaluation of inverse of a square matrix using determinants and elementary transformations, Test of consistency and solution of simultaneous linear equations in two or three variables using determinants and matrices.
4	Binomial Theorem And Its Simple Applications	Binomial theorem for a positive integral index, general term and middle term, properties of Binomial coefficients and simple applications.
5	Sequences And Series	Arithmetic and Geometric progressions, insertion of arithmetic, geometric means between two given numbers. Relation between A.M. and G.M.

Unit No.	Chapter	Topics
6	Limit, Continuity And Differentiability	Real valued functions, algebra of functions, polynomials, rational, trigonometric, logarithmic and exponential functions, inverse functions. Limits, continuity and differentiability. Differentiation of the sum, difference, product and quotient of two functions. Differentiation of trigonometric, inverse trigonometric, logarithmic, exponential, composite and implicit functions; derivatives of order up to two. Rolle's and Lagrange's Mean Value Theorems.
7	Integral Calculus	Integral as an anti-derivative. Fundamental integrals involving algebraic, trigonometric, exponential and logarithmic functions. Integration by substitution, by parts and by partial fractions. Integration using trigonometric identities. Evaluation of simple integrals of the type. Integral as the limit of a sum. Properties of definite integrals. Evaluation of definite integrals, determining areas of the regions bounded by simple curves in standard form.

CUCET 2025 English Syllabus

Unit No.	Chapter	Topics
1	Grammar	Agreement, Time and Tense, Parallel construction, Relative pronouns, Determiners, Prepositions, Modals, Adjectives, Voice, Transformation, Question tags, and Phrasal verbs.
2	Vocabulary	Synonyms, Antonyms, Odd Word, One Word, Jumbled letters, Homophones, Spelling, Contextual meaning, Analogy.
3	Reading Comprehension	Content/ideas, Vocabulary, Referents, Idioms/Phrases, Reconstruction (rewording).
4	Composition	Rearrangement, Paragraph Unity, Linkers/Connectives.

CUCET 2025 Biology Syllabus

Chapters	Topics
Unit-1: Reproduction in Organisms	Reproduction, a characteristic feature of all organisms for the continuation of species; modes of reproduction – asexual and sexual reproduction; asexual reproduction – binary fission, sporulation, budding, gemmule formation, fragmentation; vegetative propagation in plants.
Unit-2: Sexual Reproduction in Flowering Plants	Flower structure; development of male and female gametophytes; pollination – types, agencies, and examples; outbreeding devices; pollen-pistil interaction; double fertilization; post fertilization events – development of endosperm and embryo, development of seed and

Chapters	Topics
	formation of fruit; special modes - apomixis, parthenocarpy, polyembryony; significance of seed dispersal and fruit formation.
Unit-3: Human Reproduction	Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis – spermatogenesis and oogenesis; menstrual cycle; fertilization, embryo development up to blastocyst formation, implantation; pregnancy and placenta formation (elementary idea); parturition (elementary idea); lactation (elementary idea).
Unit-4: Reproductive Health	Need for reproductive health and prevention of Sexually Transmitted Diseases (STDs); birth control – need and methods, contraception, and medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies – IVF, ZIFT, GIFT (elementary idea for general awareness).
Unit-5: Principles of Inheritance and Variation	Heredity and variation: Mendelian inheritance; deviations from Mendelism – incomplete dominance, co-dominance, multiple alleles and inheritance of blood groups, pleiotropy; elementary idea of polygenic inheritance; chromosome theory of inheritance; chromosomes and genes; sex determination – in humans, birds, and honey bee; linkage and crossing over; sex-linked inheritance – hemophilia, color blindness; Mendelian disorders in humans – thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's, and Klinefelter's syndromes.
Unit-6: Molecular Basis of Inheritance	Search for genetic material and DNA as genetic material; structure of DNA and RNA; DNA packaging; DNA replication; central dogma; transcription, genetic code, translation; gene expression and regulation – lac operon; genome and human and rice genome projects; DNA fingerprinting.
Unit-7: Evolution	Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology, and molecular evidences); Darwin's contribution, modern synthetic theory of evolution; mechanism of evolution – variation (mutation and recombination) and natural selection with examples, types of natural selection; gene flow and genetic drift; Hardy – Weinberg's principle; adaptive radiation; human evolution.
Unit-8: Human Health and Diseases	Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ringworm) and their control; basic concepts of immunology – vaccines; cancer, HIV and AIDS; adolescence – drug and alcohol abuse.
Unit-9: Strategies for Enhancement in Food Production	Improvement in food production: plant breeding, tissue culture, single-cell protein, biofortification, apiculture, and animal husbandry.
Unit-10: Microbes in Human Welfare	Role of microbes in household food processing, industrial production, sewage treatment, energy generation, biocontrol agents, and biofertilizers; antibiotics – production and judicious use.

Chapters	Topics
Unit-11: Biotechnology – Principles and Processes	Genetic engineering (Recombinant DNA Technology).
Unit-12: Biotechnology and its Application	Application of biotechnology in health and agriculture: human insulin and vaccine production, stem cell technology, gene therapy; genetically modified organisms – Bt crops; transgenic animals; biosafety issues, biopiracy, and patents.
Unit-13: Organisms and Populations	Organisms and environment: habitat and niche, population and ecological adaptations; population interactions – mutualism, competition, predation, parasitism; population attributes – growth, birth rate and death rate, age distribution.
Unit-14: Ecosystem	Ecosystem patterns and components; productivity and decomposition; energy flow; pyramids of number, biomass, and energy; nutrient cycles (carbon and phosphorus); ecological succession; ecological services – carbon fixation, pollination, seed dispersal, oxygen release (in brief).
Unit-15: Biodiversity and its Conservation	Concept of biodiversity; patterns of biodiversity; the importance of biodiversity; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, biosphere reserves, national parks, sanctuaries, and Ramsar sites.
Unit-16: Environmental Issues	Air pollution and its control; water pollution and its control; agrochemicals and their effects; solid waste management; radioactive waste management; greenhouse effect and climate change; ozone layer depletion; deforestation; one case study as a success story addressing an environmental issue.