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## CUCET 2025 Syllabus with Subjects

Chandigarh University CUCET 2025 Entrance exam syllabus typically comprises English Language, Quantitative Aptitude, Logical Reasoning and General Awareness. The in-depth information of subjects including their important topics on which the question paper will be based is listed below.

Subject	Page No.
CUCET 2025 Syllabus for Accountancy	3-5
CUCET 2025 Syllabus for Aptitude	5
CUCET 2025 Syllabus for Biology	6-9
CUCET 2025 Syllabus for Chemistry	9-14
CUCET 2025 Syllabus for Chemistry (Lateral Entry)	14-16
CUCET 2025 Syllabus for Commerce	16-18
CUCET 2025 Syllabus for Computer	18-20
CUCET 2025 Syllabus for Economics	20-22
CUCET 2025 Syllabus for English	22-23
CUCET 2025 Syllabus for General Knowledge/General Studies	23
CUCET 2025 Syllabus for Geography	24
CUCET 2025 Syllabus for Hindi	25
CUCET 2025 Syllabus for History	25-26
CUCET 2025 Syllabus for Legal Studies	26
CUCET 2025 Syllabus for Logical Reasoning	27
CUCET 2025 Syllabus for Mathematics	28-30
CUCET 2025 Syllabus for Mathematics (Lateral Entry)	30-31
CUCET 2025 Syllabus for ME-Automobile Engineering	31-33
CUCET 2025 Syllabus for ME-CSE	34-35
CUCET 2025 Syllabus for ME-Civil Engineering	36-38

CUCET 2025 Syllabus for ME-ECE	39-40
CUCET 2025 Syllabus for ME - Electrical Engineering	40-42
CUCET 2025 Syllabus for ME - Mechanical Engineering	42-44
CUCET 2025 Syllabus for Philosophy	44-45
CUCET 2025 Syllabus for Physics	45-49
CUCET 2025 Syllabus for Physics (Lateral Entry)	50-52
CUCET 2025 Syllabus for Political Science	52-54
CUCET 2025 Syllabus for Psychology	54-55
CUCET 2025 Syllabus for Public Administration	55-57
CUCET 2025 Syllabus for Quantitative Aptitude	57
CUCET 2025 Syllabus for Sociology	58-59
CUCET 2025 Syllabus for Mass Media	60

# CUCET 2025 Syllabus for Accountancy

## Accounting for Partnership Firms and Companies

### Unit 1: Accounting for Partnership Firms

- Partnership: features, Partnership Deed.
- Provisions of the Indian Partnership Act 1932 in the absence of partnership deed.
- Fixed v/s fluctuating capital accounts. Preparation of Profit and Loss Appropriation account- division of profit among partners, guarantee of profits.
- Past adjustments (relating to interest on capital, interest on drawing, salary and profit sharing ratio).
- Goodwill: nature, factors affecting and methods of valuation – average profit, super profit and capitalization.

### Accounting for Partnership firms – Reconstitution and Dissolution.

- Change in the Profit Sharing Ratio among the existing partners – sacrificing ratio, gaining ratio, accounting for revaluation of assets and reassessment of liabilities and treatment of reserves and accumulated profits. Preparation of revaluation account and balance sheet.
- Admission of a partner – effect of admission of a partner on change in the profit sharing ratio, treatment of goodwill (as per AS 26), treatment for revaluation of assets and reassessment of liabilities, treatment of reserves and accumulated profits, adjustment of capital accounts and preparation of balance sheet.
- Retirement and death of a partner: effect of retirement / death of a partner on change in profit sharing ratio, treatment of goodwill (as per AS 26), treatment for revaluation of assets and reassessment of liabilities, adjustment of accumulated profits and reserves, adjustment of capital accounts and preparation of balance sheet. Preparation of loan account of the retiring partner. Calculation of deceased partner's share of profit till the date of death. Preparation of deceased partner's capital account, executor's account and preparation of balance sheet.
- Dissolution of a partnership firm: types of dissolution of a firm. Settlement of accounts - preparation of realization account, and other related accounts: capital accounts of partners and cash/bank a/c (excluding piecemeal distribution, sale to a company and insolvency of partner(s)).

### Unit 2: Accounting for Companies

- Accounting for Share Capital Share and share capital: nature and types. Accounting for share capital: issue and allotment of equity shares, private placement of shares, Employee Stock Option Plan (ESOP). Public subscription of shares – over subscription

and under subscription of shares; issue at par and at premium, calls in advance and arrears (excluding interest), issue of shares for consideration other than cash.

Accounting treatment of forfeiture and re-issue of shares. Disclosure of share capital in company's Balance Sheet.

- Accounting for Debentures Debentures: Issue of debentures at par, at a premium and at a discount. Issue of debentures for consideration other than cash; Issue of debentures with terms of redemption; debentures as collateral security- concept, interest on debentures. Redemption of debentures: Lump sum, draw of lots and purchase in the open market (excluding ex-interest and cum-interest). Creation of Debenture Redemption Reserve.

## Financial Statement Analysis

### Unit 3: Analysis of Financial Statements

- Financial statements of a company: Statement of Profit and Loss and Balance Sheet in the prescribed form with major headings and sub headings (as per Schedule III to the Companies Act, 2013).
- Financial Statement Analysis: Objectives, importance and limitations.
- Tools for Financial Statement Analysis: Comparative statements, common size statements, cash flow analysis, ratio analysis.
- Accounting Ratios: Objectives, classification and computation.
- Liquidity Ratios: Current ratio and Quick ratio.
- Solvency Ratios: Debt to Equity Ratio, Total Asset to Debt Ratio, Proprietary Ratio and Interest Coverage Ratio.
- Activity Ratios: Inventory Turnover Ratio, Trade Receivables Turnover Ratio, Trade Payables Turnover Ratio and Working Capital Turnover Ratio.
- Profitability Ratios: Gross Profit Ratio, Operating Ratio, Operating Profit Ratio, Net Profit Ratio and Return on Investment.

### Unit 4: Cash Flow Statement

- Meaning, objectives and preparation (as per AS 3 (Revised) (Indirect Method only)

## Computerised Accounting

### Unit 5: Computerised Accounting

#### Overview of Computerised Accounting System.

- Introduction: Application in Accounting.
- Features of Computerised Accounting System.

- Structure of CAS.
- Software Packages: Generic; Specific; Tailored.

### Accounting Application of Electronic Spreadsheet.

- Concept of electronic spreadsheet.
- Features offered by electronic spreadsheet.
- Application in generating accounting information – bank reconciliation statement; asset accounting; loan
- repayment of loan schedule, ratio analysis
- Data representation – graphs, charts and diagrams.

### Using Computerized Accounting System.

- Steps in installation of CAS, codification and Hierarchy of account heads, creation of accounts.
- Data: Entry, validation and verification.
- Adjusting entries, preparation of balance sheet, profit and loss account with closing entries and opening entries. Need and security features of the system.

### Database Management System (DBMS)

- Concept and Features of DBMS.
- DBMS in Business Application.
- Generating Accounting Information – Payroll.

## CUCET 2025 Syllabus for Aptitude

- Numbers
- Percentage
- Profit and Loss
- Time and Distance
- Time and Work
- Calendar & Clocks
- Non Verbal Reasoning
- Series
- Coding – Decoding
- Syllogism
- Analogy
- Directions
- Ranking & Comparison

# CUCET 2025 Syllabus for Biology

## Unit-I Diversity of Living Organisms

The Living World Biodiversity; Need for classification; three domains of life; taxonomy and systematics; concept of species and taxonomical hierarchy; binomial nomenclature ,Biological Classification Five kingdom classification; Salient features and classification of Monera, Protista and Fungi into major groups; Lichens, Viruses and Viroids, Plant Kingdom Classification of plants into major groups; Salient and distinguishing features and a few examples of Algae, Bryophyta, Pteridophyte, Gymnospermae.

## Unit-2: Cell Structure and Function

Cell theory and cell as the basic unit of life; Structure of prokaryotic and eukaryotic cell; Plant cell and animal cell; Cell envelope' cell membrane, cell wall; Cell organelles structure and function; Endomembrane system-endoplasmic reticulum' Golgi bodies' lysosomes, vacuoles; mitochondria, ribosomes, plastids, micro bodies; Cytoskeleton' cilia flagella centrioles (ultra structure and function); Nucleus-nuclear membrane' chromatin, nucleolus. chemical constituents of living cells: Biomolecules-structure and function of proteins, carbohydrates. lipids, nucleic acids; Enzymes-rypes, properties' enzyme action' classification and nomenclature of enzymes B Cetl division: Cell cycle, mitosis, meiosis and their significance.

## Unit-3: 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 formation of fruit; special modes-apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation.

## Unit-4: 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-5: 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-6: 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 – haemophilia, colour blindness; Mendelian disorders in humans – thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

#### Unit-7: 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-8: 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-9: Human Health and Diseases

Pathogens; parasites causing human diseases (malaria, dengue, chickengunia, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ring worm) and their control; Basic concepts of immunology – vaccines; cancer, HIV and AIDS; Adolescence – drug and alcohol abuse.

## Unit-10: Plant Physiology

Photosynthesis in Higher Plants Photosynthesis as a means of autotrophic nutrition; site of photosynthesis, pigments involved in photosynthesis (elementary idea); photochemical and biosynthetic phases of photosynthesis; cyclic and non-cyclic photophosphorylation; chemiosmotic hypothesis; photorespiration; C<sub>3</sub> and C<sub>4</sub> pathways; factors affecting photosynthesis, Respiration in Plants Exchange of gases; cellular respiration - glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); energy relations - number of ATP molecules generated; amphibolic pathways; respiratory quotient, Plant - Growth and Development Seed germination; phases of plant growth and plant growth rate; conditions of growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell; plant growth regulators - auxin, gibberellin, cytokinin, ethylene, ABA.

## Unit 11: Human Physiology

Respiratory system in humans; Mechanism of breathing and its regulation in humans-Exchange of gases, transport of gases and regulation of respiration Respiratory volumes; Disorders related to respiration-Asthma Emphysema, Occupational respiratory disorders. Body fluids and circulation: composition of blood, blood groups, coagulation of blood; composition of lymph and its function; Human circulatory system-structure of human heart and blood vessels; cardiac cycle, cardiac output. ECG. Double circulation; Regulation of cardiac activity; Disorders of circulatory system-Hypertension, coronary artery disease, Angina pectoris, Heart failure. Excretory products and their elimination: Modes of excretion- Ammonotelism, ureotelism, uricotelism; Human excretory system-structure and function; Urine formation, osmoregulation; Regulation of kidney function-Renin-angiotensin, Atrial Natriuretic Factor' ADH and Diabetes insipidus; Role of other organs in excretion; Disorders; Uraemia, Renal failure, Renal calculi, Nephritis; Dialysis and artificial kidney. ' Locomotion and Movement: Types of movement- ciliary, flagellar, muscular; Skeletal muscle- contractile proteins and muscle contraction; Skeletal system and its functions; Joints; Disorders of muscular and skeletal system-Myasthenia gravis, Tetany, Muscular dystrophy, Arthritis, Osteoporosis, Gout. ' Neural control and coordination: Neuron and nerves; Nervous system in humans central nervous system, peripheral nervous system and visceral nervous system; Generation and conduction of nerve impulse; ' chemical coordination and regulation: Endocrine glands and hormones; Human endocrine system- Hypothalamus, pituitary, pineal, Thyroid, parathyroid, Adrenal, Pancreas, Gonads; Mechanism of hormone action; Role of hormones as messengers and regulators, Hypo- and hyperactivity and



rerated disorders (common disorders e.g. Dwarfism, Acromegaly, Cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease).

#### Unit-12: Microbes in Human Welfare

In household food processing, industrial production, sewage treatment, energy generation and microbes as biocontrol agents and bio fertilizers. Antibiotics; production and judicious use.

#### Unit-13: Biotechnology – Principles and processes

Genetic Engineering (Recombinant DNA Technology).

#### Unit-14: 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, bio piracy and patents.

#### Unit-15: 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-16: Ecosystem

Ecosystems: Patterns, components; productivity and decomposition; energy flow; pyramids of number, biomass, energy; nutrient cycles (carbon and phosphorous); ecological succession; ecological services – carbon fixation, pollination, seed dispersal, oxygen release (in brief).

#### Unit-17: Biodiversity and its Conservation

Concept of biodiversity; patterns of biodiversity; importance of biodiversity; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, biosphere reserves, national parks, sanctuaries and Ramsar sites.

## CUCET 2025 Syllabus for Chemistry

### Unit 1: Some Basic Concepts in Chemistry

Matter and its nature, Dalton's atomic theory; Concept of atom, molecule, element and compound; Physical quantities and their measurements in Chemistry, precision and accuracy, significant figures, S.I. Units, dimensional analysis; Laws of chemical combination; Atomic and molecular masses, mole concept, molar mass.

### Unit 2: States of Matter

Classification of matter into solid, liquid and gaseous states.

#### Gaseous State:

Measurable properties of gases; Gas laws - Boyle's law, Charles's law, Graham's law of diffusion, Avogadro's law, Dalton's law of partial pressure; Concept of Absolute scale of temperature; Ideal gas equation; Kinetic theory of gases (only postulates); Real gases, deviation from Ideal behavior, compressibility factor and van der Waals equation.

#### Solid State:

Classification of solids: molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea); Bragg's Law and its applications; Unit cell and lattices, packing in solids (fcc, bcc and hcp lattices), voids, calculations involving unit cell parameters, imperfection in solids; Electrical, magnetic and dielectric properties.

### Unit 3: Atomic Structure

Thomson and Rutherford atomic models and their limitations; Nature of electromagnetic radiation, photoelectric effect; Spectrum of hydrogen atom, Bohr model of hydrogen atom - its postulates, derivation of the relations for energy of the electron and radii of the different orbits, limitations of Bohr's model; Dual nature of matter, de-Broglie's relationship, Heisenberg uncertainty principle. Elementary ideas of quantum mechanics, quantum mechanical model of atom, its important features; various quantum numbers (principal, angular momentum and magnetic quantum numbers) and their significance; shapes of s, p and d - orbitals, electron spin and spin quantum number; Rules for filling electrons in orbitals - aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of elements (only up to Atomic Numbers 30), extra stability of half-filled and completely filled orbitals.

#### Unit 4: Chemical Bonding and Molecular Structure

Kossel - Lewis approach to chemical bond formation, concept of ionic and covalent bonds. Ionic Bonding: Formation of ionic bonds, factors affecting the formation of ionic bonds; calculation of lattice enthalpy. Covalent Bonding: Concept of electronegativity, Fajan's rule, dipole moment; Valence Shell Electron Pair Repulsion (VSEPR) theory and shapes of simple molecules. Quantum mechanical approach to covalent bonding: Valence bond theory - Its important features, concept of hybridization involving s, p and d orbitals; Resonance. Molecular Orbital Theory - Its important features, LCAOs, types of molecular orbitals (bonding, antibonding), sigma and pi-bonds, molecular orbital electronic configurations of homonuclear diatomic molecules, concept of bond order, bond length and bond energy.

#### Unit 5: Chemical Thermodynamics

Fundamentals of thermodynamics: System and surroundings, extensive and intensive properties, state functions, types of processes. First law of thermodynamics - Concept of work, heat internal energy and enthalpy, heat capacity, molar heat capacity; Hess's law of constant heat summation.

#### Unit 6: Solutions

Different methods for expressing concentration of solution - molality, molarity, mole fraction, percentage (by volume and mass both), vapour pressure of solutions and Raoult's Law - Ideal and non-ideal solutions, vapour pressure - composition, plots for ideal and non-ideal solutions; Colligative properties of dilute solutions - relative lowering of vapour pressure, depression of freezing point, elevation of boiling point and osmotic pressure; Determination of molecular mass using colligative properties; Abnormal value of molar mass, Van't Hoff factor and its significance.

#### Unit 7: Electrochemistry

Electrochemical cells - Electrolytic and Galvanic cells, different types of electrodes, electrode potentials including standard electrode potential, half - cell and cell reactions, emf of a Galvanic cell and its measurement; Nernst equation and its applications; Relationship between cell potential and Gibbs' energy change; Dry cell and lead accumulator; Fuel cells.

#### Unit 8: Chemical Kinetics

Rate of a chemical reaction, factors affecting the rate of reactions: concentration, temperature, pressure and catalyst; elementary and complex reactions, order and molecularity of reactions, rate law, rate constant and its units, differential and integral forms of zero and first order reactions, their characteristics and half - lives, effect of temperature on rate of reactions - Arrhenius theory, activation energy and its calculation, collision theory of bimolecular gaseous reactions (no derivation).

#### Unit 9: d and f Block Elements

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first-row transition metals - metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation, preparation and properties of  $K_2Cr_2O_7$  and  $KMnO_4$ .

Lanthanoids - Electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and its consequences.

Actinoids - Electronic configuration, oxidation states and comparison with lanthanoids.

#### Unit 10: Coordination Compounds

Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT; structure and stereoisomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological system).

#### Unit 11: Haloalkanes and Haloarenes.

Haloalkanes: Nomenclature, nature of C-X bond, physical and chemical properties, optical rotation mechanism of substitution reactions. Haloarenes: Nature of C-X bond, substitution reactions (Directive influence of halogen in monosubstituted compounds only). Uses and

environmental effects of - dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

#### Unit 12: Alcohols, Phenols and Ethers

Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only), identification of primary, secondary and tertiary alcohols, mechanism of dehydration, uses with special reference to methanol and ethanol. Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols. Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.

#### Unit 13: Aldehydes, Ketones and Carboxylic Acids

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes, uses. Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

#### Unit 14: Amines

Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines. Diazonium salts: Preparation, chemical reactions and importance in synthetic organic chemistry. Unit XIV: Biomolecules 12 Periods Carbohydrates - Classification (aldoses and ketoses), monosaccharides (glucose and fructose), D-L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); Importance of carbohydrates. Proteins - Elementary idea of - amino acids, peptide bond, polypeptides, proteins, structure of proteins - primary, secondary, tertiary structure and quaternary structures (qualitative idea only), denaturation of proteins; enzymes. Hormones - Elementary idea excluding structure. Vitamins - Classification and functions. Nucleic Acids: DNA and RNA. Unit 17: Hydrocarbons

Classification, isomerism, IUPAC nomenclature, general methods of preparation, properties and reactions. Alkanes - Conformations: Sawhorse and Newman projections (of ethane); Mechanism of halogenation of alkanes. Alkenes - Geometrical isomerism; Mechanism of electrophilic

addition: addition of hydrogen, halogens, water, hydrogen halides (Markownikoff's and peroxide effect); Ozonolysis and polymerization.

Alkynes - Acidic character; Addition of hydrogen, halogens, water and hydrogen halides; Polymerization. Aromatic hydrocarbons - Nomenclature, benzene - structure and aromaticity; Mechanism of electrophilic substitution: halogenation, nitration, Friedel - Craft's alkylation and acylation.

#### Unit 15: Organic Compounds Containing Halogens

Classification, isomerism, IUPAC nomenclature, general methods of preparation, properties and reactions. Alkanes - Conformations: Sawhorse and Newman projections (of ethane); Mechanism of halogenation of alkanes. Alkenes - Geometrical isomerism; Mechanism of electrophilic addition: addition of hydrogen, halogens, water, hydrogen halides (Markownikoff's and peroxide effect); Ozonolysis and polymerization.

#### Unit 16: Chemistry in Everyday Life

Chemicals in medicines - Analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamins - their meaning and common examples. Chemicals in food - Preservatives, artificial sweetening agents - common examples. Cleansing agents - Soaps and detergents, cleansing action.

## CUCET 2025 Syllabus for Chemistry (Lateral Entry)

### Unit-1: Basic Concept of Chemistry

- Physical Classification of matter -solids, liquids, gases.
- Chemical Classification of matter - element, compounds and mixtures
- Symbols of elements and valency, writing of chemical formulae of simple compounds.
- Calculation of percentage of elements in the following compounds using atomic and molecular masses of  $\text{CaCO}_3$ ,  $\text{NaCl}$ ,  $\text{CuSO}_4$ ,  $\text{NaOH}$ ,  $\text{Ca(OH)}_2$ ,  $\text{H}_2\text{SO}_4$ ,  $\text{C}_2\text{H}_2\text{O}_4$ . (Atomic mass of elements should be provided)
- Chemical equations, thermo-chemical equations, balancing of chemical equations (hit and trial method)

### Unit-2: Atomic Structure, Periodic Table and Chemical Bonding

- Fundamental particles- mass and charges of electrons, protons and neutrons with names of the scientists who discovered these fundamental particles.
- Bohr's model of atom and successes and drawbacks of Bohr's Model of atom (qualitative treatment only).
- Atomic number, atomic mass number isotopes and isobars.
- Definition of orbit and orbitals, shapes of s and p orbitals only, quantum numbers and their significance,
- Aufbau's principle, Pauli's exclusion principle and Hund's rule electronic configuration of elements with atomic number (Z) = 30 only. (Electronic configurations of elements with atomic number greater than 30 are excluded).
- Modern periodic law and periodic table, groups and periods, classification of elements into s, p, d and f blocks (periodicity in properties - excluded)
- Chemical bonding and cause of bonding and types of chemical bonding; Ionic bond (example NaCl) and Covalent bond (sigma ( $\sigma$ ) and pi ( $\pi$ ) bonds) with examples of H<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub> and CH<sub>4</sub>. Elementary idea of hybridization and its types (sp<sup>3</sup>, sp<sup>2</sup> & sp) with examples of CH<sub>4</sub> BF<sub>3</sub> & BeCl<sub>2</sub>.
- Metallic bonding- explanation with the help of electron gas (sea) model.

#### Unit-3: Solutions

- Definition of solution, solute and solvent with examples
- Methods to express the concentration of solution- molarity (M), molality (m) and normality (N) and numericals based on calculation of M, m and N
- Introduction to pH of solution, simple numericals on pH and industrial applications of pH.
- Definition of buffer solution and types of buffer solutions with examples and industrial applications of buffers solutions.

#### Unit-4: Water

- Demonstration of water resources on Earth using pie chart.
- Classification of water - soft water and hard water, action of soap on hard water, types of hardness, causes of hardness, units of hardness - mg per liter (mgL<sup>-1</sup>) and part per million (ppm) and simple numericals.
- Disadvantages caused by the use of hard water in domestic and boiler feed water.
- Removal of hardness -Permutit process and Ion-exchange process.
- Chemical analysis of water for estimation of

- Total dissolved solids (TDS)
- Alkalinity of water
- Drinking water and characteristics of drinking water.
- Natural water sterilization by chlorine and UV radiation and reverse osmosis (elementary idea).

#### Unit-5: Electro Chemistry

- Electronic concept of oxidation, reduction and redox reactions
- Faradays laws of electrolysis and simple numerical problems.
- Industrial Application of Electrolysis - Electroplating, electrolytic refining and electrometallurgy.
- Application of redox reactions in electrochemical cells - commercial dry cell (Primary), commercially used lead storage battery (Secondary cell).

#### Unit-6: Organic Chemistry

- Tetra valency and catenation property of carbon to produce huge organic compounds.
- Classification of organic compounds on the bases of functional groups
- Nomenclature of simple organic compounds in accordance with I.U.P.A.C. (compounds having two carbon atoms in a molecule belongs to alkanes, alkenes, alkynes, alkyl chlorides, alcohols, ethers, aldehydes, ketones, carboxylic acids, amines) (compounds containing more than one functional groups are excluded) and their common names (if any)

## CUCET 2025 Syllabus for Commerce

### Unit 1: Nature and Significance of Management

Management - concept, objectives and importance, Management as Science, Art and Profession, Levels of management, Management functions - planning, organizing, staffing, directing and controlling, Coordination - concept, characteristics and importance

### Unit 2: Principles of Management

Principles of Management - concept, nature and significance, Fayol's principles of management, Taylor's Scientific Management - principles and techniques



### Unit 3: Management and Business Environment

Business Environment - concept and importance, Dimensions of Business Environment - Economic, Social, Technological, Political and Legal, Impact of Government policy changes on business with special reference to liberalization, privatization and globalization in India.

### Unit 4: Planning

Concept, importance and limitations, Planning process, Single use and Standing Plans - Objectives, Strategy, Policy, Procedure, Method, Rule, Budget and Programme.

### Unit 5: Organizing

Concept and importance, Organizing Process, Structure of organization - functional and divisional, Formal and informal organization, Delegation: concept, elements and importance, Decentralization: concept and importance.

### Unit 6: Staffing

Concept and importance of staffing, Staffing as a part of Human Resource Management, Staffing process: Recruitment - sources; Selection - process, Training and Development - Concept and importance. Methods of training- on the job and off the job- Induction training, vestibule training, apprenticeship training and internship training.

### Unit 7: Directing

Concept and importance, Elements of Directing: - Supervision - concept, functions of a supervisor. - Motivation - Concept, Maslow's hierarchy of needs; Financial and non-financial incentives. - Leadership - concept, styles - authoritative, democratic and laissez faire. - Communication - concept, formal and informal communication; barriers to effective communication, how to overcome the barriers.

### Unit 8: Controlling

Concept, nature and importance, Relationship between planning and controlling, Steps in the process of control

### Unit 9: Financial Management

Concept and objectives of financial management, financial decisions: investment, financing and dividend and factors affecting, financial planning - concept and importance, Capital Structure -

concept and factors affecting, Fixed and Working Capital - concept and factors affecting their requirements.

#### Unit 10: Financial Markets

Financial Markets: concept and types, Money market and its instruments, Capital market and its types (primary and secondary), Stock Exchange - functions and trading procedure. Depository Services and Demat Account, Securities and Exchange Board of India (SEBI) - objectives and functions.

#### Unit 11: Marketing Management

Marketing - concept and functions, Marketing management philosophies, Marketing Mix - concept, Product - concept, branding, labeling and packaging. Price - factors determining price, Physical distribution- concept, channels of distribution: types, choice of channels, Promotion - concept and elements; advertising- concept, role, objections against advertising, personal selling - concept and qualities of a good salesman, sales promotion - concept and techniques, public relations - concept and role.

#### Unit 12: Consumer Protection

Concept and importance of consumer protection, Consumer Protection Act 1986, Meaning of consumer and consumer protection, Rights and responsibilities of consumers, who can file a complaint and against whom? Redressed machinery, Remedies available, Consumer awareness - Role of consumer organizations and Non-Governmental Organizations (NGOs).

#### Unit 13: Entrepreneurship Development

Concept, Functions, and Need, Entrepreneurship Characteristics and Competencies, Process of Entrepreneurship Development, Entrepreneurial Values, Attitudes, and Motivation - Meaning and Concept.

## CUCET 2025 Syllabus for Computer

#### Unit 1: Computer Fundamentals

Evolution of computers; Basics of computer and its operation: Functional Components and their inter-connections, concept of Booting, Use of Operating System for directory listing, hierarchical directory structure, renaming, deleting files/folders, formatting floppy, copying files, concepts of path and pathname, switching between tasks, installation/removal of applications; Internal

Storage encoding of Characters: ASCII, ISCII (Indian scripts Standard Code for Information Interchange), UNICODE; Types of Memory: Cache (L1, L2), Buffer, RAM (DRAM, SDRAM, RDRAM, DDRAM), ROM (PROM, EPROM), Access Time; Concepts of Accumulator, Instruction Register, and Program Counter

## Unit 2: Ms- Office

### Word Processing

Word processing concepts: saving, closing, Opening an existing document, Selecting text, Editing text, Finding and replacing text, printing documents, Creating and Printing Merged Documents, Character and Paragraph Formatting, Page Design and Layout. Editing and Profiling Tools: Checking and correcting spellings. Handling Graphics, Creating Tables and Charts, Document Templates and Wizards.

### Spreadsheet Package

Spreadsheet Concepts, Creating, Saving and Editing a Workbook, Inserting, Deleting Work Sheets, entering data in a cell / formula Copying and Moving from selected cells, handling operators in Formulae, Functions: Mathematical, Logical, statistical, text, financial, Date and Time functions, Using Function Wizard. Formatting a Worksheet: Formatting Cells – changing data alignment, changing date, number, character or currency format, changing font, adding borders and colors, Printing worksheets, Charts and Graphs – Creating, Previewing, Modifying Charts. Integrating word processor, spread sheets, web pages.

## Unit 3: Network Computing

WWW and Web Browsers: Web Browsing software, Surfing the Internet, Chatting on Internet, Basic of electronic mail, Using Emails, Document handling, Network definition, Common terminologies: LAN, WAN, Node, Host, Workstation, And bandwidth, Network Components: Servers, Clients, Communication Media.

## Unit 4: Introduction to Programming in C++

C++ character set, C++ Tokens (Identifiers, Keywords, Constants, Operators), Structure of a C++ Program (include files, main function); Header files – iostream.h, iomanip.h; cout, cin; Use of I/O operators (<< and >>), Use of endl and setw(), Cascading of I/O operators, Error Messages; Use of editor, basic commands of editor, compilation, linking and execution; standard input/output operations from C language: gets(), puts() of stdio.h header file.

## Unit 5: Java Fundamentals

Types of Programming language and Paradigms; Java – what, where and why? Platform independency; Comparison in Java with C and C++; Role of Java Programmer in Industry; Java Evolution and History ; Features of Java Language.; The Java Virtual Machine (JVM); Java's Magic Byte code; JDK , JRE and JIT; Data types; Operators; Control Statements; Arrays; Enhanced for-loop; Enumerated types; C-style formatted I/O ; Variable arguments

# CUCET 2025 Syllabus for Economics

## UNIT-1: Introduction

Meaning of microeconomics and macroeconomics

What is an economy? Central problems of an economy: what, how and for whom to produce; concepts of production possibility frontier and opportunity cost.

## UNIT-2: Consumer Equilibrium and Demand

Consumer's equilibrium – meaning of utility, marginal utility, law of diminishing marginal utility, conditions of consumer's equilibrium using marginal utility analysis.

Indifference curve analysis of consumer's equilibrium-the consumer's budget (budget set and budget line), preferences of the consumer (indifference curve, indifference map) and conditions of consumer's equilibrium.

Demand, market demand, determinants of demand, demand schedule, demand curve and its slope, movement along and shifts in the demand curve; price elasticity of demand – factors affecting price elasticity of demand; measurement of price elasticity of demand – (a) percentage-change method and (b) geometric method (linear demand curve); relationship between price elasticity of demand and total expenditure.

## UNIT-3: Producer Behaviour and Supply

Production function – Short-Run and Long-Run

Total Product, Average Product and Marginal Product.

Returns to a Factor.

Cost and Revenue: Short run costs - total cost, total fixed cost, total variable cost; Average cost; Average fixed cost, average variable cost and marginal cost-meaning and their relationship.

Revenue - total, average and marginal revenue - meaning and their relationship.

Producer's equilibrium-meaning and its conditions in terms of marginal revenue-marginal cost.

Supply, market supply, determinants of supply, supply schedule, supply curve and its slope, movements along and shifts in supply curve, price elasticity of supply; measurement of price elasticity of supply - (a) percentage change method and (b) geometric method.

#### UNIT-4: Forms of Market and Price Determination

Perfect competition - Features; Determination of market equilibrium and effects of shifts in demand and supply.

Other Market Forms - monopoly, monopolistic competition, oligopoly - their meaning and features.

Simple Applications of Demand and Supply: Price ceiling, price floor.

#### UNIT-5: National Income and related aggregates

Some basic concepts: consumption goods, capital goods, final goods, intermediate goods; stocks and flows; gross investment and depreciation.

Circular flow of income; Methods of calculating National Income - Value Added or Product method, Expenditure method, Income method.

Aggregates related to National Income: Gross National Product (GNP), Net National Product (NNP), Gross and Net Domestic Product (GDP and NDP) - at market price, at factor cost; National Disposable Income (gross and net), Private Income, Personal Income and Personal Disposable Income; Real and Nominal GDP. GDP and Welfare.

#### UNIT-6: Money and Banking

Money - its meaning and functions.

Supply of money - Currency held by the public and net demand deposits held by commercial banks.

Money creation by the commercial banking system.

Central bank and its functions (example of the Reserve Bank of India): Bank of issue, Govt. Bank, Banker's Bank, Controller of Credit through Bank Rate, CRR, SLR, Repo Rate and Reverse Repo Rate, Open Market Operations, Margin requirement.

#### UNIT-7: Determination of Income and Employment

Aggregate demand and its components. Propensity to consume and propensity to save (average and marginal).

Short-run equilibrium output; investment multiplier and its mechanism.

Meaning of full employment and involuntary unemployment.

Problems of excess demand and deficient demand; measures to correct them - change in government spending, taxes and money supply.

#### UNIT-8: Government Budget and the Economy

Government budget - meaning, objectives and components.

Classification of receipts - revenue receipts and capital receipts; classification of expenditure - revenue expenditure and capital expenditure.

Measures of government deficit - revenue deficit, fiscal deficit, primary deficit their meaning.

#### UNIT-9: Balance of Payments

Balance of payments account - meaning and components; balance of payments deficit-meaning.

Foreign exchange rate - meaning of fixed and flexible rates and managed floating.

Determination of exchange rate in a free market.

## CUCET 2025 Syllabus for English

This test is designed to assess the test takers' general proficiency in the use of English language as a means of self-expression in real life situations and specifically to test the test takers' knowledge of basic grammar, their vocabulary, their ability to read fast and comprehend, and also their ability to apply the elements of effective writing.

#### UNIT 1: Grammar

Agreement, Time and Tense, Parallel construction, Relative pronouns, Determiners, Prepositions, Modals, Adjectives, Voice, Transformation, Question tags, Phrasal verbs.

#### UNIT 2: Vocabulary

Synonyms, Antonyms, Odd Word, One Word, Jumbled letters, Homophones, Spelling, Contextual meaning, Analogy.

### UNIT 3: Reading Comprehension

Content/ideas, Vocubular, Referents, Idioms/Phrases, Reconstruction (rewording).

### UNIT 4: Composition

Rearrangement, Paragraph Unity, Linkers/Connectives.

## CUCET 2025 Syllabus for General Knowledge

- Nation & States
- Sobriquets or epithets
- Country, Capital & Currencies
- Sports
- Inventions
- Books and Authors
- Basic General Knowledge
- Famous Personalities
- Awards and Honours
- World Geography
- Famous Places in India
- Days and Years
- World Organizations
- Teaching and Research
- Environment Science
- Abbreviations
- Nation & States
- Government Schemes
- Business, Economy & Banking
- Defence
- Reports and Indices
- Environment & Biodiversity
- Awards, Honours & Persons in News
- Places in News
- Important Days and Events
- Sports
- Science & Technology
- Summits and Conference in
- International Gk
- Art & Culture etc.

## CUCET 2025 Syllabus for General Studies

- Science and Society
- Contemporary Problems of Indian Society
- Cultural Heritage of India
- India's Freedom Struggle
- Constitutional Values
- Human Rights

## CUCET 2025 Syllabus for Geography

This test is designed to assess the test takers' general proficiency in the use of Geographical terms as a means of Geographical Phenomena's in real life situations and specifically to test the test takers' knowledge of basic geographical terms, their Knowledge, their ability to understand, and also their ability to apply the elements of Geographical Phenomena.

### UNIT 1: Nature and Scope and Branches of Geography

Nature and Scope of Geography, Various Branches of Geography and their relationship and its application. Basic Terms related with Population and Migration.

### UNIT 2: Different Geographical Traits of Geography

Social, Economical, Cultural and Political aspects of Geography.

### UNIT 3: Terms related to Physical Geography

Biogeography, Oceanography, Urban rural and Economic Geography.

### UNIT 4: Different Physical and Geomorphologic Features

Rocks, Volcanoes, Earthquake, Tides ,Coral reefs and types of Air masses and Jet streams  
Cyclones and Rainfall and its types.

## CUCET 2025 Syllabus for Hindi



खण्ड	विषय	
(क)	अपठित अंश	
	1.	अपठित गद्यांश - बोध (गद्यांश पर आधारित बोध, प्रयोग, रचनांतरण, शीर्षक आदि पर लघूत्तरात्मक प्रश्न [शीर्षक पर प्रश्न (1 अंक) + 7 लघूत्तरात्मक (2x7)]
	2.	अपठित काव्यांश-बोध (काव्यांश पर आधारित पाँच लघूत्तरात्मक प्रश्न) (1x5)
(ख)	कार्यालयी हिंदी और रचनात्मक लेखन	
	3.	किसी एक विषय पर निबंध
	4.	कार्यालयी पत्र
	5.	प्रिंट माध्यम, सम्पादकीय, रिपोर्ट, आलेख आदि पर पाँच अतिलघूत्तरात्मक प्रश्न
	6.	किसी एक विषय पर आलेख अथवा हाल ही में पढ़ी पुस्तक की समीक्षा
	7.	जीवन-संदर्भों से जुड़ी घटनाओं और स्थितियों पर फीचर लेखन
(ग)	पाठ्यपुस्तक	
	1)	आरोह भाग-2
	अ)	काव्य भाग
	8.	दो काव्यांशों में से किसी एक पर अर्थग्रहण के चार प्रश्न (2x4)
	9.	काव्यांश के सौंदर्यबोध पर किसी एक काव्यांश पर तीन प्रश्न (2x3)
	10.	कविताओं को विषय-वस्तु से संबंधित दो लघूत्तरात्मक प्रश्न (3+3) लघु
	ब)	गद्य भाग-2 (पूरक पाठ्य पुस्तक)
	11.	एक गद्यांश पर आधारित अर्थग्रहण के चार प्रश्न (2+2+2+2)
	12.	पाठों की विषयवस्तु पर आधारित चार बोधात्मक प्रश्न (3+3+3+3)
	2)	वितान भाग-2
	13.	पाठों की विषयवस्तु पर आधारित एक मूल्यपरक प्रश्न (1x5)
	14.	विषयवस्तु पर आधारित दो निबंधात्मक प्रश्न (5+5)

## CUCET 2025 Syllabus for History

- The Story of the First Cities: Harappan %Archaeology
- Political and Economic History: How Inscriptions tell a story
- Social Histories: Using the Mahabharata
- A History of Buddhism: Sanchi Stupa

- Agrarian Relations: The Ain-i- Akbari
- The Mughal Court: Reconstructing Histories through Chronicles
- New Architecture: Hampi
- Religious Histories: The Bhakti-Sufi tradition
- Medieval Society Through Travellers' Accounts
- Colonialism and-Rural Society: Evidence from Official Reports
- Representations of 1857
- Colonialism and Indian Towns: Town Plans and Municipal Reports
- Mahatma Gandhi through Contemporary %Eyes
- Partition through Oral Sources
- The Making of the Constitution

## CUCET 2025 Syllabus for Legal Studies

### Legal aptitude

- Indian Constitution
- Indian polity
- Legal reasoning
- Legal Maxims

### General Studies

- History
- Environment
- Geography
- Economics
- Polity
- General Science
- General Knowledge etc. up to class - 12th level

### Current affairs

Current events of national and international importance with special focus on legal aspects

### Reasoning

- Puzzle
- Sets
- Number-series
- Logical patterns

- blood relations

## CUCET 2025 Syllabus for Logical Reasoning

- Coding Decoding
- Direction Sense
- Clocks & Calendars
- Syllogism
- Cubes & Dice
- Alphabetical Series
- Blood Relation
- Input-Output
- Seating Arrangement
- Inequalities
- Mirror Image
- Water Image
- Embedded Images
- Non-Verbal Analogy
- Non-Verbal Series
- Pattern Completion
- Analogy
- Odd one out
- Paper Folding
- Paper Cutting & Folding
- Symboperations

## CUCET 2025 Syllabus for Mathematics

Unit 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 one, into and onto functions, composition of functions.

#### Unit 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.

#### Unit 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. Ad joint 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.

#### Unit 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.

#### Unit 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 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 upto two. Rolle's and Lagrange's Mean Value Theorems.

#### Unit 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 limit of a sum. Properties of definite integrals. Evaluation of definite integrals, determining areas of the regions bounded by simple curves in standard form.

#### Unit 8: Differential Equations:

Ordinary differential equations, their order and degree. Formation of differential equations. Solution of differential equations by the method of separation of variables, solution of homogeneous and linear differential equations of the type:  $dy + p(x)y = q(x)dx$

#### Unit 9: Coordinate Geometry:

Cartesian system of rectangular coordinates in a plane, distance formula, section formula, locus and its equation, slope of a line, parallel and perpendicular lines, intercepts of a line on the coordinate axes.

#### Straight lines

Various forms of equations of a line, intersection of lines, angles between two lines, conditions for concurrence of three lines, distance of a point from a line, equations of internal and external bisectors of angles between two lines, equation of family of lines passing through the point of intersection of two lines.

#### Circles, conic sections

Standard form of equation of a circle, general form of the equation of a circle, its radius and center, equation of a circle when the end points of a diameter are given, points of intersection of a line and a circle with the center at the origin and condition for a line to be tangent to a circle, equation of the tangent.

#### Unit 10: Three-Dimensional Geometry:

Coordinates of a point in space, distance between two points, section formula, direction ratios and direction cosines, angle between two intersecting lines. Skew lines, the shortest distance between them and its equation. Equations of a line and a plane in different forms, intersection of a line and a plane, coplanar lines.

#### Unit 11: Vector Algebra:

Vectors and scalars, addition of vectors, components of a vector in two dimensions and three-dimensional space, scalar and vector products, scalar and vector triple product.

#### Unit 12: Statistics and Probability:

Measures of Dispersion: Calculation of mean, median, mode of grouped and ungrouped data calculation of standard deviation, variance and mean deviation for grouped and ungrouped data.

Probability: Probability of an event, addition and multiplication theorems of probability, Baye's theorem, probability distribution of a random variate, Bernoulli trials and Binomial distribution.

Unit 13: Trigonometry:

Trigonometrical identities and equations. Trigonometrical functions. Inverse trigonometrical functions and their properties. Heights and Distances. Positive and negative angles. Measuring angles in radians and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity  $\sin^2x + \cos^2x = 1$ , for all  $x$ . Signs of trigonometric functions. Domain and range of trigonometric functions and their graphs. Expressing  $\sin(x \pm y)$  and  $\cos(x \pm y)$  in terms of  $\sin x$ ,  $\sin y$ ,  $\cos x$  &  $\cos y$  and their simple applications. Deducing identities like the following:  $\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}$ ,  $\cot(x \pm y) = \frac{\cot x \cot y \mp 1}{\cot y \pm \cot x}$   $\sin \alpha \pm \sin \beta = 2 \sin \frac{1}{2}(\alpha \pm \beta) \cos \frac{1}{2}(\alpha \mp \beta)$   $\cos \alpha + \cos \beta = 2 \cos \frac{1}{2}(\alpha + \beta) \cos \frac{1}{2}(\alpha - \beta)$   $\cos \alpha - \cos \beta = -2 \sin \frac{1}{2}(\alpha + \beta) \sin \frac{1}{2}(\alpha - \beta)$  Identities related to  $\sin 2x$ ,  $\cos 2x$ ,  $\tan 2x$ ,  $\sin 3x$ ,  $\cos 3x$  and  $\tan 3x$

## CUCET 2025 Syllabus for Mathematics (Lateral Entry)

Unit-1: Algebra

- Complex Numbers: Complex number, representation, modulus and amplitude.
- Basics and properties of logarithms.
- Partial fractions (linear factors, repeated linear factors, non-reducible quadratic factors excluding repeated factors).
- Meaning of  $nPr$  &  $nCr$  (mathematical expression). Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof), first and second binomial approximation with applications to engineering problems.
- Determinants and Matrices - Expansion of determinants (upto 3rd order, using properties and otherwise), solution of equations (upto 3 unknowns) by Cramer's rule, definition of Matrices with types, addition, subtraction and multiplication of matrices (upto 3rd order), Minors and Co-factors, inverse of a Matrix by Adjoint method (upto 3rd

order), solution of simultaneous equations (upto 3rd order) by Matrix method. Area of a triangle using determinants.

#### Unit-2: Trigonometry

- Concept of angle, measurement of angle in degrees, grades and radians and their conversions.
- T-Ratios of Allied angles (without proof), Sum, Difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T-Ratios of multiple angles, sub-multiple angles ( $2A$ ,  $3A$ ,  $A/2$ ).
- Applications of Trigonometric terms in engineering problems such as to find an angle of elevation, height, distance etc.

#### Unit-3: Co-ordinate Geometry

- Cartesian and Polar coordinates (two dimensional), conversion from Cartesian to Polar coordinates and vice-versa
- Slope of a line, equation of straight line in various standards forms (without proof); (slope intercept form, intercept form, one-point form, two-point form, symmetric form, normal form, general form), inter section of two straight lines, concurrency of lines, angle between straight lines, parallel and perpendicular lines, perpendicular distance formula, conversion of general form of equation to the various forms.
- General equation of a circle and its characteristics. To find the equation of a circle, given:

## CUCET 2025 Syllabus for ME-Automobile Engineering

#### Unit-1

- Engineering Mechanics: Free-body diagrams and equilibrium; friction and its applications including rolling friction, belt-pulley, brakes, clutches, screw jack, wedge, vehicles, etc.; trusses and frames; virtual work; kinematics and dynamics of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations; Lagrange's equation.
- Mechanics of Materials: Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; concept of shear centre; deflection of beams; torsion of circular shafts; Euler's theory of columns; energy methods; thermal stresses;

strain gauges and rosettes; testing of materials with universal testing machine; testing of hardness and impact strength.

#### Unit-2

- Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.
- Vibrations: Free and forced vibration of single degree of freedom systems, effect of damping; vibration isolation; resonance; critical speeds of shafts.
- Machine Design: Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.

#### Unit-3

- Fluid Mechanics: Fluid properties; fluid statics, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends and fittings; basics of compressible fluid flow.

#### Unit-4

- Heat-Transfer: Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan- Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis
- Thermodynamics: Thermodynamic systems and processes; properties of pure substances, behavior of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics;



thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.

- Applications: Power Engineering: Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. I.C. Engines: Air-standard Otto, Diesel and dual cycles. Refrigeration and air-conditioning: Vapour and gas refrigeration and heat pump cycles; properties of moist air, psychrometric chart, basic psychrometric processes. Turbomachinery: Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines; steam and gas turbines.

#### Unit-5

- Engineering Materials: Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials.
- Casting, Forming and Joining Processes: Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding.

#### Unit-6

- Machining and Machine Tool Operations: Mechanics of machining; basic machine tools; single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, jigs and fixtures; abrasive machining processes; NC/CNC machines and CNC programming.
- Metrology and Inspection: Limits, fits and tolerances; linear and angular measurements; comparators; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly; concepts of coordinate-measuring machine (CMM).
- Computer Integrated Manufacturing: Basic concepts of CAD/CAM and their integration tools; additive manufacturing.

## CUCET 2025 Syllabus for ME-CSE

#### SUBJECT -1: DIGITAL LOGIC AND CIRCUITS

Boolean Algebra, Logic Gates, Number Representation , Minimization , Multiplexers, Decoders, Encoders, Shift Registers, Minimization. Number representations and computer arithmetic (fixed and floating point), Combinational and sequential circuits.

#### SUBJECT -2: COMPUTER ORGANIZATION AND ARCHITECTURE

Machine instructions and addressing modes, ALU, data-path and control unit, Instruction pipelining, pipeline hazards.

Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode), Associative Memory

#### SUBJECT -3: DATA STRUCTURES & PROGRAMMING

Programming in C/C++ -Procedural Approach/Object Oriented Programming Approach. Concept of Classes, Objects, Inheritance, Polymorphism, File handling, Constructors .

Data structures : Arrays, Link lists, Types of Link Lists, Recursion, Stacks , Queues, Trees: Binary tree, Binary search tree, AVL, Heaps, Red black trees, Graphs , Pointers , Array of Pointers

#### SUBJECT -4: ALGORITHMS

Asymptotic Notations: Best Case , Average Case & Worst Case, Space Complexity & Time Complexity. Problem Solving Approaches : Divide & conquer ,Greedy, Dynamic. Graph Traversals: DFS, BFS, Minimum Spanning Tree : Prims , Shortest Path Algorithms: Kruskal, Dijkstra, Floyd Warshal. Searching, Hashing & Sorting : Insertion Sort, Selection Sort , Quick Sort, Merge Sort, Counting Sort, Heap Sort, Pattern Matching Algorithms : KMP, Naïve , Rabin Karp, Suffix trees

#### SUBJECT -5: THEORY OF COMPUTATION

Regular expressions, Finite automata. Context-free grammars and push-down automata. Regular and context-free languages, pumping lemma. Turing machines and undecidability

#### SUBJECT -6: COMPILER DESIGN

Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation. Local optimization, Data flow analyses: constant propagation, liveness analysis, common subexpression elimination.

#### SUBJECT -7: OPERATING SYSTEM

Need for Operating System, Functions, Multi programming System, Multi-tasking system, Interrupts, Process , Thread , Process State, process Scheduling: Preemptive , Non-Preemptive, Inter-process Communication : Semaphores, CPU Scheduling , I/O Scheduling, Deadlock: Bankers Algorithm, Disk Scheduling, RAID structure, Memory Management , Virtual Memory

#### SUBJECT -8: DATABASE MANAGEMENT SYSTEMS

ER-model. Relational model: relational algebra: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations: JOIN and DIVISION; Additional Relational Operations; the Tuple Relational Calculus; the Domain Relational Calculus, tuple calculus, SQL. Integrity constraints, normal forms. Transactions and concurrency control. File organization, indexing (e.g., B and B+ trees), Database Recovery Techniques

#### SUBJECT -9: COMPUTER NETWORKS

OSI and TCP Layer Model, Simplex, half duplex, Full-duplex, Circuit Switching and Packet Switching, Functions of OSI Model layers , Data Link Layer : Framing , Error Detection , IP addressing , Subnet Mask, IPv4, Classless Addressing, Network Address Translation , Routing Algorithms : Dijkstra, Flooding, IP Protocols : ARP,DHCP, RARP, Transport Layer, sockets , Connection less and Connection Oriented Service: TCP, UDP, , Application Layer Protocols: SMPT, HTTP, FTP etc.

#### SUBJECT -10: ENGINEERING MATHEMATICS

Discrete Mathematics: Propositional and first order logic. Monoids, Groups. Graphs: connectivity, matching, coloring. Sets, relations, functions, partial orders and lattices. Combinatorics: counting, recurrence relations, generating functions. Linear Algebra: Matrices, determinants, system of linear equations, eigenvalues and eigenvectors, LU decomposition. Calculus: Limits, continuity and differentiability. Maxima and minima. Mean value theorem. Integration. Probability and Statistics: Random variables. Uniform, normal, exponential, Poisson and binomial distributions. Mean, median, mode and standard deviation. Conditional probability and Bayes theorem. Computer Science and Information Technology

# CUCET 2025 Syllabus for ME-Civil Engineering

## Structural Engineering

- Engineering Mechanics: System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Frictions and its applications; Centre of mass; Free Vibrations of undamped SDOF system.
- Solid Mechanics: Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, Transformation of stress; buckling of column, combined and direct bending stresses.
- Structural Analysis: Statically determinate and indeterminate structures by force/energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis.
- Construction Materials and Management: Construction Materials: Structural Steel – Composition, material properties and behaviour; Concrete – Constituents, mix design, short-term and long-term properties. Construction Management: Types of construction projects; Project planning and network analysis – PERT and CPM; Cost estimation.
- Concrete Structures: Working stress and Limit state design concepts; Design of beams, slabs, columns; Bond and development length; Prestressed concrete beams.
- Steel Structures: Working stress and Limit state design concepts; Design of tension and compression members, beams and beam- columns, column bases; Connections – simple and eccentric, beam-column connections, plate girders and trusses; Concept of plastic analysis –beams and frames.

## Geotechnical Engineering

- Soil Mechanics: Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability – one dimensional flow, Seepage through soils – two – dimensional flow, flow nets, uplift pressure, piping, capillarity, seepage force; Principle of effective stress and quicksand condition;

Compaction of soils; One- dimensional consolidation, time rate of consolidation; Shear Strength, Mohr's circle, effective and total shear strength parameters, Stress-Strain characteristics of clays and sand; Stress paths.

- Foundation Engineering: Sub-surface investigations - Drilling bore holes, sampling, plate load test, standard penetration and cone penetration tests; Earth pressure theories - Rankine and Coulomb; Stability of slopes - Finite and infinite slopes, Bishop's method; Stress distribution in soils - Boussinesq's theory; Pressure bulbs, Shallow foundations - Terzaghi's and Meyerhoff's bearing capacity theories, effect of water table; Combined footing and raft foundation; Contact pressure; Settlement analysis in sands and clays; Deep foundations - dynamic and static formulae, Axial load capacity of piles in sands and clays, pile load test, pile under lateral loading, pile group efficiency, negative skin friction.

#### Water Resources Engineering

- Fluid Mechanics: Properties of fluids, fluid statics; Continuity, momentum and energy equations and their applications; Potential flow, Laminar and turbulent flow; Flow in pipes, pipe networks; Concept of boundary layer and its growth; Concept of lift and drag.
- Hydraulics: Forces on immersed bodies; Flow measurement in channels and pipes; Dimensional analysis and hydraulic similitude; Channel Hydraulics - Energy-depth relationships, specific energy, critical flow, hydraulic jump, uniform flow, gradually varied flow and water surface profiles.
- Hydrology: Hydrologic cycle, precipitation, evaporation, evapo-transpiration, watershed, infiltration, unit hydrographs, hydrograph analysis, reservoir capacity, flood estimation and routing, surface run- off models, ground water hydrology - steady state well hydraulics and aquifers; Application of Darcy's Law.
- Irrigation: Types of irrigation systems and methods; Crop water requirements - Duty, delta, evapo- transpiration; Gravity Dams and Spillways; Lined and unlined canals, Design of weirs on permeable foundation; cross drainage structures.

#### Environmental Engineering

- Water and Waste Water Quality and Treatment: Basics of water quality standards - Physical, chemical and biological parameters; Water quality index; Unit processes and operations; Water requirement; Water distribution system; Drinking water treatment.

- Sewerage system design, quantity of domestic wastewater, primary and secondary treatment. Effluent discharge standards; Sludge disposal; Reuse of treated sewage for different applications.
- Air Pollution: Types of pollutants, their sources and impacts, air pollution control, air quality standards, Air quality Index and limits.
- Municipal Solid Wastes: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

#### Transportation Engineering

- Transportation Infrastructure: Geometric design of highways - cross-sectional elements, sight distances, horizontal and vertical alignments.
- Geometric design of railway Track – Speed and Cant.
- Concept of airport runway length, calculations and corrections; taxiway and exit taxiway design.
- Highway Pavements: Highway materials - desirable properties and tests; Desirable properties of bituminous paving mixes; Design factors for flexible and rigid pavements; Design of flexible and rigid pavement using IRC codes
- Traffic Engineering: Traffic studies on flow and speed, peak hour factor, accident study, statistical analysis of traffic data; Microscopic and macroscopic parameters of traffic flow, fundamental relationships; Traffic signs; Signal design by Webster's method; Types of intersections; Highway capacity.

#### Geomatics Engineering

- Principles of surveying; Errors and their adjustment; Maps - scale, coordinate system; Distance and angle measurement - Levelling and trigonometric levelling; Traversing and triangulation survey; Total station; Horizontal and vertical curves. Photogrammetry and Remote Sensing - Scale, flying height; Basics of remote sensing and GIS.

## CUCET 2025 Syllabus for ME-ECE

### Section 1:

- Networks, Signals and Systems Circuit analysis: Node and mesh analysis, superposition, Thevenin's theorem, Norton's theorem, reciprocity. Sinusoidal steady state analysis: phasors, complex power, maximum power transfer.
- Time and frequency domain analysis of linear circuits: RL, RC and RLC circuits, solution of network equations using Laplace transform. Linear 2-port network parameters, wye-delta transformation. Continuous-time signals: Fourier series and Fourier transform, sampling theorem and applications.
- Discrete-time signals: DTFT, DFT, z-transform, discrete-time processing of continuous-time signals. LTI systems: definition and properties, causality, stability, impulse response, convolution, poles and zeroes, frequency response, group delay, phase delay.

#### Section 2:

- Analog Circuits Diode circuits: - clipping, clamping and rectifiers. BJT and MOSFET amplifiers: biasing, ac coupling, small signal analysis, frequency response. Current mirrors and differential amplifiers. Op-amp circuits: Amplifiers, summers, differentiators, integrators, active filters, Schmitt triggers and oscillators.

#### Section 3:

- Digital Circuits Number representations: binary, integer and floating-point- numbers.
- Combinatorial circuits: Boolean algebra, minimization of functions using Boolean identities and Karnaugh map, logic gates and their static CMOS implementations, arithmetic circuits, code converters, multiplexers, decoders.
- Sequential circuits: latches and flip-flops, counters, shift-registers, finite state machines, propagation delay, setup and hold time, critical path delay. Data converters: sample and hold circuits, ADCs and DACs.
- Semiconductor memories: ROM, SRAM, DRAM. Computer organization: Machine instructions and addressing modes, ALU, data-path and control unit, instruction pipelining.

#### Section 4:

- Communications Random processes autocorrelation and power spectral density, properties of white noise, filtering of random signals through LTI systems.

- Analog communications: amplitude modulation and demodulation, angle modulation and demodulation, spectra of AM and FM, superheterodyne receivers. Information theory: entropy, mutual information and channel capacity theorem.
- Digital communications: PCM, DPCM, digital modulation schemes (ASK, PSK, FSK, QAM), bandwidth, inter-symbol interference, MAP, ML detection, matched filter receiver, SNR and BER. Fundamentals of error correction, Hamming codes, CRC. (100)

#### Section 5:

- Electromagnetics Maxwell's equations: differential and integral forms and their interpretation, boundary conditions, wave equation, Poynting vector. Plane waves and properties: reflection and refraction, polarization, phase and group velocity, propagation through various media, skin depth.
- Transmission lines: equations, characteristic impedance, impedance matching, impedance transformation, S-parameters, Smith chart. Rectangular and circular waveguides, light propagation in optical fibers, dipole and monopole antennas, linear antenna arrays.

## CUCET 2025 Syllabus for ME - Electrical Engineering

### Electric circuits

Network elements- ideal voltage and current sources, dependent sources, R, L, C, M elements; Network solution methods: KCL, KVL, Node and Mesh analysis; Network Theorems: Thevenin's, Norton's, Superposition and Maximum Power Transfer theorem; Transient response of dc and ac networks, sinusoidal steady-state analysis, resonance, two port networks, balanced three phase circuits, star-delta transformation, complex power and power factor in ac circuits.

### Electromagnetic Fields

Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric field and potential due to point, line, plane and spherical charge distributions, Effect of dielectric medium, Capacitance of simple configurations, Biot-Savart's law, Ampere's law, Curl, Faraday's law, Lorentz force, Inductance, Magnetomotive force, Reluctance, Magnetic circuits, Self and Mutual inductance of simple configurations.



## Signals and Systems

Representation of continuous and discrete time signals, shifting and scaling properties, linear time invariant and causal systems, Fourier series representation of continuous and discrete time periodic signals, sampling theorem, Applications of Fourier Transform for continuous and discrete time signals, Laplace Transform and Z transform. R.M.S. value, average value calculation for any general periodic waveform.

## Electrical Machines

Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three-phase transformers: connections, vector groups, parallel operation; Auto-transformer, Electromechanical energy conversion principles; DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics, speed control of dc motors; Three-phase induction machines: principle of operation, types, performance, torque-speed characteristics, no-load and blocked-rotor tests, equivalent circuit, starting and speed control; Operating principle of single-phase induction motors; Synchronous machines: cylindrical and salient pole machines, performance and characteristics, regulation and parallel operation of generators, starting of synchronous motors; Types of losses and efficiency calculations of electric machines.

## Power Systems

Basic concepts of electrical power generation, ac and dc transmission concepts, Models and performance of transmission lines and cables, Economic Load Dispatch (with and without considering transmission losses), Series and shunt compensation, Electric field distribution and insulators, Distribution systems, Per-unit quantities, Bus admittance matrix, Gauss- Seidel and Newton-Raphson load flow methods, Voltage and Frequency control, Power factor correction, Symmetrical components, Symmetrical and unsymmetrical fault analysis, Principles of over-current, differential, directional and distance protection; Circuit breakers, System stability concepts, Equal area criterion.

## Control Systems

Mathematical modeling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady-state analysis of linear time invariant systems, Stability analysis using Routh-Hurwitz and Nyquist criteria, Bode plots, Root

loci, Lag, Lead and Lead-Lag compensators; P, PI and PID controllers; State space model, Solution of state equations of LTI systems.

#### Electrical and Electronic Measurements

Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers, Digital voltmeters and multimeters, Phase, Time and Frequency measurement; Oscilloscopes, Error analysis.

#### Analog and Digital Electronics

Simple diode circuits: clipping, clamping, rectifiers; Amplifiers: biasing, equivalent circuit and frequency response; oscillators and feedback amplifiers; operational amplifiers: characteristics and applications; single stage active filters, Active Filters: Sallen Key, Butterworth, VCOs and timers, combinatorial and sequential logic circuits, multiplexers, demultiplexers, Schmitt triggers, sample and hold circuits, A/D and D/A converters.

#### Power Electronics

Static V-I characteristics and firing/gating circuits for Thyristor, MOSFET, IGBT; DC to DC conversion: Buck, Boost and Buck-Boost Converters; Single and three-phase configuration of uncontrolled rectifiers; Voltage and Current commutated Thyristor based converters; Bidirectional ac to dc voltage source converters; Magnitude and Phase of line current harmonics for uncontrolled and thyristor based converters; Power factor and Distortion Factor of ac to dc converters; Single-phase and three-phase voltage and current source inverters, sinusoidal pulse width modulation.

## CUCET 2025 Syllabus for ME - Mechanical Engineering

### APPLIED THERMODYNAMICS (ATD)

Steam Generators - Boiler Classification, boiler performance-equivalent evaporation, boiler efficiency, boiler trial and heat balance; Types of draught and Calculation of chimney height. Impulse Steam Turbines - Introduction, Classification of steam turbine, Pressure and velocity variation, Condensers - Introduction, Classification, Parts of steam condensing plant. Air Compressor - Construction and working of reciprocating air compressor, Single stage compression, Multi-stage compression with & without inter-cooling, P-V & T-S diagrams of Single

## HEAT TRANSFER (HT)

Heat Conduction - Introduction to Conduction, Fourier law, Thermal resistance, thermal diffusivity, thermal conductivity and diffusivity comparison, measurement of thermal conductivity, Theory of Extended surfaces - Introduction to fins, type of fins, uniform and varying cross-sectional area, Heat Convection - Introduction to natural and forced convection, momentum and energy equation, dimensional analysis, dimensional less parameter and their significance, free and force convection Radiation - Introduction, laws of radiation, intensity of radiation, radiating surfaces ,diffuse surface Heat Exchangers - Introduction and classification,

## REFRIGERATION AND AIR -CONDITIONING (RAC)

Vapour Compression and Air Cycle Refrigeration - Review of thermodynamic principles of refrigeration Vapour

## Manufacturing technology and process:

Introduction to manufacturing processes: introduction of metal forming, machining, casting & joining processes. Need of un-conventional manufacturing processes. Machine Tools and Machining Operations Basic of Machine Tools: Classification of cutting tools as single point cutting tool & multi point cutting tool, Tool signature; Tool Materials, Non-Traditional Machining, Thermal Energy Techniques : Electron beam machining, Plasma Arc Machining and laser beam machining

## Theory of machine (TOM)

Machines and Mechanisms - Introduction to Kinematics and Dynamics, Mechanisms and Machines, Kinematic links, joints, Pairs, types of motion, Kinematic Chains, Kinematic Inversion, Grashof's criterion. Plane motion of a rigid body, Belt, Rope and Chain. Cams - Types of cams, Types of followers, Displacement, Velocity and, Acceleration. Gyroscope - Principle of gyroscopic couple, effect of gyroscopic couple and centrifugal force on aero planes, Gear - Gear terminology, law of gearing, Path of contact. Arc of contact, Interference in involute gears. Methods of avoiding interference, Back lash. Comparison of involute and cycloidal teeth. Profile Modification. Brake, Clutch and Dynamometers

## Engineering Mechanics (EM) and Strength of Material (SOM)

Simple stress and strain - Introduction to stress, strain and their types. Stress-strain curves for brittle and ductile materials, Hooke's law, elastic limit, elastic constants: Poisson's Ratio, modulus of elasticity. Factor of safety, Compound stresses & strains, Shear force and bending moment - Types of beams and loadings, support reactions, Shear stresses - Shear stress

Machine design (MD)

Springs: Types of springs, Design, Belt, rope and chain drives: Design of belt drives, Flat & V-belt drives, Conditions for Transmission of max. Power, Selection of belt, design of rope drives. Bearings : Design of pivot and collar bearing Clutches & Brakes: Various types of clutches in use, Design of friction clutches, Disc, multidisc and Cone type. Flywheel: Turning Moment diagram, Coefficient of fluctuation of energy and speed, design of flywheel Gears: Classification, Selection of gears, Terminology of gears, Force analysis, Selection of material for gears

Industrial Production Engineering and CIM

Product Design and Development: Quality and cost considerations, Work System Design: Method study, Micro-motion study, Facility Design: Types of plant layout and their evaluation; Computer aided layout design techniques; Assembly line balancing; Materials handling systems. Operation Research: Linear programming Engineering Economy and Costing, Production control: Forecasting techniques - causal and time series models, moving average, Gantt chart, CPM, PERT and GERT. Introduction to Robotics: Types and components of a robot, Classification of robots, Definition of mechanisms and manipulators, Degrees of Freedom Sensors: Contact and Proximity, Position, Velocity, Force, Tactile etc. Robot Control: Basics of control: open loop-closed loop, Transfer functions, Control laws: P, PD, PID Linear and Non-linear controls

## CUCET 2025 Syllabus for Philosophy

This test is designed to assess the test takers' general proficiency in the use of Philosophical terms as a means of Philosophical concepts in real life situations and specifically to test, the test takers' knowledge of basic philosophical terms, their knowledge, their ability to understand, and also their ability to apply the elements of Philosophical Phenomena.

UNIT 1: Nature and Scope and Branches of Philosophy

Classical Indian philosophy: Concepts of Vedic and Upanishidic period-(i) RTA, (ii) Vedas, (iii) Yajna (iv) RNA(v) Karma and Moksha. Cārvāka School of Indian Philosophy: materialism and hedonism. Yoga philosophy: nature of yoga, kinds of yoga, eight-fold path, psychology of Yoga, consciousness. Contemporary Indian philosophy: Gandhi- truth, non-violence, satyagrah, swaraj, critique of civilization; Jyotibha Phule- critical understanding of Caste system.

#### UNIT 2: Philosophy and Science

Relation of philosophy with science and religion, Branches of Philosophy: Metaphysics, Epistemology, Axiology, aesthetics. Classical western philosophy: pre-Socrates Philosophers- Thales, Anaxagoras, Anaximenes, Pythagoras, Parmenides, Heraclitus. Modern philosophy: Descartes, Spinoza. Applied ethics: meaning, domains: technology ethics, environmental ethics, medical ethics, professional ethics, legal ethics, philosophical counselling.

#### UNIT 3: Logic and Reasoning

Logic: meaning, scope, uses, logic as science and art, Logic and psychology, Logic and Grammar, fundamental laws of thought, Terms and division. Proposition and its divisions: meaning, divisions- fourfold division of proposition, Euler's Circles, Venn's diagrams, distribution of terms. Inference: meaning, kinds, square of opposition, Fallacies. Symbolic Logic: Need, value, truth function, truth table.

## CUCET 2025 Syllabus for Physics

### Unit 1: Physical World and Measurement

Units and Measurements, Need for measurement, Units of measurement, systems of units, SI units, fundamental and derived units, significant figures, Dimensions of physical 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, Zero Vector, 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; 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 4: Work, energy and power

Work done by a constant force and a 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 5: 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 6: Gravitation

The 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 7: Properties of Bulk Matter

Mechanical Properties of Solids Elasticity, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear modulus of rigidity (qualitative idea only), Poisson's ratio; elastic energy.

Mechanical Properties of Fluids Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes), effect of gravity on fluid pressure. Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow, critical velocity, Bernoulli's theorem and its simple applications. Surface energy and surface tension, angle of contact,

excess of pressure across a curved surface, application of surface tension ideas to drops, bubbles and capillary rise.

Thermal Properties of Matter Heat, temperature, thermal expansion; thermal expansion of solids, liquids and gases, anomalous expansion of water; specific heat capacity;  $C_p$ ,  $C_v$  - calorimetry; change of state - latent heat capacity. Heat transfer-conduction, convection and radiation, thermal conductivity, qualitative ideas of Blackbody radiation, Wein's displacement Law, Stefan's law .

#### Unit 8: 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 9: 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 10: 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 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; Equipotential surfaces, Electrical potential energy of a system of two-point charges in an electrostatic field. Conductors and insulators, Dielectrics and electric polarization, capacitor, combination of capacitors in series and in 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, Ohm's law, Electrical resistance, Resistances of different materials, V-I characteristics of Ohmic and nonohmic 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 in series and in parallel. Kirchhoff's laws and their applications. Wheatstone bridge, Meter bridge. Potentiometer - principle and its applications.

#### 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. Cyclotron. Force on a current-carrying conductor in a uniform magnetic field. Force between two parallel current-carrying conductors- definition of ampere. Torque experienced by a current loop in uniform magnetic field; Moving coil galvanometer, its current 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; Earth's magnetic field and magnetic elements. Para-, dia- and ferro- magnetic substances. Magnetic susceptibility and permeability, Hysteresis, Electromagnets and permanent magnets.

#### Unit 14: 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 e.m. waves.

Reflection and refraction of light at plane and spherical surfaces, mirror formula, Total internal reflection and its applications, Deviation and Dispersion of light by a prism, Lens Formula, Magnification, Power of a Lens, Combination of thin lenses in contact, Microscope and Astronomical Telescope (reflecting and refracting) and their magnifying powers. Wave optics: wave front and Huygens' principle, Laws of reflection and refraction using Huygen's principle. Interference, Young's double slit experiment and expression for fringe width. Diffraction due to a single slit, width of central maximum. Resolving power of microscopes and astronomical telescopes, Polarization, plane polarized light; Brewster's law, uses of plane polarized light and Polaroids.

#### Unit 15: 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. Davisson Germer experiment.

#### Unit 16: 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, isotopes, isobars; isotones. Radioactivity-alpha, beta and gamma particles/rays and their properties; radioactive decay law. Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number, nuclear fission and fusion.

#### Unit 17: Electronic Devices

Semiconductor Electronics: Materials, Devices and Simple Circuits Energy bands in conductors, semiconductors and insulators (qualitative ideas only) Intrinsic and extrinsic semiconductors- p and n type, p-n junction Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode -diode as a rectifier

# CUCET 2025 Syllabus for Physics (Lateral Entry)

## Unit-1: Units and Dimension

- Physical quantities Units - fundamental and derived units, systems of units (FPS, CGS and SI units)
- Dimensions and dimensional formulae of physical quantities (area, volume, velocity, acceleration, momentum, force, impulse, work, power, energy, surface tension, coefficient of viscosity, stress, strain, moment of inertia, gravitational constant.)
- Principle of homogeneity of dimensions
- Dimensional equations and their applications, conversion from one system of units to other, checking of dimensional equations and derivation of simple equations)
- Limitations of dimensional analysis
- Error in measurement, absolute error, relative error, rules for representing significant figures in calculation.
- Application of units and dimensions in measuring length, diameter, circumference, volume, surface area etc. of metallic and non-metallic blocks, wires, pipes etc (at least two each).

## Unit-2: Force and Motion

- Scalar and vector quantities – examples, representation of vector, types of vectors
- Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only), Scalar and Vector Product.
- Resolution of Vectors and its application to lawn roller.
- Force, Momentum, Statement and Derivation of Conservation of linear momentum, its applications such as recoil of gun.
- Impulse and its Applications
- Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period.
- Relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical)
- Expression and Applications of Centripetal and centrifugal forces with examples such as banking of roads and bending of cyclist
- Application of various forces in lifts, cranes, large steam engines and turbines

### Unit-3: Work, Power and Energy

- Work: and its units, examples of zero work, positive work and negative work
- Friction: modern concept, types, laws of limiting friction, Coefficient of friction and its Engineering Applications.
- Work done in moving an object on horizontal and inclined plane for rough and plane surfaces with its applications
- Energy and its units: Kinetic energy and gravitational potential energy with examples and their derivation
- Principle of conservation of mechanical energy for freely falling bodies, examples of transformation of energy.
- Power and its units, calculation of power in numerical problems
- Application of Friction in brake system of moving vehicles, bicycle, scooter, car trains etc.

### Unit-4: Rotational Motion

- Concept of translatory and rotatory motions with examples
- Definition of torque and angular momentum and their examples
- Conservation of angular momentum (quantitative) and its examples
- Moment of inertia and its physical significance, radius of gyration for rigid body, Theorems of parallel and perpendicular axes (statements only), Moment of inertia of rod, disc, ring and sphere (hollow and solid) (Formulae only).
- Application of rotational motions in transport vehicles, and machines.

### Unit-5: Properties of Matter

- Elasticity: definition of stress and strain, different types of moduli of elasticity, Hooke's law, significance of stress strain curve
- Pressure: definition, its units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its applications
- Surface tension: concept, its units, angle of contact, Ascent Formula (No derivation), applications of surface tension, effect of temperature and impurity on surface tension
- Viscosity and coefficient of viscosity: Terminal velocity, Stoke's law and effect of temperature on viscosity, application in hydraulic systems.
- Concept of fluid motion, stream line and turbulent flow, Reynold's number Equation of continuity, Bernoulli's Theorem and their applications (no derivation and numerical).

#### Unit-6: Thermometry

- Difference between heat and temperature
- Modes of transfer of heat (Conduction, convection and radiation with examples)
- Different scales of temperature and their relationship
- Types of Thermometer (Mercury Thermometer, Bimetallic Thermometer, Platinum resistance Thermometer, Pyrometer)
- Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them
- Concept of Co-efficient of thermal conductivity
- Application of various systems of thermometry in refrigeration and air- conditioning etc.

## CUCET 2025 Syllabus for Political Science

#### UNIT-1: Cold War Era

Emergence of two power blocs after the second world war. Arenas of the cold war. Challenges to Bipolarity: Non Aligned Movement, quest for new international economic order. India and the cold war.

#### UNIT-2: The End of Bipolarity

New entities in world politics: Russia, Balkan states and Central Asian states, Introduction of democratic politics and capitalism in post-communist regimes. India's relations with Russia and other post-communist countries.

#### UNIT-3: US Hegemony in World Politics

Growth of unilateralism: Afghanistan, first Gulf War, response to 9/11 and attack on Iraq. Dominance and challenge to the US in economy and ideology. India's renegotiation of its relationship with the USA.

#### UNIT-4: Alternative Centres of Power

Rise of China as an economic power in post-Maoera, creation and expansion of European Union, ASEAN. India's changing relations with China.

#### UNIT-5: Contemporary South Asia in the Post-Cold War Era

Democratisation in Pakistan and Nepal. Ethnic conflict in Sri Lanka, Impact of economic globalization on the region. Conflicts and efforts for peace in South Asia. India's relations with its neighbours.

#### UNIT-6: International Organizations

Restructuring and the future of the UN. India's position in the restructured UN. Rise of new international actors: new international economic organisations, NGOs. How democratic and accountable are the new institutions of global governance?

#### UNIT-7: Security in Contemporary World

Traditional concerns of security and politics of disarmament. Non-traditional or human security: global poverty, health and education. Issues of human rights and migration.

#### UNIT-8: Environment and Natural Resources

Environment movement and evolution of global environmental norms. Conflicts over traditional and common property resources. Rights of indigenous people. India's stand in global environmental debates.

#### UNIT-9: Globalisation

Economic, cultural and political manifestations. Debates on the nature of consequences of globalisation. Anti-globalisation movements. India as an arena of globalization and struggle against it.

#### UNIT-10: Challenges of Nation-Building

Nehru's approach to nation-building; Legacy of partition: challenge of 'refugee' resettlement, the Kashmir problem. Organisation and reorganization of states; Political conflicts over language.

#### UNIT-11: Era of One-Party Dominance

First three general elections, nature of Congress dominance at the national level, uneven dominance at the state level, coalitional nature of Congress. Major opposition parties.

#### UNIT-12: Politics of Planned Development

Five year plans, expansion of state sector and the rise of new economic interests. Famine and suspension of five year plans. Green revolution and its political fallouts.

#### UNIT-13: India's External Relations

Nehru's foreign policy. Sino-Indian war of 1962, Indo-Pak war of 1965 and 1971. India's nuclear programme. Shifting alliance in world politics.

#### UNIT-14: Challenges to the Congress System

Political succession after Nehru. Non-Congressism and electoral upset of 1967, Congress split and reconstitution, Congress' victory in 1971 elections, politics of 'garibi hatao'.

#### UNIT-15: Crisis of the Democratic Order

Search for 'committed' bureaucracy and judiciary. Navnirman movement in Gujarat and the Bihar movement. Emergency: context, constitutional and extra-constitutional dimensions, resistance to emergency. 1977 elections and the formation of Janata Party. Rise of civil liberties organisations.

#### UNIT-16: Popular Movements in India

Farmers' movements, Women's movement, Environment and Development-affected people's movements. Implementation of Mandal Commission report and its aftermath.

#### UNIT-17: Regional Aspirations

Rise of regional parties. Punjab crisis and the anti-Sikh riots of 1984. The Kashmir situation. Challenges and responses in the North East.

#### UNIT-18: Recent Developments in Indian Politics

Participatory upsurge in 1990s. Rise of the JD and the BJP. Increasing role of regional parties and coalition politics. Coalition governments: NDA (1998 - 2004), UPA (2004 - 2014), NDA (2014 onwards)

## CUCET 2025 Syllabus for Psychology

This test is designed to assess the knowledge of students pertaining to basic concepts of Psychology like History & Schools of Psychology, Learning, Memory, Intelligence, Social Psychology and Counseling.

#### UNIT 1: History & Schools of Psychology

History of Psychology, Growth of Psychology in India, Wundt, Titchener and James, Gestalt Psychology, Behaviorism, Psychoanalysis, Humanistic Psychology, Cognitive Psychology, Carl Rogers, Sigmund Freud, Alfred Adler, Jean Piaget, Lev Vyogotsky

#### UNIT 2: Basic Concepts of Psychology

Intelligence – Spearman, Sternberg, Binet, Memory, Learning- Classical and Operant Conditioning, Observational Learning, The Nervous System: Human Brain, Endocrine System, Attention, Some common Psychological Disorders- Depression, Anxiety

#### UNIT 3: Social Psychology

Social Influence, Social Cognition, Social Groups, Social Interactions, Social-Learning Theory, Asch, Sheriff, Milgram Experiment, Shock experiment

#### UNIT 4: Counselling

Concept of Counseling, Techniques of Counseling, Client-centered Therapy, Self-esteem, Self-Concept, Self-efficacy

## CUCET 2025 Syllabus for Public Administration

### CUCET-Public Administration-2022 Examination Syllabus

- Meaning, scope and significance of Public Administration.
- Wilson's vision of Public Administration; Evolution of the discipline and its present status;
- New Public Administration; Public Choice approach; Challenges of liberalization, Privatisation, Globalisation;
- Scientific Management and Scientific Management movement; Classical Theory;
- Weber's bureaucratic model – its critique and post-Weberian Developments;
- Dynamic Administration (Mary Parker Follett); Human Relations School (Elton Mayo and others); Functions of the Executive (C.I. Barnard);
- Simon's decision-making theory; Participative Management (R. Likert, C. Argyris, D. McGregor).

## Administrative Law

- Meaning, scope and significance; Dicey on Administrative law;
- Delegated legislation; Administrative Tribunals

## Public Policy

- Models of policy-making and their critique
- Processes of conceptualisation, planning, implementation, monitoring, evaluation and review and their limitations;
- State theories and public policy formulation.

## Financial Administration

- Monetary and fiscal policies;
- Public borrowings and public debt Budgets – types and forms; Budgetary process; Financial accountability; Accounts and audit.

## Evolution of Indian Administration

- Kautilya's Arthashastra; Mughal administration;
- Legacy of British rule in politics and administration – Indianization of public services, revenue administration, district administration, local self- government.
- Historical Background of constitution of India
- Making of Indian Constitution
- Indian Constitution: Bag of Borrowings
- Parts, Schedules and Articles of Indian constitution
- Preamble
- Union and Territory of India
- Fundamental Rights (FR)
- Directive Principles of State Policy (DPSP)
- Union Executive President
- Vice President
- Prime Minister & COM
- Attorney general & Comptroller and Auditor General
- Union Parliament
- Sessions of Parliament
- Law making procedure



- Indian Judiciary-Supreme Court & High Court
- State Government- State Executive
- State Legislature
- Administration of Union Territories (UT)
- Administration of Special Areas
- Schedule & Tribal Areas
- Emergency Provisions in Indian constitution
- Panchayati raj and municipalities

## CUCET 2025 Syllabus for Quantitative Aptitude

- Classification of Numbers
- Divisibility & BODMAS
- L.C.M & H.C.F
- Remainders, Factorials & Unit digit of Higher powers
- Percentage
- Profit & Loss
- Problem on Ages
- Simple & Compound Interest
- Ratio, Proportion & Variation
- Partnership
- Averages
- Mixture & Alligation
- Time & work
- Pipes & Cistens
- Time, Speed & Distance
- Problem on Trains
- Boats & Streams
- Permutation & Combination
- Probability
- True discount and Bankers Discount
- Polynomials, Quadratic Equations

# CUCET 2025 Syllabus for Sociology

## UNIT-1: Introducing Indian Society

- Colonialism, Nationalism, Class and Community

## UNIT-2: Demographic Structure and Indian Society

- Rural-Urban Linkages and Divisions

## UNIT-3: Social Institutions: Continuity and Change

- Family and Kinship
- The Caste System
- UNIT-4: Market as a Social Institution
- Market as a Social Institution

## UNIT-5: Pattern of Social Inequality and Exclusion

- Caste Prejudice, Scheduled Castes and Other Backward Classes
- Marginalization of Tribal Communities
- The Struggle for Women's Equality
- The Protection of Religious Minorities
- Caring for the Differently Abled

## UNIT-6: The Challenges of Cultural Diversity

- Problems of Communalism, Regionalism, Casteism and Patriarchy
- Role of the State in a Plural and Unequal Society
- What We Share
- UNIT-7: Structural Change
- Colonialism, Industrialization, Urbanization

## UNIT-8: Cultural Change

- Modernization, Westernization, Sanskritisation, Secularization
- Social Reform Movements and Laws

## UNIT-9: The Story of Democracy

- The Constitution as an instrument of Social Change

- Parties, Pressure Groups and Democratic Politics
- Panchayati Raj and the Challenges of Social Transformation

#### UNIT-10: Change and Development in Rural Society

- Land Reforms, Green Revolution and Agrarian Society

#### UNIT-11: Change and Development in Industrial Society

- From Planned Industrialization to Liberalization
- Changes in the Class Structure
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#### UNIT-12: Globalisation and Social Change

- Meaning and Nature of Globalisation: Economic Dimension, Cultural Dimension
- Theories of Social Change: Cyclical, Structure-Functionalist theory, Linear Theory of social Change.
- Factors of Social Change

#### UNIT-13: Mass Media and Communication Process

- Understanding Mass Media and Communication: Meaning and Definition
- Elements, Process and Functions of Communication
- Types of Mass-Media

#### UNIT-14: Social Movements

- Concept of Social Movement
- Types of Social Movements
- Theories of Social Movement: Relative Deprivation Theory, The Strain Theory
- Class-Based Movements: Workers, Peasants
- Caste-Based Movements: Dalit Movement, Backward Castes, Trends in Upper Caste
- Responses
- Women's Movements in Independent India
- Tribal Movements
- Environmental Movements

# CUCET 2025 Syllabus for Mass Media

## UNIT-I

- General English: Comprehension, Fundamental Grammar, Antonyms, Synonyms, Tense forms, Simple and Complex sentences etc.

## UNIT-II

- Current Affairs: Political Developments in India and World, Administrative Reforms, Inter-State issues and disputes, Insurgency, Law and Order situations, Internal Problems, Budget, Federal Structure, Parliament, Legislative Assembly, Panchayatiraj, Urban Local Bodies, Disputes with neighbouring countries, World Health Organisation, United Nations Organisation, International Relations.

## UNIT-III

- History: Indian history, Freedom movement, popular figures of Indian history, popular figures of world history.
- Political Science: Elections (Parliamentary, Assembly, ULB, Panchayat). Election Commission, Political reforms, multiparty system, bi-party system, President, Prime Minister, Chief Ministers, Ruling party, Opposition party.
- Geography: Geographic distribution of India, Geographic distribution of World, Continents, Countries, Rivers, Mountains, Monsoon, Agriculture patterns.

## UNIT-IV

- Culture: State cultures, folk songs, folk music, Places of pilgrimage, Places of historic importance.
- Language & Literature: Regional languages, popular works of writers, literary awards etc.

## UNIT-V

- Sports: Cricket, Olympics, Asian Games, Common Wealth Games, Hockey, Tennis
- Media Awareness: Different TV Channels, Newspapers, Magazines, Editors of different media, Media controversies, Films, Film industry, Indian and world cinema.