



# UNDERGRADUATE TEST SYLLABUS 2017

The admission test syllabus is based on XI/XII Std. of CBSE. The question paper will be of Multiple Choice type.

- › There will be negative marking for all multiple choice questions.
- › The General English / Verbal skills Test is compulsory for all undergraduate programmes (including B.C.A. and Integrated M.C.A.)
- › **Model Test Papers** will be available on the university's website - [sssihl.edu.in](http://sssihl.edu.in) - 1 December 2016 onwards

## GENERAL ENGLISH

- › Comprehension of Unseen Passage: Prose and Poetry.
- › **Vocabulary:** Antonyms, Synonyms, One-word Substitutes, Pairs of Words Often Confused
- › **Grammar:** Tenses, Prepositions, Phrasal Verbs, Voice(s), 'too – enough', 'since' and 'for'
- › **Structure:** Reported Speech, Spellings, Punctuation, Correction of Sentences
- › **Composition:** Re-ordering or re-arranging of sentences to form a coherent whole, guided composition, paragraph writing, letter writing.

## MATHEMATICS

- › **Algebra and Trigonometry:** Sets, Relations and functions; Complex Numbers; Matrices and Determinants; Quadratic Equations; Permutations and Combinations; Mathematical Induction and its applications; Binomial theorem and its applications; Sequences and Series; Trigonometry.
- › **Calculus:** Differential Calculus; Integral Calculus; Differential Equations.
- › **Two Dimensional Geometry.**
- › **Statistics:** Measures of Central tendency and Dispersion; Probability.

## PHYSICS

- › **Measurements:** Fundamental and derived units – length, mass and time measurements; Accuracy and precision of measuring instruments, errors in measurement – significant figures; Dimensions - dimensions of physical quantities – dimensional analysis;
- › **Scalar and vector quantities:** Addition and subtraction of vectors, unit vector, resolution of vectors, rectangular components, multiplication of vectors - scalar, vector products.
- › **Mechanics and Kinematics:** Motion in a straight line, position time graph, speed and velocity, uniform and non-uniform

motion, uniformly accelerated motion; Motion in two dimensions; projectile motion; Force and inertia, Newton's laws and their applications; unit of force – impulse; law of conservation of linear momentum and its applications; Equilibrium of concurrent forces – triangle law, parallelogram law; Uniform circular motion, angular velocity, angular acceleration; relation between linear and angular velocities. Centripetal force; Work done by a constant force and a variable force; unit of work. Potential and kinetic energy, work – energy theorem; Collisions – Elastic and in-elastic collisions in one dimension; Moment of inertia and its physical significance – radius of gyration; angular momentum. Torque – conservation of angular momentum.

- › **Gravitation:** The universal law of gravitation; acceleration due to gravity and its variation with the altitude, latitude, depth and rotation of the Earth.
- › **Solids:** Elastic behaviour, stress – strain relationship, Hooke's law; three types of moduli of elasticity;
- › **Periodic motion:** Period, frequency, displacement as a function of time. Simple harmonic motion – amplitude, frequency, phase – uniform circular motion as SHM. Oscillations of a spring; Energy in SHM. kinetic and potential energies;
- › **Wave motion:** longitudinal and transverse waves – relation between frequency, wavelength and velocity of a wave, Superposition principle, Interference – intensity and sound level; beats, standing waves – standing waves in strings and pipes – sonometer – resonance air column – fundamental mode and harmonics. Doppler effect;
- › **Thermodynamics and Kinetic theory:** Laws of thermodynamics; heat conduction, convection, radiation; kinetic theory of gases;
- › **Optics:** Reflection of light – reflection at plane and curved surfaces; total internal reflection; determination of velocity of light – Michelson's method; refraction – spherical lenses – thin lens formula, lens makers formula – magnification – power

of a lens – combination of thin lenses in contact; refraction of light through a prism – dispersion – spectrometer – determination of  $\mu$  – rainbow; optical instruments – microscope, telescope, resolving power;

- › **Electrostatics and Current Electricity:** Electric charges, conductors, insulators, charging by induction, properties of electric charge, coulomb's law, forces between multiple charges, electric field, electric field lines, electric flux, electric dipole, dipole in uniform external field, electrostatic potential, potential due to point charge, electrostatics of conductors, capacitors, capacitance, parallel plate capacitor, energy stored in capacitors, combination of capacitors.
- › **Electric current, Electric current in conductors:** ohm's law - electrical energy and power, combination of resistance, Kirchoff's law, wheat stone bridge network, metre bridge, potentiometer
- › **Moving Charges, Magnetism and Electromagnetic induction:** Earth's magnetic field and magnetic elements. Bar magnet - magnetic field lines. Magnetic field due to magnetic dipole along the axis and perpendicular to the axis; torque on a magnetic dipole in a uniform magnetic field; magnetic properties of materials – Intensity of magnetisation, magnetic susceptibility, magnetic induction and permeability Dia, Para and Ferromagnetic substances with examples; magnetic force and motion in a magnetic field, Biot-savart Law, Ampere's circuital law, solenoid, torque on current loop, magnetic flux, Faraday's law, Lenz's law, motional EMF, AC generator;
- › **Atomic and Nuclear Physics:** Alpha particle scattering and Rutherford's nuclear model, atomic spectra, Bohr model of hydrogen atom, hydrogen atom spectra, composition of nucleus, size of the nucleus, nuclear binding energy, nuclear force, radioactivity, Nuclear Fission and Fusion;
- › **Electronics: Semiconductors:** intrinsic and extrinsic, p-n junction, diodes, special purpose diodes, transistors, digital electronics -logic gates.

## CHEMISTRY

- › **General and Physical Chemistry:** Some basic concepts of chemistry-structure of atom-acids and bases-pH-buffers-buffer action-buffer capacity-hydrolysis of salts-solubility product-states of matter (gases and liquids)-solutions-thermodynamics-1st and 2nd law-electrochemistry-Nernst equation, electrochemical cell, cell representation and cell potential-chemical equilibrium- redox reactions-solid state-chemical kinetics-1st order rate expression, 2nd order rate expression, half life period and Arrhenius equation and surface chemistry- chemical adsorption and physical expression.
- › **Inorganic Chemistry:** Periodic table-chemical bonding and molecular structure – hydrogen-general characteristics of s-block elements-p-block elements and d-block elements-coordination chemistry-EAN rule, nomenclature and valence bond theory- organometallics-importance of coordination compounds in qualitative inorganic analysis principles and processes of isolation of elements-nuclear chemistry-different types of decay.
- › **Organic and Applied Chemistry:** Purification and Characterization of Organic Compounds; Some basic principles-Hydrocarbons-haloalkanes and haloarenes-organic compounds containing oxygen (alcohols, phenols, carbonyl compounds, carboxylic acids), Organic Compounds containing Nitrogen (aliphatic and aromatic amines – primary, secondary and tertiary amines) – diazonium salts-synthetic and natural polymers-biomolecules - chemistry in action-environmental chemistry.

## BOTANY

- › **Plant Kingdom:** Five kingdom classification major groups and their salient features. Bacteria, Fungi, Bryophytes, Pteridophytes, Gymnosperm.
- › **Morphology:** Structural organization of stem, leaf and root and their modifications (Stem-climber, Rhizome, tuber, bulb, corm); leaf - foliage, scale and bract; root - tap and adventitious roots in dicot and monocot plants.
- › **Anatomy:** Tissues - Parenchyma, collenchymas, sclerenchyma, xylem, phloem. Anatomy of root, stem and leaf of monocot and dicot plants.
- › **Embryology:** Structure and function of flower, Inflorescence, (Cymose,

- Racemose and special types) Androecium (Anther structure, microsporangium, microsporogenesis and male gametophyte), Entomophilies, Hydrophily, Zoophily, Fertilization, Fruits (Simple, aggregate and multiple fruits).
- › **Physiology:** Basic account on water absorption, Ascent of sap, Transpiration (Exchange of gases, stomatal mechanism), Respiration (Glycolysis, Krebs cycle, electron transport system), Photosynthesis {Light and dark reaction - Calvin cycle}, factors affecting photosynthesis - light, temperature and Carbon dioxide}, Growth (Plant hormones and growth regulation) and movements (Turgor and growth movements), Mineral nutrition (essential and non-essential elements) in plants.
- › **Applied Botany:** Plant concept of Plant breeding - mutation, hybridization, polyploidy. Use of fertilizers and pesticides (advantages and hazards).
- › **Cell Biology:** Introduction on Cell theory, Prokaryotic, Eukaryotic cell, Cell wall, cell membrane and cell organelles, Plastids, mitochondria, endoplasmic reticulum, golgi bodies, ribosome, lysosome, nucleus and chromosomes, Mitosis, Meiosis.
- › **Ecology:** Concept of Organism and population, Ecological adaptation, Ecosystem: Components, types, energy flow, nutrient cycling.

## ZOOLOGY

- › **Diversity of living organisms:** Classification of animals, salient features of non-chordata upto phyla level, chordate to class level.
- › **Anatomy, histology and physiology (Earthworm, cockroach, Frog and Human):** Integumentary system, digestive system, respiratory, circulatory, excretory, Muscular, nervous, endocrine and reproductive systems. Connective tissue, epithelial tissue, small intestine, Histology of stomach, bone, blood, lymph, liver, pancreas, lung, spleen, kidney, skin, testis and ovary.

## ACCOUNTANCY

(Including Quantitative Aptitude)

- › Basic Accounting theory
- › Recording of transactions: Subsidiary books - Journal - Ledger
- › Trial balance, rectification of errors
- › Financial statements, trading and profit and loss account (with adjustments) and balance sheet

- › Final accounts for non-trading concerns
- › Bills of exchange
- › Partnership accounting: Admission, retirement, death and dissolution
- › Company accounts: Issue of shares, forfeiture, re-issue, issue and redemption of debentures, final accounts - classification of assets and liabilities of presenting balance sheet
- › Depreciation Accounting: Straight line and Diminishing value methods; Provision for Depreciation
- › Single entry: Statement of affairs and determination of profit.
  
- › Quantitative Aptitude:
- › Basic arithmetical operations - Basic properties of numbers - HCF & LCM - Fractions - Decimals - Percentages - Ratio & proportions - Power & groups - Simple Interest & Compound Interest - Mensuration - Problem solving in Algebra - Elementary Geometry - Statistical tables & averages.

## COMMERCE

- › Business Organization and Principles of Management:
- › Economic activities and business
- › Formation of business units
- › Corporate Organization – Types
- › Stock exchange
- › Transport and storage/warehousing
- › Banking and financial institutions
- › Evolution and growth of management
- › Organization of modern business office
- › Nature and purpose of business
- › Structural aspects of business
- › Business and sources of finance
- › Trade: Internal and external
- › Elements of insurance/types
- › Nature and significance of management
- › Planning, organizing, staffing, directing and controlling

## ECONOMICS

- › **Basic concepts:** What is an economic problem? - Meaning of economy - Goods and Services - Economic systems (Capitalism, Socialism and Mixed Economy)- Economic Methods (deductive and inductive)- Micro and Macroeconomics.
- › **Consumption:** Meaning of wants - Utility - Laws of demand - Elasticity of demand- Indifference Curve Analysis-Consumer equilibrium.
- › **Production:** Supply- Law of variable proportions - Cost and Revenue concepts- Economies of scale (large scale and small scale production)- Returns to

Scale.

- › **Value and Exchange:** Determination of price - Market price and normal price- Market structure-features - nature of demand curves- Perfect competition, Imperfect competition and Monopoly.
- › **Distribution:** Factor Pricing-derived demand- The concepts of Rent, Wages, Interest and Profit.
- › **Macro economics:** Aggregate demand – Aggregate supply- Effective demand- Equilibrium level of income - Propensity to consume- Propensity to save and invest - MEC – MEI- Multiplier- Accelerator (only concepts).
- › **Indian Economic Problems:** Nature of Indian Economy- Basic structure - Poverty and unemployment in India - Problem of Population - Regional disparities - India's national Income- Inequality- Indian Planning – The effect of Economic Reforms.

## STATISTICS

- › **Statistical data:** Definition and scope of the Statistics - collection and organisation of data, frequency distributions - diagrams and graphical representation of data.
- › Measures of Location: Arithmetic mean - Median, Quartiles, Deciles and Percentiles - Mode - Weighted arithmetic mean, Geometric mean and Harmonic mean - Simple problems.
- › Measures of Dispersion: Range - Quartile deviation - Mean deviation - Variance and Standard - Coefficient of variation - simple problems.
- › Correlation: Concept of bivariate distributions - Scatter diagram, Karl Pearson's co-efficient of correlation - Spearman's rank correlation (without ties) - Simple Problems.
- › Data interpretation: Interpretation of quantitative variables from tables and from diagrams.
- › Index Numbers: Meaning- types- Wholesale Price Index- Consumer Price Index- Inflation and Index Numbers- Uses of Index Numbers.

## CIVICS

- › **Civics** - Meaning and scope; Aims and value of its study; its relationship with History, Political Science, Economics and Ethics.
- › **Individual and his relationship with family and society, Society** - meaning and advantages of social life; Role of various Associations, eg., Religious, Political, Economic and Cultural.
- › **Citizenship** - meaning and importance: Single and dual citizenship - advantages and disadvantages; Rights and Duties of Citizens; Hindrances to good citizenship.

- › **Nation** - meaning and importance: Nationality, meaning and elements, India as a Nation.
- › **State and its essential elements;** Population; Territory; Government and Sovereignty. Definition of the term sovereignty - nature, characteristics and coercive nature of the State.
- › **Individual and the Modern State** (Basic concepts):
- › (a) **Law** - meaning, characteristics, sources - law and morality, (b) **Liberty** - meaning and kinds; Law and Liberty, (c) **Equality** - meaning and kinds; Relation between liberty and equality, (d) **Fraternity** - meaning - need for co-operation and co-existence of individuals for common good.
- › **Liberty** - meaning and kinds; Law and Liberty
- › **Forms of Government;** Unitary and Federal, Parliamentary and Presidential - characteristics - merits and demerits. (Provide stress on the functions of the Legislature, Executive and Judiciary)
- › **Spheres of State activity,** Individualism, socialism, communism, capitalism and dictatorship.
- › **Democracy:** meaning - kinds - features - merits and demerits of direct and indirect democracy, conditions necessary for the success of democracy; role of parties and public opinion in democracy.
- › **Constitution of India:** Brief study of the features as given below:
- › (a) Preamble, (b) Fundamental rights, (c) Directive principles of State Policy, (d) Federal System, (e) Parliamentary features.
- › **Govt. of India:**
- › (a) Parliament, (b) Cabinet, (c) All India Services, (d) State Legislatures and Cabinet, (e) Centre-State relations - Administrative, Legislative and Financial.
- › Structure and working of Local Governments (Brief Study)
- › (a) Corporations and Municipalities, (b) Panchayat Raj, (c) Zilla Parishads and Mandala Parishads, (d) The role of District Collectors.
- › **Adult Franchise:** Meaning and working. Advantages and disadvantages; Development of Weaker Sections.
- › **National Integration and its need:**
- › (a) Communalism, (b) Casteism, (c) Linguism, (d) Regionalism.
- › United Nations - Its aims and principal organs. Its role in promoting international peace and understanding.

## POLITICAL SCIENCE

- › **Political Science** - meaning, nature and scope
- › **Citizen** - State and Society; Citizenship - Rights and duties of citizens (a brief

study of the fundamental rights and fundamental duties of Indian citizens).

- › **State and Government:** Nature and definition of State; Elements of state; State and Society; State and Associations.
- › **Nation and Nationality:** Meaning of the terms Nation and Nationality, Elements of Nationality; Nationalism - meaning, importance, merits and demerits.
- › **Sovereignty** - meaning, characteristics and kinds of sovereignty, legal, political and popular sovereignty.
- › **Law, Liberty and equality:** Meaning of the terms Law and Liberty, Law and morality. Liberty and Law, Sources of Law, Kinds of Law; Definition of the term Liberty, Kinds of liberty; Equality - Definition of the term, kinds - liberty and equality.
- › **Forms of Government:** Unitary and Federal - meaning, merits and demerits, Parliamentary and Presidential - explanation - merits and demerits of both systems.
- › **Spheres of State activity:** Individualism, Socialism, Communism, Capitalism and Dictatorship, Gandhism and Sarvodaya.
- › **Constitution:** Classification - Written and Unwritten; Rigid and Flexible - meaning - merits and demerits.
- › **Indian Constitution:** Salient Features - Indian National Movement: Main events 1857, 1919, 1935, 1942 and 1945.
- › **Legislature:** Organization, powers and functions of the legislature; A brief study of the organization, functions and working of Indian Parliament.
- › **Executive in India:** President - election, powers and functions; Vice-President, Prime Minister and the Council of Ministers; Governor - appointment - powers and functions, Chief Minister and the Council of Ministers.
- › **Judiciary:** Role and importance, Independence of Judiciary, Supreme Court and the High Courts in India.
- › **Civil Services:** Nature - importance and functions of Civil Services; Bureaucracy, U.P.S.C., Organization and functions.
- › **Electorate:** Types of franchise, Merits and Demerits, Direct Democratic Devices.
- › **Party system:** Political parties, their role and functions, Role of opposition in democracy.
- › **Public Opinion:** Meaning - Agencies of public opinion, role and importance of Public Opinion.
- › **Local Self Government:** Panchayat Raj, Municipal Govt., planning - importance - socio economic development - rural and urban development; development of scheduled castes and tribes.
- › **Factors conditioning Indian Democracy:** Inequality - social and economic; Regional imbalance, communalism and casteism, Regionalism and Linguism.
- › **Internationalism:** Meaning and importance - United Nations - Aims - Objectives, Organs and functions.

## HISTORY

### ANCIENT INDIA

- › **Introduction:** Pre-history – The Stone Age; Paleolithic and Neolithic cultures
- › **The Harappan Culture:** Origin, extent and date, Important cities: Harappa; Mohenjodaro; Kalibangan; Lothal and Dholavira; Trade, commerce, seals and script; Religion
- › **The Vedic Period:** Rigveda, its date and geographical knowledge; Socio, Economic, Religious and Political conditions; Later Vedas, their date and geographical knowledge; Epics: Ramayana and Mahabharata, their contents.
- › **Jainism and Buddhism:** Jainism - Mahavira and his teachings; Buddhism - Buddha and his teachings.
- › **The Mauryan Age:** Chandragupta Maurya and his achievements; Ashoka and his achievements; Asoka and Buddhism; Mauryan administration; Fall of the Mauryas.
- › **Satavahanas:** Early history; Gautamiputra Satakarni; Later Satavahanas and their decline.
- › **Kushans:** Kanishka and his achievements; Decline of Kushans.
- › **Age of the Guptas:** Samudragupta; Chandragupta II; Science and technology; Art, architecture and painting; Golden age of the Guptas.
- › **Chalukyas of Badami:** Early history; Pulakesi II.
- › **Rashtrakutas:** Early history; Dhruva; Amoghavarsha Nrupatunga.
- › **Pallavas:** Mahendrarman I; Narasimharman I; Contribution to literature, art and architecture.
- › **Cholas:** Rajaraja Chola I; Rajendra Chola I; Chola art and architecture.

### MEDIEVAL INDIA

- › **Harshavardhana and his times:** Career and achievements of Harshavardhana; Religion with special reference to Buddhism.
- › **Arabs in India:** Arab conquest of Sindh; Mohammed of Ghazni, and nature of his invasions; Mohammed of Ghor, his conflicts with Prithviraj Chauhan.
- › **The Vijayanagar Empire:** Origin and founders of Vijayanagara kingdom; Sri Krishnadevaraya, and his patronage to art, literature, religion and philosophy; the battle of Tallikota.
- › **Sher Shah:** Early life and his rise to power; Wars with Mughals; Administrative reforms.
- › **Mughals:** Akbar's accession and political achievements; His religious policy and Din – e – Illahi; Aurangzeb and fall of the Mughal Empire; Mughal contribution to Art, Architecture and Literature.
- › **Rise of the Marathas:** Shivaji's political achievements; Shivaji's administration;
- › **Peshwas:** Balaji Viswanath; Baji Rao; Balaji Baji Rao.

### MODERN INDIA

- › **Advent of Europeans in India:** Portuguese in India; Dutch and their decline; English and the formation of the East India Company; French settlements in India.
- › **The Revolt of 1857:** Causes and nature of revolt; Course of the revolt and results;
- › Causes for the failure.
- › **Rise of the British power in India:** Battles of Plassey and Buxar; Three Carnatic wars and the success of the English.
- › **Nationalism Movement in India:** Genesis of Indian National Congress; Moderates and Extremists; Surat Split; Rise of Extremism; Home Rule Movement; Revolutionary and Terrorist movement; Jallianwalabagh Tragedy of 1919; Non Cooperation Movement; Civil Disobedience Movement; Quit India Movement; Indian Independence.

### B.B.A.

#### Numerical skills and Reasoning skills

- › Basic arithmetical operations
- › Basic properties of numbers
- › HCF & LCM
- › Fractions
- › Decimals
- › Percentages
- › Ratio & proportions
- › Power & groups
- › Simple Interest & Compound Interest
- › Mensuration - Problem solving in Algebra
- › Elementary Geometry
- › Statistical tables & averages and logical reasoning.

### B.C.A. & INTEGRATED M.C.A.

#### MATHEMATICS

##### Part A: Algebra, Vectors, Linear Programming

- › Real Numbers, Complex Numbers
- › Polynomials, Linear Equations in one and two variables, Quadratic Equations in one variable, Permutations and Combinations, Binomial Theorem, Arithmetic Progression, Geometric Progression, Standard Progressions and Series
- › Types of Vectors, Vector addition, Scalar multiplication, Scalar and Vector products of 2, 3 and 4 vectors
- › Linear Inequalities, Linear Programming – Graphical Method

##### Part B: Mensuration, Geometry, Analytical Geometry

- › Areas, Surface Areas and Volumes of standard plane and solid regions
- › Euclid's Axioms and Postulates, Lines, Angles, Triangles, Congruent Triangles, Quadrilaterals, Area, Circles, Similar Triangles
- › Cartesian coordinate system for a plane, Distance formula, Section formula, Area

- › of Triangle, Equations of a straight line, Equations of a plane, Conic Sections
- › Cartesian coordinate system for space, Direction Cosines, Direction Ratios, Lines and Planes in Space

##### Part C: Trigonometry, Calculus and Differential Equations

- › Trigonometric Ratios, Identities, Trigonometric Functions of sum and difference of Angles, Trigonometric Equations
- › Sets, Relations, Functions, Simple problems on Limits, Continuity, Derivatives of First and Higher Order, Rules of Differentiation, Bernoulli Rule, Partial Derivatives of First order
- › Indefinite Integral, Definite Integral, Rules of Integration, Applications of Integrals
- › Ordinary Differential Equations, General and Particular Solutions, First Order Differential Equations – Classification and Solution, Second Order Homogeneous Differential Equations

##### Part D: Statistics and Probability

- › Introduction to Statistics, Data Collection & presentation, Mean, Median, & Mode, Cumulative Frequency Distribution, Measures of Dispersion, Range, Mean Deviation, Standard Deviation,
- › Sets and Relations, Empirical Probability, Theoretical Approach Random Experiments, Events, Axiomatic Approach to Probability, Conditional Probability, Independent Events, Bayes's Theorem, Random Variable & its distribution, Bernoulli's trials, Binomial Distribution.

#### QUANTITATIVE APTITUDE

- › This test is with a view to test the candidate's ability in comprehending and analyzing quantitative data) Basic arithmetical operations - Basic properties of numbers - HCF & LCM - Fractions - Decimals - Percentages - Ratio & proportions - Power & groups - Simple Interest & Compound Interest - Mensuration - Problem solving in Algebra - Elementary Geometry - Statistical tables & averages.

#### LOGICAL REASONING

- › This test is with a view to ascertain the candidate's ability to apply logic, rationale and constraint based deduction skills. This will be tested with questions which involve pictorial representations and hypothetical situations of real life scenarios which call for application of logic and reason to find feasible solutions.