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SYLLABUS OF  
Teaching Aptitude  
(327)

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# Teaching Aptitude

**Note:**

***There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.***

Unit No.	Details
1	Two narratives/ newspaper reports about schools/teachers/ children/ Questions on data/information/analysis/issues Such as Gender, school access, teacher's work, scores
2.	Based on popular films on education, books, documentaries showing the struggles of girls', tribals' and Dalits'
3.	Science (i) Based on observation of natural phenomenon (ii) famous Indian Scientists, women scientists, (iii) Current information such as COVID, technology and programs in science
4.	Mathematics (i) Based on sense of proportion, perspective, abilities that mathematics gives (ii) Famous mathematicians, women mathematicians (iii) Difficulties that children face while learning Mathematics
5.	Arts, Music and Drama (Performing and Visual Arts) (i) Academies of art teaching (ii) Benefits of practising art forms (iii) Indian art and music traditions
6.	Social Sciences (i) Based on difficulties that children face in social sciences (ii) Details of subjects being taught (iii) Nobel and other award winners for creating knowledge such as in economics or other fields. (iv) Teachers in history: Buddha, Jain, construction of teachers in Upanishads.
7.	Language and Literature (i) Based on famous stories, novels, poems that have reference to school/education/learning and are in NCERT syllabus from 6 <sup>th</sup> to 12 <sup>th</sup> (ii) Biographies/autobiographies of famous women/tribals/Dalits who have described their school experiences, teachers or a class. (iii) Difficulties that children face while learning poems or grammar.

**SOCIOLOGY -326**

**SOCIOLOGY**

**SYLLABUS FOR CLASS 12**

# SOCIOLOGY

*Note:*

*There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.*

## **Unit I: Structure of Indian Society**

- Introducing Indian Society: Colonialism, Nationalism, Class, and Community
- Demographic Structure
- Rural-Urban Linkages and Divisions

## **Unit II: Social Institutions: Continuity and Change**

- Family and Kinship
- The Caste System
- Tribal Society
- The Market as a Social Institution

## **Unit III: Social Inequality and Exclusion**

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

## **Unit IV: The Challenges of Unity in Diversity**

- Problems of Communalism, Regionalism, Casteism, and Patriarchy
- Role of the State in a Plural, and Unequal Society
- What We Share

## **Unit V: Process of Social Change in India**

- Process of Structural Change: Colonialism, Industrialisation, Urbanisation
- Process of Cultural Change: Modernization, Westernisation, Sanskritisation, Secularisation
- Social Reform Movements and Laws

## **Unit VI: Social Change and the Polity**

- The Constitution as an instrument of Social Change
- Parties, Pressure Groups, and Democratic Politics
- Panchayati Raj and the Challenges of Social Transformation

## **Unit VII: Social Change and the Economy**

- Land Reforms, the Green Revolution, and Agrarian Society
- From Planned Industrialisation to Liberalisation
- Changes in the Class Structure

## **Unit VIII: Arenas of Social Change**

- Media and Social Change
- Globalization and Social Change

# SOCIOLOGY -326

## **Unit IX: *New Arenas of Social Change***

- Media and Social Change
- Globalization and Social Change

## **Unity X: *Social Movements***

- 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

**PHYSICS-322**

# **PHYSICS-322**

## **Syllabus of Class 12**

# PHYSICS-322

*Note:*

*There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.*

## PHYSICS

### Unit I: Electrostatics

Electric charges and their conservation. Coulomb's law – force 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, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet, and uniformly charged thin spherical shell (field inside and outside).

Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, the electrical potential energy of a system of two point charges, and electric dipoles in an electrostatic field.

Conductors and insulators, free charges, and bound charges inside a conductor. Dielectrics and electric polarization, capacitors and capacitance, the combination of capacitors in series and in parallel, the capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor, Van de Graff generator.

### Unit II: Current Electricity

Electric current, the flow of electric charges in a metallic conductor, drift velocity and mobility, and their relation with electric current; Ohm's law, electrical resistance, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity.

Carbon resistors, colour code for carbon resistors; series and parallel combinations of resistors; temperature dependence of resistance.

The internal resistance of a cell, potential difference, and emf of a cell, combination of cells in series and in parallel.

Kirchhoff's laws and simple applications. Wheatstone bridge, Metre Bridge.

Potentiometer – principle, and applications to measure potential difference, and for comparing emf of two cells; measurement of internal resistance of a cell.

### Unit III: Magnetic Effects of Current and Magnetism

Concept of the magnetic field, Oersted's experiment. Biot - Savart law and its application to current carrying circular loop.

Ampere's law and its applications to infinitely long straight wire, straight and toroidal solenoids. Force on a moving charge in uniform magnetic and electric fields. Cyclotron.

Force on a current-carrying conductor in a uniform magnetic field. The force between two parallel current-

# PHYSICS-322

carrying conductors – definition of ampere. Torque experienced by a current loop in a 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. The magnetic dipole moment of a revolving electron. Magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis. Torque on a magnetic dipole (bar magnet) in a uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; Earth's magnetic field and magnetic elements.

Para-, dia- and ferromagnetic substances, with examples. Electromagnets and factors affecting their strengths. Permanent magnets.

## Unit IV: Electromagnetic Induction and Alternating Currents

Electromagnetic induction; Faraday's law, induced emf and current; Lenz's Law, Eddy currents. Self and mutual inductance.

Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance; LC oscillations (qualitative treatment only), LCR series circuit, resonance; power in AC circuits, wattless current. AC generator and transformer.

## Unit V: Electromagnetic Waves

Need for displacement current. Electromagnetic waves and their characteristics (qualitative ideas only). Transverse nature of electromagnetic waves.

Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, x-rays, gamma rays) including elementary facts about their uses.

## Unit VI: Optics

Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection, and its applications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula. Magnification, power of a lens, combination of thin lenses in contact combination of a lens and a mirror. Refraction and dispersion of light through a prism.

Scattering of light—blue colour of the sky and reddish appearance of the sun at sunrise and sunset.

Optical instruments: Human eye, image formation, and accommodation, correction of eye defects (myopia and hypermetropia) using lenses.

Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.

Wave optics: Wave front and Huygens' Principle, reflection, and refraction of plane wave at a plane surface using wave fronts.

Proof of laws of reflection and refraction using Huygens' Principle.

Interference, Young's double hole experiment and expression for fringe width, coherent sources, and sustained interference of light.

Diffraction due to a single slit, width of central maximum.

Resolving the power of microscopes and astronomical telescopes. Polarization, plane polarized light; Brewster's law, uses of plane polarized light and Polaroids.



# PHYSICS-322

## Unit VII: Dual Nature of Matter and Radiation

Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation – particle nature of light.

Matter waves – wave nature of particles, de Broglie relation. Davisson-Germer experiment (experimental details should be omitted; only the conclusion should be explained.)

## Unit VIII: 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 IX: Electronic Devices

Energy bands in solids (qualitative ideas only), conductors, insulators, and semiconductors; semiconductor diode –  $I$ - $V$  characteristics in forward and reverse bias, diode as a rectifier;  $I$ - $V$  characteristics of LED, photodiode, solar cell, and Zener diode; Zener diode as a voltage regulator. Junction transistor, transistor action, characteristics of a transistor; transistor as an amplifier (common emitter configuration) and oscillator. Logic gates (OR, AND, NOT, NAND and NOR). Transistor as a switch.

## Unit X: Communication Systems

Elements of a communication system (block diagram only); bandwidth of signals (speech, TV, and digital data); bandwidth of transmission medium. Propagation of electromagnetic waves in the atmosphere, sky, and space wave propagation. Need for modulation. Production and detection of an amplitude-modulated wave.

**Mathematics/Applied Mathematics (319)**

**MATHEMATICS/  
APPLIED  
MATHEMATICS (319)**

**Syllabus for Class 12**

# Mathematics/Applied Mathematics (319)

*Note:*

*There will be one Question Paper which will contain Two Sections i.e. Section A and Section B [B1 and B2].*

*Section A will have 15 questions covering both i.e. Mathematics/Applied Mathematics which will be compulsory for all candidates*

*Section B1 will have 35 questions from Mathematics out of which 25 questions need to be attempted.*

*Section B2 will have 35 questions purely from Applied Mathematics out of which 25 question will be attempted.*

## SECTION A

1. Algebra	(iv). Application of Integration as area under the curve
(i) Matrices and types of Matrices	4. Differential Equations
(ii) Equality of Matrices, transpose of a Matrix, Symmetric and Skew Symmetric Matrix	(i) Order and degree of differential equations
(iii) Algebra of Matrices	(ii) Formulating and solving of differential equations with variable separable
(iv) Determinants	5. Probability Distributions
(v) Inverse of a Matrix	(i) Random variables and its probability distribution
(vi) Solving of simultaneous equations using Matrix Method	(ii) Expected value of a random variable
2. Calculus	(iii) Variance and Standard Deviation of a random variable
(i) Higher order derivatives	(iv). Binomial Distribution
(ii) Tangents and Normals	6. Linear Programming
(iii) Increasing and Decreasing Functions	(i) Mathematical formulation of Linear Programming Problem
(iv). Maxima and Minima	(ii) Graphical method of solution for problems in two variables
3. Integration and its Applications	(iii) Feasible and infeasible regions
(i) Indefinite integrals of simple functions	(iv). Optimal feasible solution
(ii) Evaluation of indefinite integrals	
(iii) Definite Integrals	

# Mathematics/Applied Mathematics (319)

## Section B1: Mathematics

### UNIT I: RELATIONS AND FUNCTIONS

#### 1. Relations and Functions

Types of relations: Reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function. Binary operations.

#### 2. Inverse Trigonometric Functions

Definition, range, domain, principal value branches. Graphs of inverse trigonometric functions. Elementary properties of inverse trigonometric functions.

### UNIT II: ALGEBRA

#### 1. Matrices

Concept, notation, order, equality, types of matrices, zero matrix, transpose of a matrix, symmetric and skew symmetric matrices. Addition, multiplication and scalar multiplication of matrices, simple properties of addition, multiplication and scalar multiplication. Non-commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Concept of elementary row and column operations. Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

#### 2. Determinants

Determinant of a square matrix (up to  $3 \times 3$  matrices), properties of determinants, minors, cofactors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.

### UNIT III: CALCULUS

#### 1. Continuity and Differentiability

Continuity and differentiability, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit function. Concepts of exponential, logarithmic functions. Derivatives of  $\log x$  and  $e^x$ . Logarithmic differentiation. Derivative of functions expressed in parametric forms. Second-order derivatives. Rolle's and Lagrange's Mean Value Theorems (without proof) and their geometric interpretations.

#### 2. Applications of Derivatives

Applications of derivatives: Rate of change, increasing/decreasing functions, tangents and normals, approximation, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations). Tangent and Normal.

# Mathematics/Applied Mathematics (319)

## 3. Integrals

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, only simple integrals of the type –

$$\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}},$$
$$\int \frac{(px + q)}{ax^2 + bx + c} dx, \int \frac{(px + q)}{\sqrt{ax^2 + bx + c}} dx, \int \sqrt{a^2 \pm x^2} dx \text{ and } \int \sqrt{x^2 - a^2} dx,$$
$$\int \sqrt{ax^2 + bx + c} dx \text{ and } \int (px + q)\sqrt{ax^2 + bx + c} dx$$

to be evaluated.

Definite integrals as a limit of a sum. Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.

## 4. Applications of the Integrals

Applications in finding the area under simple curves, especially lines, arcs of circles/parabolas/ellipses (in standard form only), area between the two above said curves (the region should be clearly identifiable).

## 5. Differential Equations

Definition, order and degree, general and particular solutions of a differential equation. Formation of differential equation whose general solution is given. Solution of differential equations by method of separation of variables, homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type –

$$\frac{dy}{dx} + Py = Q, \text{ where } P \text{ and } Q \text{ are functions of } x \text{ or constant}$$

$$\frac{dx}{dy} + Px = Q, \text{ where } P \text{ and } Q \text{ are functions of } y \text{ or constant}$$

# Mathematics/Applied Mathematics (319)

## UNIT IV: VECTORS AND THREE-DIMENSIONAL GEOMETRY

### 1. Vectors

Vectors and scalars, magnitude and direction of a vector. Direction cosines/ratios of vectors. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Scalar (dot) product of vectors, projection of a vector on a line. Vector (cross) product of vectors, scalar triple product.

### 2. Three-dimensional Geometry

Direction cosines/ratios of a line joining two points. Cartesian and vector equation of a line, coplanar and skew lines, shortest distance between two lines. Cartesian and vector equation of a plane. Angle between (i) two lines, (ii) two planes, (iii) a line and a plane. Distance of a point from a plane.

## Unit V: Linear Programming

Introduction, related terminology such as constraints, objective function, optimization, different types of linear programming (L.P.) problems, mathematical formulation of L.P. problems, graphical method of solution for problems in two variables, feasible and infeasible regions, feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

## Unit VI: Probability

Multiplications theorem on probability. Conditional probability, independent events, total probability, Baye's theorem. Random variable and its probability distribution, mean and variance of haphazard variable. Repeated independent (Bernoulli) trials and Binomial distribution.

# Mathematics/Applied Mathematics (319)

## Section B2: Applied Mathematics

### Unit I: Numbers, Quantification and Numerical Applications

#### A. Modulo Arithmetic

- Define modulus of an integer
- Apply arithmetic operations using modular arithmetic rules

#### B. Congruence Modulo

- Define congruence modulo
- Apply the definition in various problems

#### C. Allegation and Mixture

- Understand the rule of allegation to produce a mixture at a given price
- Determine the mean price of a mixture
- Apply rule of allegation

#### D. Numerical Problems

- Solve real life problems mathematically

#### E. Boats and Streams

- Distinguish between upstream and downstream
- Express the problem in the form of an equation

#### F. Pipes and Cisterns

- Determine the time taken by two or more pipes to fill or

#### G. Races and Games

- Compare the performance of two players w.r.t. time,
- distance taken/distance covered/ Work done from the given data

#### H. Partnership

- Differentiate between active partner and sleeping partner
- Determine the gain or loss to be divided among the partners in the ratio of their investment with due
- consideration of the time volume/surface area for solid formed using two or more shapes

#### I. Numerical Inequalities

- Describe the basic concepts of numerical inequalities
- Understand and write numerical inequalities

### UNIT II: ALGEBRA

#### A. Matrices and types of matrices

- Define matrix
- Identify different kinds of matrices

#### B. Equality of matrices, Transpose of a matrix, Symmetric and Skew symmetric matrix

- Determine equality of two matrices
- Write transpose of given matrix
- Define symmetric and skew symmetric matrix

# Mathematics/Applied Mathematics (319)

## UNIT III: CALCULUS

### A. Higher Order Derivatives

- Determine second and higher order derivatives
- Understand differentiation of parametric functions and implicit functions Identify dependent and independent variables

### B. Marginal Cost and Marginal Revenue using derivatives

- Define marginal cost and marginal revenue
- Find marginal cost and marginal revenue

### C. Maxima and Minima

- Determine critical points of the function
- Find the point(s) of local maxima and local minima and corresponding local maximum and local minimum values
- Find the absolute maximum and absolute minimum value of a function

## UNIT IV: PROBABILITY DISTRIBUTIONS

### A. Probability Distribution

- Understand the concept of Random Variables and its Probability Distributions
- Find probability distribution of discrete random variable

### B. Mathematical Expectation

- Apply arithmetic mean of frequency distribution to find the expected value of a random variable

### C. Variance

- Calculate the Variance and S.D. of a random variable

## UNIT V: INDEX NUMBERS AND TIME BASED DATA

### A. Index Numbers

- Define Index numbers as a special type of average

### B. Construction of Index numbers

- Construct different type of index numbers

### C. Test of Adequacy of Index Numbers

- Apply time reversal test

## UNIT VI: UNIT V: INDEX NUMBERS AND TIME BASED DATA

### A. Population and Sample

- Define Population and Sample
- Differentiate between population and sample
- Define a representative sample from a population

### B. Parameter and Statistics and Statistical Inferences

- Define Parameter with reference to Population
- Define Statistics with reference to Sample



# Mathematics/Applied Mathematics (319)

- Explain the relation between Parameter and Statistic
- Explain the limitation of Statistic to generalize the estimation for population
- Interpret the concept of Statistical Significance and Statistical Inferences
- State Central Limit Theorem
- Explain the relation between Population-Sampling Distribution-Sample

## UNIT VII: INDEX NUMBERS AND TIME-BASED DATA

### A. Time Series

- Identify time series as chronological data

### B. Components of Time Series

- Distinguish between different components of time series

### C. Time Series analysis for univariate data

- Solve practical problems based on statistical data and Interpret

## UNIT VIII: FINANCIAL MATHEMATICS

### A. Perpetuity, Sinking Funds

- Explain the concept of perpetuity and sinking fund
- Calculate perpetuity
- Differentiate between sinking fund and saving account

### B. Valuation of Bonds

- Define the concept of valuation of bond and related terms
- Calculate value of bond using present value approach

### C. Calculation of EMI

- Explain the concept of EMI
- Calculate EMI using various methods

### D. Linear method of Depreciation

- Define the concept of linear method of Depreciation
- Interpret cost, residual value and useful life of an asset from the given information
- Calculate depreciation

## UNIT IX: LINEAR PROGRAMMING

### A. Introduction and related terminology

- Familiarize with terms related to Linear Programming Problem

### B. Mathematical formulation of Linear Programming Problem

- Formulate Linear Programming Problem

### C. Different types of Linear Programming Problems

- Identify and formulate different types of LPP

### D. Graphical Method of Solution for problems in two Variables

- Draw the Graph for a system of linear inequalities involving two variables and to find its solution graphically

# Mathematics/Applied Mathematics (319)

## E. Feasible and Infeasible Regions

- Identify feasible, infeasible and bounded regions

## F. Feasible and infeasible solutions, optimal feasible solution

- Understand feasible and infeasible solutions
- Find optimal feasible solution

**Syllabus  
for  
SECTION III  
GENERAL TEST (501)**

## GENERAL TEST

**Note:**

*There will be one Question Paper which will have 60 questions out of which 50 questions need to be attempted.*

The Question paper will contain questions from the following topics:

- General Knowledge, Current Affairs,
- General Mental Ability, Numerical Ability,
- Reasoning (Simple application of basic mathematical concepts Quantitative arithmetic / algebra geometry / mensuration / statistics),
- Logical and Analytical Reasoning.

**GEOGRAPHY/GEOLOGY-313**

**GEOGRAPHY/GEOLOGY  
SYLLABUS FOR CLASS 12**

*Note:*

*There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.*

## **GEOGRAPHY/GEOLOGY**

### **Fundamentals of Human Geography**

#### **Unit I: Human Geography: Nature and Scope**

#### **Unit II: People**

- Population of the world – distribution, density and growth;
- Population change-spatial patterns and structure; determinants of population change;
- Age-sex ratio; rural-urban composition;
- Human development – concept; selected indicators, international comparisons.

#### **Unit III: Human Activities**

- Primary activities – concept and changing trends; gathering, pastoral, mining, subsistence agriculture, modern agriculture; people engaged in agriculture and allied activities – some examples from selected countries;
- Secondary activities – concept; manufacturing: agro-processing, household, small scale, large scale; people engaged in secondary activities – some examples from selected countries;
- Tertiary activities – concept; trade, transport and communication; services; people engaged in tertiary activities – some examples from selected countries;
- Quaternary activities – concept; knowledge based industries; people engaged in quaternary activities – some examples from selected countries.

#### **Unit IV: Transport, Communication and Trade**

- Land transport – roads, railways – rail network; trans-continental railways;
- Water transport- inland waterways; major ocean routes;
- Air transport – Intercontinental air routes;
- Oil and gas pipelines;
- Satellite communication and cyber space;
- International trade – Basis and changing patterns; ports as gateways of international trade, role of WTO in International trade.

#### **Unit V: Human Settlements**

- Settlement types – rural and urban; morphology of cities (case study); distribution of megacities; problems of human settlements in developing countries.

# GEOGRAPHY/GEOLOGY-313

## India: People and Economy

### Unit I: *People*

- Population: distribution, density and growth; composition of population - linguistic, religious; sex, rural-urban and occupational - regional variations in growth of population ;
- Migration: international, national – causes and consequences;
- Human development – selected indicators and regional patterns;
- Population, environment and development.

### Unit II: *Human Settlements*

- Rural settlements – types and distribution;
- Urban settlements – types, distribution and functional classification.

### Unit III: *Resources and Development* (Periods 30)

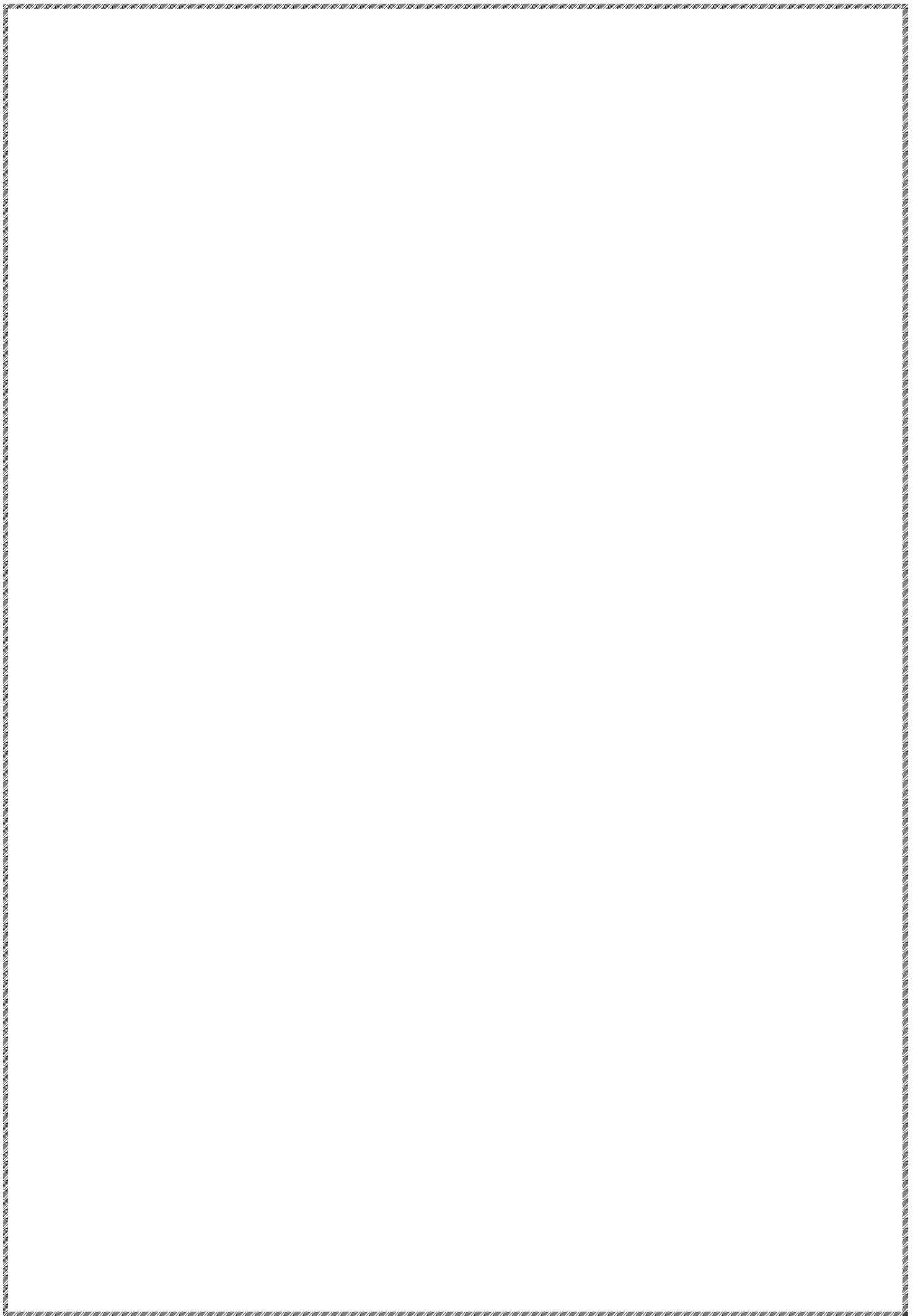
- Land resources – general land use; agricultural land use – major crops; agricultural development and problems, common property resources;
- Water resources – availability and utilization – irrigation, domestic, industrial and other uses; scarcity of water and conservation methods – rain water harvesting and watershed management (one case study related with participatory watershed management to be introduced) ;
- Mineral and energy resources – metallic and non-metallic minerals and their distribution; conventional and non-conventional energy sources;
- Industries – types and distribution; industrial location and clustering; changing pattern of selected industries – iron and steel, cotton textiles, sugar, petrochemicals, and knowledge based industries; impact of liberalisation, privatisation and globalisation on industrial location;
- Planning in India – target area planning (case study); idea of sustainable development (case study).

### Unit IV: *Transport, Communication and International Trade*

- Transport and communication — roads, railways, waterways and airways; oil and gas pipelines; national electric grids; communication networkings – radio, television, satellite and internet;
- International trade — changing pattern of India's foreign trade; sea ports and their hinterland and airports.

### Unit V: *Geographical Perspective on Selected Issues and Problems*

- Environmental pollution; urban-waste disposal;
- Urbanisation-rural-urban migration; problem of slums;
- Land Degradation.





**ECONOMICS /  
BUSINESS  
ECONOMICS-309  
Syllabus for Class 12**

# ECONOMICS/BUSINESS ECONOMICS-309

*Note:*

*There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.*

## **Unit I: Introduction to Microeconomics**

- What is microeconomics?
- Central problems

## **Unit II: Consumer Behaviour and Demand**

- **Consumer's Equilibrium:** meaning and attainment of equilibrium through Utility Approach: One and two commodity cases.
- **Demand:** market demand, determinants of demand, demand schedule, demand curve, movement along and shifts in the demand curve, price elasticity of demand, measurement of price elasticity of demand – percentage, total expenditure, and geometric methods

## **Introductory Macroeconomics**

### **Unit III: National Income and Related Aggregates — Basic Concepts and Measurement**

- Macroeconomics: meaning.
- Circular flow of income, concepts of GDP, GNP, NDP, NNP (at market price and factor cost).
- Measurement of National Income – Value Added method, Income method, and Expenditure method.

### **Unit IV: Determination of Income and Employment**

- Aggregate demand, aggregate supply, and their components
- Propensity to consume and propensity to save (average and marginal)
- Meaning of involuntary unemployment and full employment
- Determination of income and employment: two-sector model
- Concept of investment multiplier and its working
- Problems of excess and deficient demand
- Measures to correct excess and deficient demand – availability of credit, change in government spending

### **Unit V: Money and Banking**

- Money: meaning, evolution, and functions
- Central bank: meaning and functions
- Commercial banks: meaning and functions

### **Unit VI: Government Budget and the Economy**

- Government budget – meaning and its components
- Objectives of government budget
- Classification of receipts – revenue and capital; classification of expenditure – revenue and capital, plan and non-plan, and developmental and non-developmental

- Balanced budget, surplus budget, and deficit budget: meaning and implications
- Revenue deficit, fiscal deficit, and primary deficit: meaning and implications; measures to contain different deficits.

### Unit VII: Balance of Payments

- Foreign exchange rate – meaning (fixed and flexible), merits and demerits; determination through demand and supply
- Balance of payments accounts – meaning and components
- A brief analysis of recent exchange rate issues

## INDIAN ECONOMIC DEVELOPMENT

### Unit VIII: Development Experience (1947-90) and Economic Reforms since 1991

A brief introduction of the state of the Indian economy on the eve of independence. Indian economic system and common goals of Five year Plans.

Main features, problems and policies of agriculture (institutional aspects and new agricultural strategy), industry (IPR 1956; SSI – role & importance) and foreign trade.

### Unit IX: Current challenges facing the Indian Economy

**Poverty** – absolute and relative; Main programmes for poverty alleviation: A critical assessment;

**Human Capital Formation** – How many people become resource; Role of human capital in economic development;

**Rural development:** Key issues – credit and marketing – role of cooperatives; agricultural diversification;

**Employment:** Growth and changes in work force participation rate in formal and informal sectors; problems and policies

**Infrastructure:** Meaning and Types: Cases Studies: Health: Problems and Policies – A critical assessment;

**Sustainable Economic Development:** Meaning, Effects of Economic Development on Resources and Environment, including global warming

### Unit X: Development Experience of India

- A comparison with neighbours
- India and Pakistan
- India and China
- Issues: economic growth, population, sectoral development and other Human Development Indicators

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# **Computer Science/ Informatics Practices - 308 Syllabus for Class 12**

# Computer Science/Informatics Practices

- 308

*Note:*

*There will be one Question Paper which will contain Two Sections i.e. Section A and Section B [B1 and B2].*

*Section A will have 15 questions covering both i.e. Computer Science/Informatics Practices which will be compulsory for all candidates*

*Section B1 will have 35 questions from Computer Science out of which 25 questions need to be attempted.*

*Section B2 will have 35 questions purely from Informatics Practices out of which 25 question will be attempted.*

## Section A

### Exception and File Handling in Python

Exception Handling: syntax errors, exceptions, need of exception handling, user-defined exceptions, raising exceptions, handling exceptions, catching exceptions, Try - except - else clause, Try - finally clause, recovering and continuing with finally, built-in exception classes.

File Handling: text file and binary file, file types, open and close files, reading and writing text files, reading and writing binary files using pickle module, file access modes.

### Database Concepts

Introduction to database concepts, difference between database and file system, relational data model: concept of domain, tuple, relation, keys - candidate key, primary key, alternate key, foreign key;

*Relational algebra:* selection, projection, union, set difference and cartesian product;

### Structured Query Language

Advantages of using Structured Query Language, Data Definition Language, Data Query Language and Data Manipulation Language, Introduction to MySQL, Creating a database using MySQL, Data Types

Data Definition: CREATE TABLE, DROP TABLE, ALTER TABLE,

Data Query: SELECT, FROM, WHERE

Data Manipulation: INSERT, UPDATE, DELETE

Math functions: POWER (), ROUND (), MOD ().

Text functions: UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (), LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().

Date Functions: NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().

Aggregate Functions: MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT (\*). Querying and manipulating data using Group by, Having, Order by.

Operations on Relations - Union, Intersection, Minus, Cartesian Product, JOIN

## Computer Networks

Introduction to computer networks, Evolution of networking,

*Network types:* LAN, WAN, MAN

Network devices: Modem, Ethernet Card, Repeater, Hub, Switch, Router, Gateway.

Network Topologies: Mesh, Ring, Bus, Star, and Tree topologies

Basic concept of MAC and IP Address Difference

between Internet and web

# Section B1: Computer Science

## Chapter 1: Exception and File Handling in Python

Exception Handling: syntax errors, exceptions, need of exception handling, user-defined exceptions, raising exceptions, handling exceptions, catching exceptions, Try - except - else clause, Try - finally clause, recovering and continuing with finally, built-in exception classes.

File Handling: text file and binary file, file types, open and close files, reading and writing text files, reading and writing binary files using pickle module, file access modes.

## Chapter 2: Stack

Stack (List Implementation): Introduction to stack (LIFO Operations), operations on stack (PUSH and POP) and its implementation in python. Expressions in Prefix, Infix and postfix notations, evaluating arithmetic expressions using stack, conversion of Infix expression to postfix expression

### Chapter 3: Queue

Queue (List Implementation): Introduction to Queue (FIFO), Operations on Queue (INSERT and DELETE) and its implementation in Python.

Introduction to DQueue and its implementation in Python.

### Chapter 4: Searching

Searching: Sequential search, Binary search, Analysis of Sequential and Binary Search. Dry run to identify best, worst and average cases. Implementation of searching techniques in Python.

### Chapter 5: Sorting

Overview of sorting techniques, Bubble Sort, Selection Sort and Insertion Sort. Dry run to identify best, worst and average cases. Implementation of sorting techniques in Python.

Hashing: Hash Functions, Collision Resolution, Implementing the Map Abstract Data Type.

### Chapter 6: Understanding Data

Data and its purpose, collection and organization; understanding data using statistical methods: mean, median, standard deviation, variance; data interpretation; visualization of data.

### Chapter 7: Database Concepts

Introduction to database concepts, difference between database and file system, relational data model: concept of domain, tuple, relation, keys - candidate key, primary key, alternate key, foreign key;

*Relational algebra*: selection, projection, union, set difference and cartesian product;

### Chapter 8: Structured Query Language

Advantages of using Structured Query Language, Data Definition Language, Data Query Language and Data Manipulation Language, Introduction to MySQL, Creating a database using MySQL, Data Types

Data Definition: CREATE TABLE, DROP TABLE, ALTER TABLE,

Data Query: SELECT, FROM, WHERE

Data Manipulation: INSERT, UPDATE, DELETE

Math functions: POWER (), ROUND (), MOD ().

Text functions: UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (), LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().

Date Functions: NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().

Aggregate Functions: MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT (\*). Querying and manipulating data using Group by, Having, Order by.

Operations on Relations - Union, Intersection, Minus, Cartesian Product, JOIN

## Chapter 9: Computer Networks

Introduction to computer networks, Evolution of networking,

*Network types:* LAN, WAN, MAN

Network devices: Modem, Ethernet Card, Repeater, Hub, Switch, Router, Gateway.

Network Topologies: Mesh, Ring, Bus, Star, and Tree topologies

Basic concept of MAC and IP Address

Difference between Internet and web

## Section B2: Informatics Practices

### Chapter 1: Database Query using SQL

*Math functions:* POWER (), ROUND (), MOD ().

*Text functions:* UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (),LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().

*Date Functions:* NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().

*Aggregate Functions:* MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT (\*).Querying and manipulating data using Group by, Having, Order by.

*Operations on Relations* - Union, Intersection, Minus, Cartesian Product, JOIN

### Chapter 2: Data Handling using Pandas – I

Introduction to Python libraries- Pandas, NumPy,



Matplotlib. Data structures in Pandas - Series and DataFrames.

Series: Creation of Series from – and array, dictionary, scalar value; mathematical operations; Head and Tail functions; Selection, Indexing, and Slicing.

DataFrames: creation - from the dictionary of Series, list of dictionaries, Text/CSV files; display; iteration; Operations on Rows and columns: add, select, delete, rename; Head and Tail functions; Indexing using Labels, Boolean Indexing; Styling & Formatting data, Head and Tail functions; Joining, Merging and Concatenations.

Importing/Exporting Data between CSV files and DataFrames.

### **Chapter 3: Data Handling using Pandas – II**

Descriptive Statistics: max, min, count, sum, mean, median, mode, quartile, Standard deviation, variance.

DataFrame operations: Aggregation, group by, Sorting, Deleting and Renaming Index, Pivoting. Handling missing values – dropping and filling.

Importing/Exporting Data between MySQL database and Pandas.

### **Chapter 4: Plotting Data using Matplotlib**

Purpose of plotting; drawing and saving the following types of plots using Matplotlib – line plot, bargraph, histogram, pie chart, frequency polygon, box plot, and scatter plot.

Customizing plots: color, style (dashed, dotted), width; adding label, title, and legend in plots.

### **Chapter 5: Introduction to Computer Networks**

Introduction to Networks, Types of networks: LAN, MAN, WAN.

Network Devices: modem, hub, switch, repeater, router, gateway

Network Topologies: Star, Bus, Tree, Mesh.

Introduction to Internet, URL, WWW, and its applications- Web, email, Chat, VoIP.

Website: Introduction, the difference between a website and webpage, static vs dynamic web page, webserver, and hosting of a website.

Web Browsers: Introduction, commonly used browsers, browser settings, add-ons and plug-ins, cookies.

### **Chapter 6: Societal Impacts**

Digital footprint, Etiquettes for Net surfing and for communicating through social media, data protection, Intellectual Property Rights (IPR) and their violation, plagiarism licensing and copyrights, Free and Open Source Software (FOSS), Cybercrime and cyber laws, hacking,

phishing, cyberbullying, Overview of Indian IT Act, preventing cybercrime.

E-waste its a hazard and management

Awareness about health concerns related to the usage of technology like effect on eyesight, physiological issues, and ergonomic aspects.

## Chapter 10: Data Communication

Concept of communication, Types of Data Communication, switching techniques

*Communication Media:* Wired Technologies – Twisted pair cable, Co-axial cable, Ethernet Cable, Optical Fibre;

Introduction to mobile telecommunication technologies

Wireless Technologies – Bluetooth, WLAN, Infrared,

Microwave

*Network Protocol:* Need for Protocol, Categorization and Examples of protocol, HTTP, FTP, IP, PPP; electronic mail protocol

Concept of Channel, Bandwidth (Hz, KHz, MHz) and Data Transfer rate (bps, Kbps, Mbps, Gbps, Tbps)

## Chapter 11: Security Aspects

Threats and prevention: Viruses, Worms, Trojan horse, Spam, Cookies, Adware, Firewall, http vs https

Network Security Concepts: Firewall, Cookies, Hackers and Crackers

Antivirus and their workings

Network security threats: Denial of service, Intrusion problems, Snooping, Eavesdropping

# **Chemistry - 306**

# **Syllabus for Class 12**

Note:

There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

## CHEMISTRY - 306

### Unit I: Solid State

Classification of solids based on different binding forces: molecular, ionic covalent, and metallic solids, amorphous and crystalline solids (elementary idea), unit cell in two dimensional and three-dimensional lattices, calculation of density of unit cell, packing in solids, packing efficiency, voids, number of atoms per unit cell in a cubic unit cell, point defects, electrical and magnetic properties, Band theory of metals, conductors, semiconductors and insulators and  $n$  and  $p$ -type semiconductors.

### Unit II: Solutions

Types of solutions, expression of concentration of solutions of solids in liquids, the solubility of gases in liquids, solid solutions, colligative properties – the relative lowering of vapour pressure, Raoult's law, elevation

of B.P., depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, Vant Hoff factor.

### Unit III: Electrochemistry

Redox reactions; conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells; lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells. Relation between Gibbs energy change and EMF of a cell, fuel cells; corrosion.

### Unit IV: Chemical Kinetics

Rate of a reaction (average and instantaneous), factors affecting rates of reaction: concentration, temperature, catalyst; order and molecularity of a reaction; rate law and specific rate constant, integrated rate equations, and half-life (only for zero and first-order reactions); concept of collision theory (elementary idea, no mathematical treatment). Activation energy, Arrhenius equation.

### Unit V: Surface Chemistry

*Adsorption* – physisorption and chemisorption; factors affecting adsorption of gases on solids; catalysis: homogenous and heterogeneous, activity and selectivity: enzyme catalysis; colloidal state: the distinction between true solutions, colloids, and suspensions; lyophilic, lyophobic multimolecular and macromolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation; emulsions – types of emulsions.

### Unit VI: General Principles and Processes of Isolation of Elements

*Principles and methods of extraction* – concentration, oxidation, reduction electrolytic method, and refining; occurrence and principles of extraction of aluminum, copper, zinc, and iron.

### Unit VII: $p$ -Block Elements

*Group 15 elements:* General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; nitrogen – preparation, properties, and uses; compounds of nitrogen: preparation and properties of ammonia and nitric acid, oxides of nitrogen (structure only); Phosphorous-allotropic forms; compounds of phosphorous: preparation and properties of phosphine, halides ( $PCl_3$ ,  $PCl_5$ ) and oxoacids (elementary idea only).

**Group 16 elements:** General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; dioxygen: preparation, properties, and uses; classification of oxides; ozone. Sulphur – allotropic forms; compounds of sulphur: preparation, properties, and uses of sulphur dioxide; sulphuric acid: industrial process of manufacture, properties and uses, oxoacids of sulphur (structures only).

**Group 17 elements:** General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; compounds of halogens: preparation, properties and uses of chlorine and hydrochloric acid, interhalogen compounds, oxoacids of halogens (structures only).

**Group 18 elements:** General introduction, electronic configuration, occurrence, trends in physical and chemical properties, uses.

### **Unit VIII: *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 IX Coordination Compounds**

**Coordination compounds:** Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds, bonding, Werner's theory VBT, CFT; isomerism (structural and stereo) importance of coordination compounds (in qualitative analysis, extraction of metals and biological systems).

### **Unit X: Haloalkanes and Haloarenes**

**Haloalkanes:** Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions. Optical rotation.

**Haloarenes:** Nature of C-X bond, substitution reactions (directive influence of halogen for monosubstituted compounds only).

Uses and environmental effects of – dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

### **Unit XI: 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 XII: Aldehydes, Ketones, and Carboxylic Acids**

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

**Carboxylic Acids:** Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

## Unit XIII: Organic Compounds Containing Nitrogen

*Amines*: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary secondary, and tertiary amines.

*Cyanides and Isocyanides* – will be mentioned at relevant places in context.

*Diazonium salts*: Preparation, chemical reactions, and importance in synthetic organic chemistry.

## Unit XIV: Biomolecules

*Carbohydrates* – Classification (aldoses and ketoses), monosaccharide (glucose and fructose), D-L configuration, oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen): importance.

*Proteins* - Elementary idea of  $\alpha$ -amino acids, peptide bond, polypeptides, proteins, primary structure, secondary structure, tertiary structure and quaternary structure (qualitative idea only), denaturation of proteins; enzymes.

***Hormones* –Elementary idea (excluding structure).**

*Vitamins* – Classification and functions.

*Nucleic Acids*: DNA and RNA

## Unit XV: Polymers

*Classification* – Natural and synthetic, methods of polymerization (addition and condensation), copolymerization. Some important polymers: natural and synthetic like polythene, nylon, polyesters, bakelite, rubber. Biodegradable and non-biodegradable polymers.

## Unit XVI: Chemistry in Everyday Life

1. Chemicals in medicines – analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines.
2. Chemicals in food – preservatives, artificial sweetening agents, **elementary idea of antioxidants**.
3. Cleansing agents – soaps and detergents, cleansing action.

**BUSINESS STUDIES - 305**

**BUSINESS STUDIES - 305  
SYLLABUS FOR CLASS 12**

# BUSINESS STUDIES – 305

*Note:*

*There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.*

## ***Principles and Functions of Management***

### **Unit I: Nature and Significance of Management**

- Management – concept, objectives, importance.
- Nature of management; Management as Science, Art, Profession.
- Levels of management – top, middle supervisory (First level).
- Management functions – planning, organizing, staffing, directing, and controlling.
- Coordination – nature, and importance.

### **Unit II: Principles of Management**

- Principles of Management – meaning, nature and significance.
- Fayol's principles of management.
- Taylor's Scientific Management – Principles and Techniques.

### **Unit III: Business Environment**

- Business Environment – meaning and importance.
- Dimensions of Business Environment – Economic, Social, Technological, Political, and Legal.
- Economic Environment in India; Impact of Government policy changes on business and industry, with special reference to the adoption of the policies of liberalization privatization, and globalization.

### **Unit IV: Planning**

- Meaning, features, importance, limitations.
- Planning process.
- Types of Plans – Objectives, Strategy, Policy, Procedure, Method, Rule, Budget, Programme

### **Unit V: Organising**

- Meaning and importance.
- Steps in the process of organizing.
- Structure of organization – functional, and divisional.
- Formal and informal organization.
- Delegation: meaning elements and importance.
- Decentralization: meaning and importance.
- Difference between delegation and decentralization.

### **Unit VI: Staffing**

- Meaning, need, and importance of staffing.
- Staffing as a part of Human Resources Management.
- Steps in the staffing process.
- Recruitment – meaning and sources.
- Selection – meaning and process.
- 
- Training and Development – meaning, need, methods – on the job and off the job methods of



# BUSINESS STUDIES - 305

training.

## Unit VII: Directing

- Meaning, importance, and principles.
- Elements of Direction:
  - Supervision – meaning and importance
    - Motivation – meaning and importance, Maslow's hierarchy of needs; Financial and non-financial incentives.
  - Leadership – meaning, importance; qualities of a good leader.
  - Communication – meaning and importance, formal and informal communication; barriers to effective communication.

## Unit VIII: Controlling

- Meaning and importance.
- Relationship between planning and controlling.
- Steps in the process of control.
- Techniques of controlling.

## Business Finance and Marketing

### Unit IX: Business Finance

- Business finance – meaning, role, objectives of financial management.
- Financial planning – meaning and importance.
- Capital Structure – meaning and factors.
- Fixed and Working Capital – meaning and factors affecting their requirements.

### Unit X: Financial Markets

- Concept of Financial Market: Money Market – nature instruments;
- Capital market: nature and types – primary and secondary market.
- The distinction between capital market and money market.
- Stock Exchange – meaning, functions, NSEI, OTCI, Trading Procedure.
- Securities and Exchange Board of India (SEBI) – Objectives, Functions.

### Unit XI: Marketing

- Marketing – meaning, functions, role.
- The distinction between marketing and selling.
- Marketing mix – concept and elements:
  - Product – nature, classification, branding, labeling, and packaging
  - Physical distribution: meaning, role; Channels of distribution, – meaning, types, factors, determining the choice of channels.
  - Promotion – meaning and role, promotion mix, Role of Advertising and personal selling; objections to Advertising.
  - Price: factors influencing pricing.

## **Unit XII: *Consumer Protection***

- Importance of consumer protection.
- Consumer rights.
- Consumer responsibilities.
- Ways and means of consumer protection – Consumer awareness and legal redressal with special reference to the Consumer Protection Act.
- Role of consumer organizations and NGOs.

## **Unit XIII: *Entrepreneurship Development***

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

**BIOLOGY/BIOLOGICAL STUDIES/BIOTECHNOLOGY/ BIOCHEMISTRY-304**

**BIOLOGY/BIOLOGICAL  
STUDIES/BIOTECHNOLOGY/  
BIOCHEMISTRY**

**(304)**

**Syllabus for Class 12**

*Note:*

*There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.*

## **BIOLOGY/BIOLOGICAL STUDIES/BIOTECHNOLOGY/BIOCHEMISTRY**

### **Unit I: Reproduction**

Reproduction in organisms: Reproduction, a characteristic feature of all organisms for continuation of species; Modes of reproduction – Asexual and sexual; Asexual reproduction; Modes- Binary fission, sporulation, budding, gemmule, fragmentation; vegetative propagation in plants.

Sexual reproduction in flowering plants: Flower structure; Development of male and female gametophytes; Pollination–types, agencies and examples; Outbreedings 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 and fruit formation.

Human Reproduction: Male and female reproductive systems; Microscopic anatomy of testis and ovary; Gametogenesis- spermatogenesis & oogenesis; Menstrual cycle; Fertilisation, embryo development upto blastocyst formation, implantation; Pregnancy and placenta formation (Elementary idea); Parturition (Elementary idea); Lactation (Elementary idea).

Reproductive health: Need for reproductive health and prevention of sexually transmitted diseases(STD); 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 II: Genetics and Evolution**

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, honey bee; Linkage and crossing over; Sex linked inheritance- Haemophilia, Colour blindness; Mendelian disorders in humans– Thalassaemia; Chromosomal disorders in humans; Down’s syndrome, Turner’s and Klinefelter’s syndromes.

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 genome project; DNA fingerprinting.

Evolution: Origin of life; Biological evolution and evidences for biological evolution (Paleontological, comparative anatomy, embryology and molecular evidence); 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 III: Biology and Human Welfare**

Health and Disease: Pathogens; parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm); Basic concepts of immunology–vaccines; Cancer, HIV and AIDS; Adolescence, drug and alcohol abuse.

Improvement in food production: Plant breeding, tissue culture, single cell protein, Biofortification; Apiculture and Animal husbandry.

Microbes in human welfare: In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers.

## Unit IV: Biotechnology and Its Applications

Principles and process of Biotechnology: Genetic engineering (Recombinant DNA technology).

Application of Biotechnology in health and agriculture: Human insulin and vaccine production, genetherapy; Genetically modified organisms- Bt crops; Transgenic Animals; Biosafety issues– Biopiracy and patents.

## Unit V: Ecology and environment

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.

Ecosystems: Patterns, components; productivity and decomposition; Energy flow; Pyramids of number, biomass, energy; Nutrient cycling (carbon and phosphorous); Ecological succession; Ecological Services– Carbon fixation, pollination, oxygen release.

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 and sanctuaries.

Environmental issues: Air pollution and its control; Water pollution and its control; Agrochemicals and their effects; Solid waste management; Radioactive waste management; Greenhouse effect and global warming; Ozone depletion; Deforestation; Any three case studies as success stories addressing environmental issues.

# **FINE ARTS -312**

## **FINE ARTS (312)**

### **(Painting, Sculpture, Graphics and Commerical Arts)**

### **Syllabus of Class 12**

# FINE ARTS -312

**Note:**

*There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.*

## FINE ARTS (312)

### PAINTING

**Unit 1: The Rajasthani and Pahari Schools of Miniature Painting**

**Unit 2: The Mughal and Deccan schools of miniature painting**

**Unit 3: The Bengal School and Cultural Nationalism**

**Unit 4: The Modern trends In Indian Art**

**Unit 1: The Rajasthani and Pahari Schools of Miniature Painting (16<sup>th</sup> Century A.D to 19<sup>th</sup> Century A.D.)**

Introduction to Indian Miniature Schools: Western-Indian, Pala, Rajasthani, Mughal, Central India, Deccan, and Pahari.

(A) ***The Rajasthani Schools***

1. Origin and development of the following schools in brief:  
Mewar, Bundi, Bikaner, Kishangarh, and Jaipur, and the main features of the Rajasthani schools.
2. Study of the following Rajasthani paintings:

<b>Title / Set / Painter</b>	<b>School</b>
• A Folio from Ramayana paintings of Sahibdin	Mewar
• One Court scene or Hunting scene or Festival scene	Mewar Jagat Singh II
• One Folio from Ragamala or Rasikapriya	Bundi
• One painting of a Hunting Scene in a Forest Maharaja	Kotah with Kotah
• Radha (Bani-Thani) by Nihal Chand	Kishangarh
• Pabuji Ki Phad, Folk Scroll painting	Bhilwara
• Maru-Ragini	Mewar
• Raja Aniruddha Singh Hara	Bundi
• Chaugan Players	Jodhpur

# FINE ARTS -312

- Krishna on swing Bikaner
- Radha (Bani- Thani) Kishangarh
- Bharat Meets Rama at Chitrakuta Jaipur

## **(B) The Pahari Schools:**

1. Origin and development of Basohli, Guler, and Kangra schools in brief and main features of the Pahari schools
2. Study of the following Pahari Paintings:

<b>Title / Set / Painter</b>	<b>School</b>
• One Folio of Ramayana (Sangri – Early Phase) One Folio of Gita Govinda of Jaideva by Manaku	Basohli Guler
• One Krishna Lila or Bhagavata Purana Sukh	Kangra Folio by Nain
• One painting from Nayaka Nayika Baramasa or Ragamala	Guler or Kangra or
• Krishna with Gopis • Nand, Yashoda and Krishna with Kinsmen Going to Vrindavana	Basohli Kangra

## **Unit 2: The Mughal and Deccani Schools of miniature painting (16<sup>th</sup> Century A.D. to 19<sup>th</sup> Century A.D.)**

### **1. The Mughal School**

1. Origin and development of the Mughal school in brief and main features of the Mughal School
2. Study of the following Mughal Paintings:

<b>Title</b>	<b>Painter</b>	<b>School</b>
• A Folio from Akbar Namah	Basawan	Akbar
• Baber Crossing the river Sone	Jagannath	Akbar
• Krishna Lifting Mount Govardhana	Miskin	Akbar
• Birth of Salim	Ramdass	Akbar
• Jahangir holding the picture	Abul Hassan	Jahangir
• Falcon on Bird-Rest	Ustad Mansoor	Jahangir





# FINE ARTS -312

## 2. The Deccani School

1. Origin and development of the Deccani school and Main features of the Deccan School.

### 2. Study of the following Deccani Paintings:

- |   |            |
|---|------------|
| a. Ibrahim AdilShah II of Bijapur           | Bijapur    |
| b. Raga Hindola                             | Ahmednagar |
| c. Ragini Pat-hamsika                       | Ahmednagar |
| d. Hazart Nizamuddin Auliya and Amir Khusro | Hyderabad  |
| e. Chand Bibi Playing Polo (Chaugan)        | Golconda   |

## Unit 3: The Bengal School and Cultural Nationalism

- New Era in Indian art-an introduction

### ● Study of the following paintings:

- |   |                         |
|---|-------------------------|
| (i) Rama Vanquishing the pride of the ocean | Raja Ravi Verma         |
| (ii) Journey's End                          | Abanidranath Tagore     |
| (iii) Parthasarthi                          | Nandlal Bose            |
| (ii) Ghalib's Poetry Painting based on      | M.A.R. Chughtai         |
| (iii) Select a cubistic painting            | Gaganendranath Tagore   |
| (iv) Mother and child                       | Jamini Roy              |
| (v) Female Face                             | Rabindranath Tagore     |
| (vi) Hill Women                             | Amrita Sher Gill        |
| (vii) Shiv and Sati                         | Nandlal Bose            |
| (viii) Rasa-Lila                            | Kshitindranath Majumdar |
| (ix) Radhika                                | M.A.R. Chughtai         |
| (vii) Meghdoot                              | Ram Gopal Vijaivargiya  |

- National flag and the Symbolic significance of its forms and the colours.
- Contribution of Indian artists in the struggle for National Freedom Movement
- Tiller of the Soil-Nandlal Bose.

## Unit 4: The Modern trends In Indian Art Introduction

S.No	Painting	Artist/Painter
i.	Mother Teresa	M.F. Hussain
ii.	Birth of Poetry	K.K. Hebbar
iii.	Gossip	N.S. Bendre

# FINE ARTS -312

iv.	Tantric Painting	G.R. Santosh
v.	Words and images	K.C.S. Pannikar
vi.	Rama Vanquishing the Pride of the Ocean	Raja Ravi Varma
vii.	Mother and child	Jamini Roy
viii.	Haldi Grinders	Amrita Sher Gil
ix.	Mother Teresa	M.F. Husain
x.	The Vulture	Kamlesh Dutt Pande

## Sculpture

### Study of the following sculptures:

(i)	Triumph of Labour	D. P. Roychowdhury
(ii)	Santhal Family	Raminker Vajj
(iii)	Standing Woman	Dhanraj Bhagat
(iv)	Cries Unheard	Amar Nath Sehgal
(v)	Ganesh Figure	P.V.Jankiram
(vi)	Dhanpal	Sankho Chaudhuri
(vii)	Chatturmukhi	Aekka Yada Giri Rao

## Graphic-Prints

(i)	Whirlpool	Krishna Reddy
(ii)	Children	Somnath Hore
(iii)	Devi	Jyoti Bhatt
(iv)	Of walls	Anupam Sud
(v)	Man, Woman and Tree	K. Laxma Goud

# **FINE ARTS -312**

## **FINE ARTS (312)**

### **(Painting, Sculpture, Graphics and Commerical Arts)**

#### **Syllabus of Class 12**

# FINE ARTS -312

**Note:**

*There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.*

## FINE ARTS (312)

### PAINTING

**Unit 1: The Rajasthani and Pahari Schools of Miniature Painting**

**Unit 2: The Mughal and Deccan schools of miniature painting**

**Unit 3: The Bengal School and Cultural Nationalism**

**Unit 4: The Modern trends In Indian Art**

**Unit 1: The Rajasthani and Pahari Schools of Miniature Painting (16<sup>th</sup> Century A.D to 19<sup>th</sup> Century A.D.)**

Introduction to Indian Miniature Schools: Western-Indian, Pala, Rajasthani, Mughal, Central India, Deccan, and Pahari.

(A) ***The Rajasthani Schools***

1. Origin and development of the following schools in brief:  
Mewar, Bundi, Bikaner, Kishangarh, and Jaipur, and the main features of the Rajasthani schools.
2. Study of the following Rajasthani paintings:

<b>Title / Set / Painter</b>	<b>School</b>
• A Folio from Ramayana paintings of Sahibdin	Mewar
• One Court scene or Hunting scene or Festival scene	Mewar Jagat Singh II
• One Folio from Ragamala or Rasikapriya	Bundi
• One painting of a Hunting Scene in a Forest Maharaja	Kotah with Kotah
• Radha (Bani-Thani) by Nihal Chand	Kishangarh
• Pabuji Ki Phad, Folk Scroll painting	Bhilwara
• Maru-Ragini	Mewar
• Raja Aniruddha Singh Hara	Bundi
• Chaugan Players	Jodhpur

# FINE ARTS -312

- Krishna on swing Bikaner
- Radha (Bani- Thani) Kishangarh
- Bharat Meets Rama at Chitrakuta Jaipur

## **(B) The Pahari Schools:**

1. Origin and development of Basohli, Guler, and Kangra schools in brief and main features of the Pahari schools
2. Study of the following Pahari Paintings:

<b>Title / Set / Painter</b>	<b>School</b>
• One Folio of Ramayana (Sangri – Early Phase) One Folio of Gita Govinda of Jaideva by Manaku	Basohli Guler
• One Krishna Lila or Bhagavata Purana Sukh	Kangra Folio by Nain
• One painting from Nayaka Nayika Baramasa or Ragamala	Guler or Kangra or
• Krishna with Gopis • Nand, Yashoda and Krishna with Kinsmen Going to Vrindavana	Basohli Kangra

## **Unit 2: The Mughal and Deccani Schools of miniature painting (16<sup>th</sup> Century A.D. to 19<sup>th</sup> Century A.D.)**

### **1. The Mughal School**

1. Origin and development of the Mughal school in brief and main features of the Mughal School
2. Study of the following Mughal Paintings:

<b>Title</b>	<b>Painter</b>	<b>School</b>
• A Folio from Akbar Namah	Basawan	Akbar
• Baber Crossing the river Sone	Jagannath	Akbar
• Krishna Lifting Mount Govardhana	Miskin	Akbar
• Birth of Salim	Ramdass	Akbar
• Jahangir holding the picture	Abul Hassan	Jahangir
• Falcon on Bird-Rest	Ustad Mansoor	Jahangir

# FINE ARTS -312

- |   |                        |                             |
|---|------------------------|-----------------------------|
| • Kabir and Raidas                      | Ustad Faquirullah Khan | Shajahan                    |
| • Marriage procession of<br>Dara Shikoh | Haji Madni             | Provincial<br>Mughal (Oudh) |

# FINE ARTS -312

## 2. The Deccani School

1. Origin and development of the Deccani school and Main features of the Deccan School.

### 2. Study of the following Deccani Paintings:

- |   |            |
|---|------------|
| a. Ibrahim AdilShah II of Bijapur           | Bijapur    |
| b. Raga Hindola                             | Ahmednagar |
| c. Ragini Pat-hamsika                       | Ahmednagar |
| d. Hazart Nizamuddin Auliya and Amir Khusro | Hyderabad  |
| e. Chand Bibi Playing Polo (Chaugan)        | Golconda   |

## Unit 3: The Bengal School and Cultural Nationalism

- New Era in Indian art-an introduction

### ● Study of the following paintings:

- |   |                         |
|---|-------------------------|
| (i) Rama Vanquishing the pride of the ocean | Raja Ravi Verma         |
| (ii) Journey's End                          | Abanidranath Tagore     |
| (iii) Parthasarthi                          | Nandlal Bose            |
| (ii) Ghalib's Poetry Painting based on      | M.A.R. Chughtai         |
| (iii) Select a cubistic painting            | Gaganendranath Tagore   |
| (iv) Mother and child                       | Jamini Roy              |
| (v) Female Face                             | Rabindranath Tagore     |
| (vi) Hill Women                             | Amrita Sher Gill        |
| (vii) Shiv and Sati                         | Nandlal Bose            |
| (viii) Rasa-Lila                            | Kshitindranath Majumdar |
| (ix) Radhika                                | M.A.R. Chughtai         |
| (vii) Meghdoot                              | Ram Gopal Vijaivargiya  |

- National flag and the Symbolic significance of its forms and the colours.
- Contribution of Indian artists in the struggle for National Freedom Movement
- Tiller of the Soil-Nandlal Bose.

## Unit 4: The Modern trends In Indian Art Introduction

S.No	Painting	Artist/Painter
i.	Mother Teresa	M.F. Hussain
ii.	Birth of Poetry	K.K. Hebbar
iii.	Gossip	N.S. Bendre



# FINE ARTS -312

iv.	Tantric Painting	G.R. Santosh
v.	Words and images	K.C.S. Pannikar
vi.	Rama Vanquishing the Pride of the Ocean	Raja Ravi Varma
vii.	Mother and child	Jamini Roy
viii.	Haldi Grinders	Amrita Sher Gil
ix.	Mother Teresa	M.F. Husain
x.	The Vulture	Kamlesh Dutt Pande

## Sculpture

### Study of the following sculptures:

(i) Triumph of Labour	D. P. Roychowdhury
(ii) Santhal Family	Raminker Vajj
(iii) Standing Woman	Dhanraj Bhagat
(iv) Cries Unheard	Amar Nath Sehgal
(v) Ganesha Figure	P.V.Jankiram
(vi) Dhanpal	Sankho Chaudhuri
(vii) Chatturmukhi	Aekka Yada Giri Rao

## Graphic-Prints

(i) Whirlpool	Krishna Reddy
(ii) Children	Somnath Hore
(iii) Devi	Jyoti Bhatt
(iv) Of walls	Anupam Sud
(v) Man, Woman and Tree	K. Laxma Goud

# **FINE ARTS -312**

## **FINE ARTS (312)**

### **(Painting, Sculpture, Graphics and Commerical Arts)**

#### **Syllabus of Class 12**

# FINE ARTS -312

**Note:**

*There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.*

## FINE ARTS (312)

### PAINTING

**Unit 1: The Rajasthani and Pahari Schools of Miniature Painting**

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**Unit 3: The Bengal School and Cultural Nationalism**

**Unit 4: The Modern trends In Indian Art**

**Unit 1: The Rajasthani and Pahari Schools of Miniature Painting (16<sup>th</sup> Century A.D to 19<sup>th</sup> Century A.D.)**

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1. Origin and development of the following schools in brief:  
Mewar, Bundi, Bikaner, Kishangarh, and Jaipur, and the main features of the Rajasthani schools.
2. Study of the following Rajasthani paintings:

<b>Title / Set / Painter</b>	<b>School</b>
• A Folio from Ramayana paintings of Sahibdin	Mewar
• One Court scene or Hunting scene or Festival scene	Mewar Jagat Singh II
• One Folio from Ragamala or Rasikapriya	Bundi
• One painting of a Hunting Scene in a Forest Maharaja	Kotah with Kotah
• Radha (Bani-Thani) by Nihal Chand	Kishangarh
• Pabuji Ki Phad, Folk Scroll painting	Bhilwara
• Maru-Ragini	Mewar
• Raja Aniruddha Singh Hara	Bundi
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# FINE ARTS -312

- Krishna on swing Bikaner
- Radha (Bani- Thani) Kishangarh
- Bharat Meets Rama at Chitrakuta Jaipur

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1. Origin and development of Basohli, Guler, and Kangra schools in brief and main features of the Pahari schools
2. Study of the following Pahari Paintings:

<b>Title / Set / Painter</b>	<b>School</b>
• One Folio of Ramayana (Sangri – Early Phase) One Folio of Gita Govinda of Jaideva by Manaku	Basohli Guler
• One Krishna Lila or Bhagavata Purana Sukh	Kangra Folio by Nain
• One painting from Nayaka Nayika Baramasa or Ragamala	Guler or Kangra or
• Krishna with Gopis • Nand, Yashoda and Krishna with Kinsmen Going to Vrindavana	Basohli Kangra

## **Unit 2: The Mughal and Deccani Schools of miniature painting (16<sup>th</sup> Century A.D. to 19<sup>th</sup> Century A.D.)**

### **1. The Mughal School**

1. Origin and development of the Mughal school in brief and main features of the Mughal School
2. Study of the following Mughal Paintings:

<b>Title</b>	<b>Painter</b>	<b>School</b>
• A Folio from Akbar Namah	Basawan	Akbar
• Baber Crossing the river Sone	Jagannath	Akbar
• Krishna Lifting Mount Govardhana	Miskin	Akbar
• Birth of Salim	Ramdass	Akbar
• Jahangir holding the picture	Abul Hassan	Jahangir
• Falcon on Bird-Rest	Ustad Mansoor	Jahangir



# FINE ARTS -312

## 2. The Deccani School

1. Origin and development of the Deccani school and Main features of the Deccan School.

### 2. Study of the following Deccani Paintings:

- |   |            |
|---|------------|
| a. Ibrahim AdilShah II of Bijapur           | Bijapur    |
| b. Raga Hindola                             | Ahmednagar |
| c. Ragini Pat-hamsika                       | Ahmednagar |
| d. Hazart Nizamuddin Auliya and Amir Khusro | Hyderabad  |
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## Unit 3: The Bengal School and Cultural Nationalism

- New Era in Indian art-an introduction

### ● Study of the following paintings:

- |   |                         |
|---|-------------------------|
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| (ii) Journey's End                          | Abanidranath Tagore     |
| (iii) Parthasarthi                          | Nandlal Bose            |
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| (iv) Mother and child                       | Jamini Roy              |
| (v) Female Face                             | Rabindranath Tagore     |
| (vi) Hill Women                             | Amrita Sher Gill        |
| (vii) Shiv and Sati                         | Nandlal Bose            |
| (viii) Rasa-Lila                            | Kshitindranath Majumdar |
| (ix) Radhika                                | M.A.R. Chughtai         |
| (vii) Meghdoot                              | Ram Gopal Vijaivargiya  |

- National flag and the Symbolic significance of its forms and the colours.
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# FINE ARTS -312

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v.	Words and images	K.C.S. Pannikar
vi.	Rama Vanquishing the Pride of the Ocean	Raja Ravi Varma
vii.	Mother and child	Jamini Roy
viii.	Haldi Grinders	Amrita Sher Gil
ix.	Mother Teresa	M.F. Husain
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(v) Man, Woman and Tree	K. Laxma Goud

**ANTHROPOLOGY (303)**  
**Syllabus for Class 12**



## ANTHROPOLOGY (303)

*Note:*

*There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.*

### **Unit-1: Physical Anthropology:**

- (i) Preliminary knowledge of Human genetics. Mendel's Laws of heredity Monohybrid and Dihybrid ratio.
- (ii) Definition of Race and Racial criteria, significance of skin colour, Eye form and colour, Head form, and ABO blood groups as racial criteria.
- (iii) Racial classification, distinctive physical features and geographical distribution of the major racial groups of man: Caucasoid, Mongoloid, Negroid and Australoid.

### **Unit-2: Prehistoric Archaeology:**

- (i) Tool Making: Techniques of manufacturing core and flake tools, primary and secondary flaking, pressure flaking, grinding and polishing. Materials used in making prehistoric tools.
- (ii) Tool families: Pebble tools, Hand axe, Cleaver, Scrapers, Microliths, Points, Blades, Awl, Graver, Celts, Sickles, Spear-head, Arrow-head and Bone tools.
- (iii) Prehistoric Cultures: A brief outline of the following prehistoric cultures of the Paleolithic, Mesolithic and Neolithic periods-
- (iv) A comparative study of the salient features of Paleolithic and Neolithic cultures.

### **Unit-3: Material culture and economic Anthropology :**

- (i) Economic life: meaning and aspects, characteristic features of primitive or simple economic system.
- (ii) Subsistence economy: domestication of animals-pastoralism, agriculture-shifting cultivation, horticulture, terrace cultivation and plough cultivation.
- (iii) Brief outline of the methods of hunting, fishing and agriculture with reference to Various communities of North East India as far as practicable.

### **Unit-4: Social Anthropology and Ethnography :**

*A : Social Anthropology :*

- (i) Family: Definition, forms and types: nuclear family, joint family, family of orientation, family of procreation, monogamous and polygamous (polygynous and polyandrous).
- (ii) Clustered relationship in a nuclear family.
- (iii) Rules of residence: Patrilocal, matrilocal, neolocal, avunculocal, bi-local, matripatri local. Rules of descent: Patrilineal and matrilineal descent.
- (iv) Functions of family, social nature of family.

*B : Ethnography :*

- (i) A brief outline of the land and people of North-East India.
- (ii) Study of material culture and economic life of the following communities
- (iii) The Garo: Shifting or Jhum cultivation.
- (iv) The Mishing: Plough cultivation
- (v) A study of social organization of the Ao Naga and the Apatani.

## ANTHROPOLOGY (303)

### Unit-5: Ecology:

- (i) Meaning and definition of ecology and environment.
- (ii) Elements of the environment: Solid, liquid, and gas.
- (iii) Physical or abiotic environment, biological or biotic environment and sociocultural environment.
- (iv) Man as the main agent to disturb the ecological balance.

**AGRICULTURE (302)**

**AGRICULTURE  
(302)**

**Syllabus for Class 12**

# AGRICULTURE (302)

*Note:*

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## **Unit-1: Agrometeorology, Genetics and Plant Breeding, Biochemistry and Microbiology**

**Agrometeorology:** Elements of Weather-rainfall, temperature, humidity, wind velocity, Sunshine weather forecasting, climate change in relation to crop production.

### **Genetics & Plant Breeding :**

- (a) Cell and its structure, cell division-mitosis and meiosis and their significance
- (b) Organisation of the genetic materials in chromosomes, DNA and RNA (c) Mendel's laws of inheritance. Reasons for the success of Mendel in his experiments, Absence of linkage in Mendel's experiments. (d) Quantitative inheritance, continuous and discontinuous variation in plants. (e) Monogenic and polygenic inheritance. (f) Role of Genetics in Plant breeding, self and cross-pollinated crops, methods of breeding in field crops-introduction, selection, hybridization, mutation and polyploidy, tissue and cell culture. (g) Plant Biotechnology-definition and scope in crop production.

**Biochemistry:** pH and buffers, Classification and nomenclature of carbohydrates; proteins; lipids; vitamins and enzymes.

**Microbiology:** Microbial cell structure, Micro-organisms- Algae, Bacteria, Fungi, Actinomycetes, Protozoa and Viruses. Role of micro-organisms in respiration, fermentation and organic matter decomposition

## **Unit-2: Livestock Production**

**Scope and importance :** (a) Importance of livestock in agriculture and industry, White revolution in India. (b) Important breeds Indian and exotic, distribution of cows, buffaloes and poultry in India.

**Care and management :** (a) Systems of cattle and poultry housing (b) Principles of feeding, feeding practices.

Balanced ration-definition and ingredients. (d) Management of calves, bullocks, pregnant and milch animals as well as chicks, cockrels and layers, poultry. (e) Signs of sick animals, symptoms of common diseases in cattle and poultry, Rinderpest, black quarter, foot and mouth, mastitis and haemorrhagic septicaemia, coccidiosis, Fowl pox and Ranikhet disease, their prevention and control.

**Artificial Insemination :** Reproductive organs, collection, dilution and preservation of semen and artificial insemination, **role of artificial insemination in cattle improvement. Livestock Products:** Processing and marketing of milk and Milk products.

# AGRICULTURE (302)

## Unit-3: Crop Production

**Introduction :** (a) Targets and achievements in foodgrain production in India since independence and its future projections, sustainable crop production, commercialization of agriculture and its scope in India. (b) Classification of field crops based on their utility-cereals, pulses, oils seeds, fibre, sugar and forage crops.

**Soil, Soil fertility, Fertilizers and Manures:** (a) Soil, soil pH, Soil texture, soil structure, soil organisms, soil tilth, soil fertility and soil health. (b) Essential plant nutrients, their functions and deficiency symptoms. (c) Soil types of India and their characteristics. (d) Organic manure, common fertilizers including straight, complex, fertilizer mixtures and biofertilizers; integrated nutrient management system.

**Irrigation and Drainage:** (a) Sources of irrigation (rain, canals, tanks, rivers, wells, tubewells). (b) Scheduling of irrigation based on critical stages of growth, time interval, soil moisture content and weather parameters. (c) Water requirement of crops. (d) Methods of irrigation and drainage. (e) Watershed management

**Weed Control :** Principles of weed control, methods of weed control (cultural, mechanical, chemical, biological and Integrated weed management).

**Crops:** Seed bed preparation, seed treatment, time and method of sowing/planting, seed rate; dose, method and time of fertilizer application, irrigation, interculture and weed control; common pests and diseases, caused by bacteria, fungi virus and nematode and their control, integrated pest management, harvesting, threshing, post harvest technology: storage, processing and marketing of major field crops-Rice, wheat, maize, sorghum, pearl millet, groundnut, mustard, pigeon-pea, gram, sugarcane, cotton and berseem.

## Unit-4: Horticulture

- (a) Importance of fruits and vegetables in human diet, Crop diversification & processing Industry. (b) Orchard- location and layout, ornamental gardening and kitchen garden. (c) Planting system, training, pruning, intercropping, protection *from frost* and sunburn. (d) Trees, shrubs, climbers, annuals, perennials-definition and examples. Propagation by seed, cutting, budding, layering and grafting. (e) Cultivation practices, processing and marketing of: (i) Fruits - mango, papaya, banana, guava, citrus, grapes. (ii) Vegetables - Radish, carrot, potato, onion, cauliflower, brinjal, tomato, spinach and cabbage. (iii) Flowers - Gladiolus, canna, chrysanthemums, roses and marigold. (f) Principles and methods of fruit and vegetable preservation. (g) Preparation of jellies, jams, ketchup, chips and their packing.

# **ACCOUNTANCY/BOOK KEEPING-301 SYLLABUS FOR CLASS 12**

**Note:**

*There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.*

## **Accounting for Not-for-Profit Organizations and Partnership Firms**

### **Unit I: Accounting Not-for-Profit Organisation**

- Not-for-profit organization: Meaning and Examples.
- Receipts and Payments: Meaning and Concept of fund-based and non-fund-based accounting.
- Preparation of Income and Expenditure Account and Balance sheet from receipt and payment account with additional information.

### **Unit II: Accounting for Partnership**

- Nature of Partnership Firm: Partnership deed (meaning, importance).
- Final Accounts of Partnership: Fixed v/s Fluctuating capital, Division of profit among partners, Profit, and Loss Appropriation account.

### **Unit III: Reconstitution of Partnership**

Changes in profit sharing ratio among the existing partners – Sacrificing ratio and Gaining ratio.

- Accounting for Revaluation of Assets and Liabilities and Distribution of reserves and accumulated profits.
- Goodwill: Nature, Factors affecting and Methods of valuation: Average profit, Super profit, Multiplier, and Capitalization methods.
- Admission of a Partner: Effect of admission of a partner, Change in profit sharing ratio, the Accounting treatment for goodwill, Revaluation of assets and liabilities, Reserves (accumulated profits), and Adjustment of capitals.
- Retirement/Death of a Partner: Change in profit sharing ratio, Accounting treatment of goodwill, Revaluation of assets and liabilities, Adjustment of accumulated profits (Reserves).

### **Unit IV: Dissolution of Partnership Firm**

- Meaning, Settlement of accounts: Preparation of realization account and related accounts (excluding piecemeal distribution, sale to a company and insolvency of a Partner)

## **Company Accounts and Financial Statement Analysis**

### **Unit V: Accounting for Share and Debenture Capital**

- Share Capital: Meaning, Nature and Types.
- Accounting for Share Capital: Issue and Allotment of Equity and Preference Shares; Over subscription and Under subscription; Issue at par, premium and at discount; Calls in advance, Calls in arrears, Issue of shares for consideration other than cash.
- Forfeiture of Shares: Accounting treatment, Re-issue of forfeited shares.
- Presentation of shares and Debentures Capital in the company's balance sheet.
- Issue of Debenture – At par, premium, and discount; Issue of debentures for consideration other than cash.

- Redemption of the debenture.
- Out of proceeds of fresh issue, accumulated profits, and sinking fund.

### **Unit VI: Analysis of Financial Statements**

- Financial Statements of a Company: Preparation of simple financial statements of a company in the prescribed form with major headings only.
- Financial Analysis: Meaning, Significance, Purpose, Limitations.
- Tools for Financial Analysis: Comparative statements, Common size statements.
- Accounting Ratios: Meaning and Objectives, Types of ratios:
  - Liquidity Ratios:* Current ratio, Liquidity ratio.
  - Solvency Ratio:* Debt to equity, Total assets to debt, Proprietary ratio.
  - Activity Ratio:* Inventory turnover, Debtors turnover, Payables turnover, Working capital turnover, fixed assets turnover, Current assets turnover.
  - Profitability Ratio:* Gross profit, Operating ratio, Net profit ratio, Return on Investment, Earning per Share, Dividend per Share, Profit Earning ratio.

### **Unit VII: Statement of Changes in Financial Position**

- Cash Flow Statement: Meaning and Objectives, Preparation, Adjustments related to depreciation, dividend and tax, sale and purchase of non-current assets (as per revised standard issued by ICAI).

## **Computerized Accounting System**

### **Unit I: Overview of Computerized Accounting System**

- Concept and Types of Computerized Accounting System (CAS).
- Features of a Computerized Accounting System.
- Structure of a Computerized Accounting System.

### **Unit II: Using Computerized Accounting System**

- Steps in the installation of CAS, Preparation of chart of accounts, Codification, and Hierarchy of account heads.
- Data entry, Data validation, and Data verification.
- Adjusting entries, Preparation of financial statements, Closing entries, and Opening entries.
- Security of CAS and Security features are generally available in CAS (Students are expected to understand and practice the entire accounting process using an accounting package.)

### **Unit III: Accounting Using Database Management System (DBMS)**

- Concepts of DBMS. Objects in DBMS: Tables, Queries, Forms, Reports.
- Creating data tables for accounting.
- Using queries, forms, and reports for generating accounting information. Applications of DBMS in generating accounting information such as shareholders' records, sales reports, customers' profiles, suppliers' profiles payroll, employees' profiles, and petty cash registers.

### **Unit IV: Accounting Applications of Electronic Spreadsheet**

- Concept of an Electronic Spreadsheet (ES).
- Features offered by Electronic Spreadsheet.
- Applications of Electronic Spreadsheet in generating accounting information, preparing depreciation schedules, loan repayment schedules, payroll accounting, and other such company



