



## STUDENT PERFORMANCE AND LEARNING OUTCOMES

2.6.2

### Attainment of POs and COs are Evaluated Mapping in the Syllabus Bachelor of Science (B.Sc.)

Principal

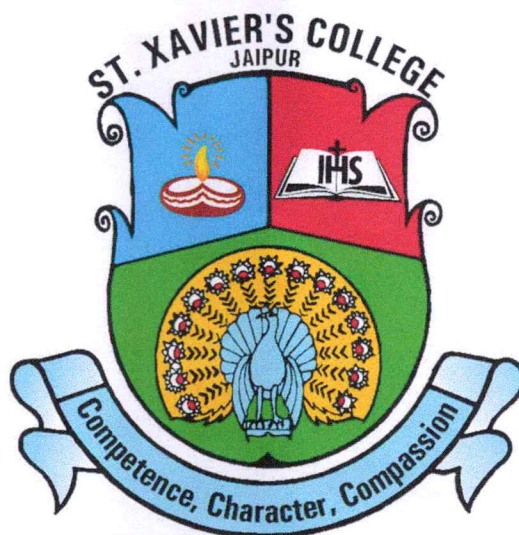
St. Xavier's College Jaipur  
Nevta-Mahapura Road, Jaipur

# ST. XAVIER'S COLLEGE JAIPUR

Nevta - Mahapura Road, Jaipur - 302029, Rajasthan, India

*Affiliated to the University of Rajasthan*

*Approved under Section 2(f) & 12(B) of the UGC Act, 1956*



## PROGRAMME OUTCOMES

**B.Sc.**

**(Bachelor of Science)**

**Department of Science**

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## Programme Outcomes (POs)

<b>PO 1.</b>	Students will demonstrate proficiency in mathematical principles, cultivating a comprehensive understanding essential for grasping physics concepts
<b>PO 2.</b>	Students will exhibit a profound understanding of classical mechanics, electromagnetism, and modern physics, proficiently applying this knowledge to analyse diverse physical phenomena
<b>PO 3.</b>	Graduates are expected to cultivate logical thinking through advanced mathematical learning, enabling practical applications in real-life scenarios within their respective disciplines
<b>PO 4.</b>	Through practical applications, graduates will acquire the ability to conceptualise and implement mathematical functions and terminology in computer languages and software
<b>PO 5.</b>	Will demonstrate proficiency in explaining and comprehending chemical concepts across various scientific disciplines
<b>PO 6.</b>	Graduates will develop scientific acumen, enabling them to perform, observe, and analyse the outcomes of chemical reactions
<b>PO 7.</b>	Graduates will demonstrate an awareness of the multidisciplinary approach inherent in the field of plant sciences
<b>PO 8.</b>	Graduates will possess a thorough understanding of both theoretical principles and practical applications in Botany with a focus on environmental sustainability
<b>PO 9.</b>	Graduates will comprehend fundamental concepts related to the biology of life with an emphasis on respect towards humanity
<b>PO 10.</b>	Facilitate hands-on experience for students in the practical aspects of zoology, enhancing their understanding of the subject with consideration for gender perspectives
<b>PO 11.</b>	Develops proficiency in economic analysis, utilising economic theories and quantitative methods to evaluate economic phenomena and propose informed solutions

  
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<b>PO 12.</b>	It helps to critically evaluate economic policies, considering their impact on various stakeholders and proposing evidence-based recommendations for policy improvement
<b>PO 13.</b>	Students will develop the ability to analyse data, identify trends, and make evidence-based decisions across various sectors
<b>PO 14.</b>	Equips students with the skills for designing, conducting, and evaluating research using statistical methodologies
<b>PO 15.</b>	It develops the ability to analyse spatial patterns, processes, and relationships using geographic information systems (GIS) and other tools to understand and solve real-world problems
<b>PO 16.</b>	Environmental sustainability knowledge demonstrates a deep understanding of environmental issues and sustainability, applying geographical concepts to address challenges related to climate change, resource management, and urban planning

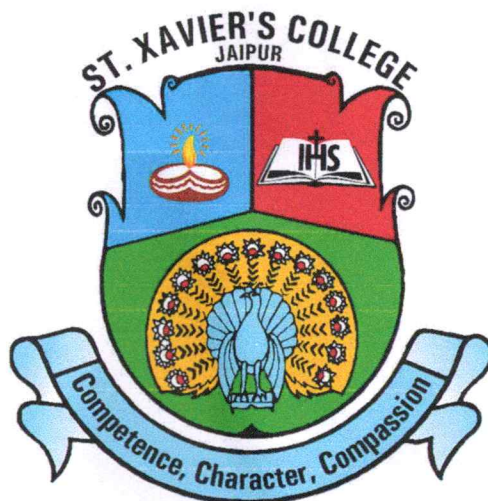
  
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## COURSE OUTCOMES

**B.Sc.**

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**Department of Science**



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## Course Outcomes (COs)

### B.Sc. (Physics) Part-I

#### P-101: Mechanics & Oscillators

CO 1.	Introduction of Basics Mechanics and Oscillations
CO 2.	Concepts of measurement of motion
CO 3.	Detailed study of mechanical behaviour of real objects
CO 4.	Analyse the momentum, conservation and collision between two real-life objects
CO 5.	Understand the various kinds of oscillations and how different waves travel in space using their different modes of oscillation

#### P-102: Electromagnetism

CO 1.	Introduction to the basic theory of electric fields and magnetic field of Electromagnetism
CO 2.	Knowledge about magnetism, Maxwell equation and electromagnetism
CO 3.	Learning about the different types of interferences and diffraction processes
CO 4.	Understand the concepts of electricity and magnetism and also have a clear picture of how current is generated in various arrangements
CO 5.	Understanding of the Maxwell equations

#### P-103: Optics

CO 1.	Understand the exchange between heat and work through various interactions
CO 2.	To have a deeper understanding of optics
CO 3.	Detailed knowledge of the concept of study about the holographical methods
CO 4.	Learn about Newton rings, Air wedge, and some interferometers of the lasers
CO 5.	Explain the latest technology-based devices such as laser, holography and fibre optics

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Physics) Part-II</b>	
<b>P-204: Thermodynamics</b>	
<b>CO 1.</b>	Introduction of statistical and quantum mechanics
<b>CO 2.</b>	Detailed study of the three laws of thermodynamics
<b>CO 3.</b>	Learn how the industrial level high temperatures are produced using different set-ups based on thermal laws
<b>CO 4.</b>	Analyse the exchange between heat and work through various interactions
<b>CO 5.</b>	Understand the collective behaviour of molecules and atoms in any medium via classical statistics and quantum statistics

<b>P-205: Mathematical Physics</b>	
<b>CO 1.</b>	Knowledge of Mathematical physics and how is it from general physics
<b>CO 2.</b>	Techniques of Lorentz transformations, four-vector formulations
<b>CO 3.</b>	Introduction of differential equations and equations of first order and second order differential equations
<b>CO 4.</b>	Knowledge of homogeneous linear differential equations
<b>CO 5.</b>	Knowledge of the Boundary value problems, Laplace equations, and separation techniques

<b>P-206: Electronics &amp; Solid-State Devices</b>	
<b>CO 1.</b>	Understand the charge distribution and charge transfer process in semiconductors
<b>CO 2.</b>	Design and analyse electronic circuits. Calculating the parameters of the rectifiers, transistors, and De Morgan's laws
<b>CO 3.</b>	Understand amplification oscillator and amplifiers
<b>CO 4.</b>	Understand the band theory of solids and the carrier concentration in solids
<b>CO 5.</b>	Calculate parameters associated with semiconducting devices and analyse devices based on their applications

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Physics) Part-III</b>	
<b>P-307: Quantum Mechanics &amp; Spectroscopy</b>	
<b>CO 1.</b>	Understand the basic concept of principles of quantum mechanics and its applications to simple systems like simple harmonic oscillations
<b>CO 2.</b>	Describe angular momentum and spin dynamics of quantum systems and solve the angular momentum using co-efficient
<b>CO 3.</b>	Will be able to find the energy and wave functions of quantum conservative systems
<b>CO 4.</b>	Can understand Schrodinger equations and how their solutions explain the internal phenomena of hydrogen atoms
<b>CO 5.</b>	Understand the molecular structure and various spectroscopic technique and their modern developments

<b>P-308: Nuclear and Particle Physics</b>	
<b>CO 1.</b>	Describe basic properties of nuclei, nuclear interactions, nuclear structure and reactions
<b>CO 2.</b>	Identify the strengths and limitations of various models
<b>CO 3.</b>	Apply the knowledge of basic laws of conservation and momentum in the determination of particle properties of process in the subatomic world
<b>CO 4.</b>	Work on elementary particles in physics and related theoretical predictions and measurement results
<b>CO 5.</b>	Demonstrate the quark models based on nuclei in the subatomic molecules

<b>P-309: Solid State Physics</b>	
<b>CO 1.</b>	Different types of structure of solids and its characterisation of X-Ray technique
<b>CO 2.</b>	Understand Thermal and Electrical properties of solids specifically heat and some models for calculations
<b>CO 3.</b>	Explain the bonding crystal structure, crystallography, diffraction and band theory of solids
<b>CO 4.</b>	Characterise solid based on fermi level position in the semiconductors
<b>CO 5.</b>	Origin of magnetism, various types of magnitude materials and its use in modern technology

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Mathematics) Part-I</b>	
<b>M-101: Discrete Mathematics</b>	
<b>CO 1.</b>	Introduction to set theory and number theory
<b>CO 2.</b>	Boolean algebra and its significance to the theory of probability, geometry of sets, and information theory
<b>CO 3.</b>	Learn to use proposition in augmentation/argumentation so that it can be used to create new propositions
<b>CO 4.</b>	Introduction to Graph Theory and important terms of graph theory
<b>CO 5.</b>	Application of Graph Theory

<b>M-102: Calculus</b>	
<b>CO 1.</b>	Knowledge about the Infinity Series.
<b>CO 2.</b>	Introduction to Derivatives of Arcs.
<b>CO 3.</b>	Understanding the concept of maxima minima function of two variables.
<b>CO 4.</b>	A detailed study of Beta and Gamma Function.
<b>CO 5.</b>	Get knowledge of Area Rectification.

<b>M-103: Analytic Geometry and Optimization Theory</b>	
<b>CO 1.</b>	Understanding Polar Equations of Conic section
<b>CO 2.</b>	Introduction to Sphere and cone theory
<b>CO 3.</b>	Understanding Cylinder and Coincides
<b>CO 4.</b>	Knowledge of generating lines
<b>CO 5.</b>	Introduction to Linear Programming Problem

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Mathematics) Part-II</b>	
<b>M-204: Real Analysis</b>	
<b>CO 1.</b>	Introduction about real Analysis and its application
<b>CO 2.</b>	Introduction to Real Sequence and Convergence of sequence
<b>CO 3.</b>	Know the different properties of derivatives
<b>CO 4.</b>	Introduction to Riemann Integral
<b>CO 5.</b>	Knowledge about Sequence and Series of Functions

<b>M-205: Differential Equations</b>	
<b>CO 1.</b>	Introduction to Differential Equations and Equations of first order and first degree
<b>CO 2.</b>	Understanding the concept of First order and of higher degree
<b>CO 3.</b>	Knowledge of Homogeneous linear differential equations
<b>CO 4.</b>	Introduction to the linear differential equation of second order
<b>CO 5.</b>	Introduction to Differential Equations and Equations of first order and first degree

<b>M-206: Numerical Analysis</b>	
<b>CO 1.</b>	Acquire basic knowledge in solving interpolation with equal-interval problems by various numerical methods. Estimate the missing terms through interpolation methods
<b>CO 2.</b>	Develop skills in analysing the methods of interpolating a given data, properties of interpolation with unequal intervals and derive conclusions, approximate a function using an appropriate numerical method
<b>CO 3.</b>	Be able to derive and understand the Trapezoidal rule, Simpson's 1/3 – rule, Simpson's 3/8 rule, and Weddle's rules
<b>CO 4.</b>	Be able to find the solution of linear systems by using Direct methods, Matrix Inversion method, Gaussian elimination methods, Gauss-Jordan Method, and Method of factorisation
<b>CO 5.</b>	Be able to find the solution of ordinary differential equations of first order by the Euler Method

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Mathematics) Part-III</b>	
<b>M-307: Abstract Algebra</b>	
<b>CO 1.</b>	Introduction to Group Theory
<b>CO 2.</b>	Usage and application of Morphism of the group
<b>CO 3.</b>	Analysis of simple properties of Ring and Subring
<b>CO 4.</b>	Knowledge about the Ideals and Quotient Ring
<b>CO 5.</b>	Understand Linear Combinations and Vector Space

<b>M-308: Complex Analysis</b>	
<b>CO 1.</b>	Understand Complex Plane
<b>CO 2.</b>	Demonstrate Complex Integration
<b>CO 3.</b>	Knowledge about Taylor's Theorem
<b>CO 4.</b>	Understand Singularities of an Analytic Function
<b>CO 5.</b>	Analysis of Conformal Mapping

<b>M-309: Mechanics</b>	
<b>CO 1.</b>	Understand the radial and transverse velocity and acceleration
<b>CO 2.</b>	Understand Motion in resisting medium
<b>CO 3.</b>	Understand Central orbits
<b>CO 4.</b>	Knowledge about the Equilibrium of coplanar
<b>CO 5.</b>	Understand Virtual Work and Catenary



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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Chemistry) Part-I</b>	
<b>CH-101: Inorganic Chemistry</b>	
CO 1.	Develop a thorough understanding of band theories, ionic structure, and defects, including the properties associated with them
CO 2.	Engage in the study of theories of bonding, exploring the geometry of inorganic molecules, and understand the ionic, dipolar, and electronegativity characteristics of bonds
CO 3.	Acquire knowledge about the periodic properties of the 's' and 'p' block elements within the periodic table
CO 4.	Delve into the study of the structure, formation, and properties of compounds involving 'p' block elements
CO 5.	Engage in the learning of laws, concepts, and kinetics related to radioactivity, particles, reactions, and the stability features of the nucleus

<b>CH-102: Organic Chemistry</b>	
CO 1.	Gain knowledge about the general reaction mechanisms, intermediates, energy pathways, and methods used to determine reaction mechanisms
CO 2.	Develop a deep understanding of stereochemistry in organic molecules, encompassing optical, geometrical, and conformational isomerism, as well as different types of isomers and their representation
CO 3.	Undertake a detailed study of the nomenclature, preparation, and properties of alkanes, cycloalkanes, alkenes, cycloalkenes, alkadienes, and alkynes
CO 4.	Learn about aromaticity, synthesis, reactions, and the directive influence on benzene in organic compounds
CO 5.	Engage in a comparative study of the formation and chemical properties of alkyl, aryl, benzyl, and vinyl halides

<b>CH-103: Physical Chemistry</b>	
CO 1.	Practice the application of mathematical formulas commonly used in chemistry, along with gaining a qualitative understanding of liquid crystals
CO 2.	Learn about the ideal and non-ideal behaviour of gases, including different types of isotherms, velocity, and physical parameters in gaseous molecules
CO 3.	Acquire knowledge about crystal lattice, laws of crystallography, and diffraction patterns, enabling them to identify crystal structures
CO 4.	Engage in a broad study of the order of reactions, exploring physical and experimental methods for identifying them and understanding the terms and theories related to chemical kinetics
CO 5.	Practice the application of mathematical formulas commonly used in chemistry, along with gaining a qualitative understanding of liquid crystals

  
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## Course Outcomes (COs)

### B.Sc. (Chemistry) Part-II

#### CH-204: Inorganic Chemistry

CO 1.	Learn about the characteristics of d-block elements, including the properties of compounds formed by these elements
CO 2.	Gain knowledge of nomenclature, isomerism, and concepts and theories related to coordination compounds
CO 3.	Explore the general features, chemistry, occurrence, and separation methods of lanthanides and actinides
CO 4.	Delve into redox chemistry through the analysis of Frost, Latimer, and Pourbaix diagrams
CO 5.	Understand different concepts of acidic and basic behaviour, along with the classification and characteristics of some aqueous and non-aqueous solvents

#### CH-205: Organic Chemistry

CO 1.	Learn about the electromagnetic spectrum, laws of UV & IR spectroscopy, the idea about $\lambda_{\max}$ values, the reason for shifting, types of vibrations and regions of radiation lying in it
CO 2.	Engage in a detailed Study of nomenclature, synthesis, and physical and chemical properties of alcohol, phenols, ethers and epoxides
CO 3.	Gain knowledge of preparation and mechanistic pathways of reactions shown by aldehydes and ketones
CO 4.	Study the synthesis, physical properties and reaction mechanism of carboxylic acids, acid halides, anhydrides, esters and amides
CO 5.	Understand the nitro and amine derivatives of alkanes and arenes

#### CH-206: Physical Chemistry

CO 1.	Learn terms, systems, and processes involved in thermodynamics, calculations related to the first law and thermochemistry
CO 2.	Acquire knowledge of theorems related to the second and third laws of thermodynamics, derivations of functions related to it, and concepts of chemical equilibrium
CO 3.	Engage in the study of phase rule and terms related to it, phase diagram of phase systems and mixtures
CO 4.	Undertake a detailed study of terms, theories, experiments and applications related to conductivity
CO 5.	Gain information about types of electrodes and cell, emf and pH measurements by using Conductometric titration

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Mathematics) Part-III</b>	
<b>CH-307: Inorganic Chemistry</b>	
<b>CO 1.</b>	Understand acid-base behaviour based on hard and soft concepts and theories related to it
<b>CO 2.</b>	Be able to explain splitting of 'd' orbital, theories and factors affecting it, reasons for magnetic behaviour in metal complexes
<b>CO 3.</b>	Study of reactions and stability of metal complexes, types, and discussion of electronic transitions
<b>CO 4.</b>	Learn about the preparation, properties, bonding and applications of different organometallic compounds
<b>CO 5.</b>	Knowledge of different elements in biological processes, structure and bonding in some inorganic polymers

<b>CH-308: Organic Chemistry</b>	
<b>CO 1.</b>	Understand NMR spectroscopy for organic molecules and structural elucidation from it and the role of active methylene group in organic synthesis and related name reactions
<b>CO 2.</b>	A detailed study of preparation, properties, and chemical reactions of some benzo fused, five and six-membered heterocycles
<b>CO 3.</b>	Learning of classification, structure, stereochemistry, bonding pattern, and physical & and chemical properties of carbohydrates
<b>CO 4.</b>	Overview of structure, stereochemistry, and properties of amino acids, constitution, and bonding in proteins and nucleic acids
<b>CO 5.</b>	Study of organosulphur compounds having different functional groups, classification, formation and bonding in organic polymers and dyes

<b>CH-309: Physical Chemistry</b>	
<b>CO 1.</b>	Study of quantum mechanics - laws and principles, Schrödinger and sinusoidal wave equations and concepts related to it
<b>CO 2.</b>	Basic ideas of formation and physical characteristics of bonding, antibonding, and hybrid molecular orbitals
<b>CO 3.</b>	Learn the principle, energy, and selection rules in vibrational, rotational, Raman, and electronic spectrum
<b>CO 4.</b>	Understand the laws of photochemistry and process involved in, dipole moment and optical activity of molecules
<b>CO 5.</b>	Knowledge about concentration measurements in solution, colligative properties, and calculation of molecular weight by these

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Botany) Part-I</b>	
<b>B-101: Algae Lichens &amp; Bryophytes</b>	
<b>CO 1.</b>	General characters & classification of Algae
<b>CO 2.</b>	Reproduction, life cycle & economic importance of Algae
<b>CO 3.</b>	Lifecycle of Oscillatoria, Nostoc, Volvox & Chara
<b>CO 4.</b>	Lifecycle of Vaucheria, Ectocarpus, Polysiphonia
<b>CO 5.</b>	General characters, origin & evolution of bryophytes
<b>CO 6.</b>	Lifecycle of Riccia, Marchantia & Anthoceros
<b>CO 7.</b>	Lifecycle of Funaria & Lichens
<b>CO 8.</b>	Laboratory Exercises related to the genera of Algae & Bryophytes including identification, slide preparation & section cuttings
<b>CO 9.</b>	Laboratory exercises related to permanent specimens of Lichens

<b>B102: Cell Biology &amp; Genetics</b>	
<b>CO 1.</b>	Introduction to cells and cell membranes
<b>CO 2.</b>	Study of cell organelles like Nucleus, Mitochondria, ER, Chloroplast, Plasma Membranes etc.
<b>CO 3.</b>	Study of chromosomes, chromosomal aberrations, lamp brush, polytene & sex chromosomes
<b>CO 4.</b>	Knowledge of Mendel's laws of inheritance
<b>CO 5.</b>	Study of Monohybrid Cross, Dihybrid Cross, Test Cross & Back Cross
<b>CO 6.</b>	Concept of gene, operon concept, one gene-one enzyme theory
<b>CO 7.</b>	Introduction to plan breeding, techniques of plant breeding
<b>CO 8.</b>	Study of applications of plant breeding.
<b>CO 9.</b>	Laboratory exercises on Mitosis & Meiosis
<b>CO 10.</b>	Permanent specimens of the special chromosome, the study of permanent slides & solving of problems of genetics

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Botany) Part-I</b>	
<b>B-103: Microbiolog, Mycology and Plant Pathology</b>	
<b>CO 1.</b>	General introduction to Microbiology
<b>CO 2.</b>	Describe the structure & reproduction of bacteria
<b>CO 3.</b>	Classification & economic importance of bacteria
<b>CO 4.</b>	To study the lifecycle of Mycoplasma & virus
<b>CO 5.</b>	Detailed study of general characters of fungi, their classification & economic importance
<b>CO 6.</b>	To study the general account of plant pathology
<b>CO 7.</b>	Describe the diseases caused in plants like white rust, green ear, black rust, smut & early blight
<b>CO 8.</b>	Laboratory exercises on staining & preparation of slides of genera of Fungi
<b>CO 9.</b>	Gram Staining of bacteria, study of micrographs & permanent specimens



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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Botany) Part-II</b>	
<b>B-204: Pteridophyte, gymnosperm, &amp; Paleobotany</b>	
<b>CO 1.</b>	To study the general characters of gymnosperms
<b>CO 2.</b>	To study the life cycle of Cycas, Pinus & Ephedra
<b>CO 3.</b>	To study the classification & economic importance of gymnosperms
<b>CO 4.</b>	To study the classification & economic importance of Pteridophytes
<b>CO 5.</b>	Describe in detail about Paleobotany
<b>CO 6.</b>	Study the life cycle of Fossil plants
<b>CO 7.</b>	Laboratory exercises on section cutting, slide preparation of vegetative & reproductive parts of pteridophytes & gymnosperms
<b>CO 8.</b>	Laboratory exercises on the study of permanent specimens of fossil plants


<b>B-205: Molecular Biology &amp; Biotechnology</b>	
<b>CO 1.</b>	Describe the biological, physical & chemical nature of hereditary material DNA & RNA
<b>CO 2.</b>	Explain the function of DNA replication & preliminary account of DNA damage & repair
<b>CO 3.</b>	Give the central dogma of life
<b>CO 4.</b>	Explain the genetic code, initiation, elongation & termination
<b>CO 5.</b>	Study the regulation of gene expression in prokaryotes & eukaryotes
<b>CO 6.</b>	Describe in detail the basic aspects of Biotechnology, the concept of culture techniques, plant tissue culture & their applications
<b>CO 7.</b>	Describe in detail recombinant DNA technology
<b>CO 8.</b>	Laboratory exercises on media preparation, culture techniques, identification & working of equipment

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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Botany) Part-II</b>	
<b>B-206: Plant Physiology &amp; Biochemistry</b>	
<b>CO 1.</b>	To study the physiochemical properties of water, transpiration, guttation, & their factors
<b>CO 2.</b>	Describe in detail about mineral nutrition in plants
<b>CO 3.</b>	Describe in detail about transport of organic substances in plants
<b>CO 4.</b>	Explain the theoretical & practical aspects of photosynthesis
<b>CO 5.</b>	Explain the theoretical & practical aspects of respiration
<b>CO 6.</b>	Explain in detail carbohydrates, proteins & lipids
<b>CO 7.</b>	Study about enzymes, growth, and plant hormones
<b>CO 8.</b>	Laboratory exercises on demonstration & performance of processes like photosynthesis, respiration, growth, transpiration etc.

  
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## Course Outcomes (COs)

### B.Sc. (Botany) Part-III

#### B-307: Plant Morphology & Anatomy

CO 1.	Study the basic body plan of flowering plants
CO 2.	Study the diversity of plant forms
CO 3.	Describe the branching pattern & canopy architecture in plants
CO 4.	Explain the tissue, tissue system, and shoot apical meristem in detail
CO 5.	Explain the primary structure of the stem, leaf & root
CO 6.	To study the secondary growth in plants
CO 7.	To study the structure & ecological adaptation in seed
CO 8.	Laboratory exercises on the study of the root, stem, leaf, flower, section cutting, staining, slide preparation

#### B-308: Taxonomy & Embryology

CO 1.	To classify the plant families
CO 2.	To study the general characteristics of different flowering plants
CO 3.	To demonstrate the floral aspect of families in the curriculum
CO 4.	Study ovules in detail, including the types of ovules, endosperm, ovary, etc.
CO 5.	To go for field visits to Botanical gardens, herbaria, and research institutes
CO 6.	Laboratory exercises on the study of anatomical & morphological characters of flowering plants of different families

#### B-309: Ecology & Economic Botany

CO 1.	Describe in detail about plant ecology
CO 2.	Study the climatic, edaphic & biotic factors affecting plants
CO 3.	Describe in detail population ecology & community ecology
CO 4.	Study about the plant succession & ecosystem
CO 5.	Describe in detail the vegetation of India
CO 6.	Explain the general introduction of economic botany with reference to cereals, starch, sugar plants, vegetables, fruits, spices, beverage plants, fibre plants, wood, rubber, oil leading plants & medicinal plants
CO 7.	Give an account of Ethnobotany
CO 8.	Perform the lab exercises on density, pH, and porosity of different types of soils
CO 9.	Perform quadrat exercises
CO 10.	Identify the economic importance of cereals, beverages, tea, rubber, and wood, oil-yielding plants, spices, fruits, vegetables & medicinal plants



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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Zoology) Part-I</b>	
<b>Z-101: Diversity of Animals</b>	
<b>CO 1.</b>	Students gain knowledge about taxonomy, cladistics, nomenclature
<b>CO 2.</b>	Know about the concepts of organisation levels, Protozoa and Metazoa
<b>CO 3.</b>	Learn about the classification of chordates and Non-chordates: Concepts on symmetry, coelom, segmentation and embryogeny
<b>CO 4.</b>	In-depth knowledge of Non-chordates and Chordates
<b>CO 5.</b>	Learn in detail about Phylum - their habitats, habits, morphology, structure, and physiological system along with affinities and adaptations
<b>CO 6.</b>	Learn in detail about Phylum Ctenophora, Platyhelminthes, Aschelminths, and Annelida

<b>Z-102: Cell Biology and Genetics</b>	
<b>CO 1.</b>	Study on structural and functional aspects of Prokaryotic and Eukaryotic animal cell
<b>CO 2.</b>	Understand cell membrane, its structure and concept of the unit membrane
<b>CO 3.</b>	Understand Transport across the cell membrane, osmosis, facilitated diffusion and active transport
<b>CO 4.</b>	Study about organelles, their structure and function
<b>CO 5.</b>	Imparting in-depth knowledge of the function and Physiological process of the cell
<b>CO 6.</b>	Understand Nuclear organisation with a detailed account of chromosomes and their organisation
<b>CO 7.</b>	Study about Nucleic acids: DNA structure & RNA structure and its type
<b>CO 8.</b>	Gain knowledge on Replication, Transcription & Translation
<b>CO 9.</b>	Students get to know about Genetic code & Cell reproduction: Mitosis, Meiosis & Cell Cycle
<b>CO 10.</b>	Study detailed concepts of Genetics: Mendel's Law of Inheritance, Chromosomal mutations, Linkage, Genetic Interaction, Multiple Gene Inheritance, Cytoplasm inheritance

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Zoology) Part-I</b>	
<b>Z-103: Gamete and Developmental Biology</b>	
<b>CO 1.</b>	Study the concepts of developmental processes and stages
<b>CO 2.</b>	Study the concepts of Gametogenesis, Fertilization & Parthenogenesis
<b>CO 3.</b>	Detailed account of the patterns and processes: Cleavage, Fate maps, Embryonic Induction
<b>CO 4.</b>	Understand the development of chick up to the 96-hour stage
<b>CO 5.</b>	Knowledge of extra embryonic membranes in chicks their development & function
<b>CO 6.</b>	Students get introduced to Paedogenesis and Neoteny
<b>CO 7.</b>	Students will be able to explicate the concepts of Regeneration.
<b>CO 8.</b>	Students learn about the concepts of stem cells, their application, and the cloning of animals through different techniques
<b>CO 9.</b>	Students gain knowledge about teratogenesis, the biology of ageing & cell death

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Zoology) Part-II</b>	
<b>Z-204: Structure and Function of Invertebrate Types</b>	
<b>CO 1.</b>	Detailed account of detailed features, organs and systems, affinities & adaptations of Arthropoda, Onychophora, Mollusca, Echinoderms, and Hemichordata
<b>CO 2.</b>	Detailed account of Palaemon, Scorpion, Periplaneta, Apis, Peripatus, Pila, Unio, Sepia, Ascaris, Echinus etc.
<b>CO 3.</b>	Salient Features of Hemichordata
<b>CO 4.</b>	Introduction to canal system of sponges & parasitic adaptations in Helminthes
<b>CO 5.</b>	Social organisation in termites and honeybees; direct & indirect development in insects
<b>CO 6.</b>	Understanding of the water vascular system of starfish
<b>CO 7.</b>	Introduction to Parasitism in Crustacea, Crustacean larvae & mouth parts in insects

<b>Z-205: Animal Physiology and Biochemistry</b>	
<b>CO 1.</b>	Detailed account of Animal Physiology with special reference to mammals.
<b>CO 2.</b>	Understand the physiology of digestion, blood circulation, respiration, and excretion.
<b>CO 3.</b>	Concepts on physiology of nerve impulse and reflex action, physiology of muscle contraction, reproduction & preliminary idea of neurosecretion, hypothalamic control of pituitary function
<b>CO 4.</b>	Detailed concepts of biochemistry.
<b>CO 5.</b>	Develop an understanding of carbohydrates.
<b>CO 6.</b>	Understand proteins: structure, function and significance.
<b>CO 7.</b>	Understand lipids: structure, function and significance, pathways, and biosynthesis of biomolecules.

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Zoology) Part-II</b>	
<b>Z-206: Immunology, Microbiology and Biotechnology</b>	
<b>CO 1.</b>	Detailed knowledge of the immune system
<b>CO 2.</b>	Detailed concepts on Antigen-Antibody reactions, immunity regulating cells, mechanism of humoral or antibody-mediated immunity and cell-mediated immunity
<b>CO 3.</b>	Introduction to microbes.
<b>CO 4.</b>	Detailed concept of structural organisation: Prokaryota (Bacteria) Size, Shapes, Structural organisation
<b>CO 5.</b>	Introduction to Genetic Material of Bacteria
<b>CO 6.</b>	Understand Reproduction in Bacteria: asexual, binary fission, budding, sexual reproduction etc.
<b>CO 7.</b>	Concepts of microbial nutrition & bacteria of medical importance
<b>CO 8.</b>	Introduction to detailed concepts, scope and application of biotechnology
<b>CO 9.</b>	Understanding of animal cells, tissue organs and embryo cultures
<b>CO 10.</b>	Detailed concepts of recombinant DNA technology, monoclonal antibodies and cloning



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## Course Outcomes (COs)

### B.Sc. (Zoology) Part-III

#### Z-307: Structure and Function of Chordate Types

CO 1.	Detailed description of chordates with special reference to Herdmania and Branchiostoma
CO 2.	Affinities of Hemichordata, Urochordata and Cephalochordata
CO 3.	Ascidian tadpole larva and its metamorphosis
CO 4.	Detailed account of structure, organ systems of Pisces, Amphibia, Reptilia, Aves, mammal
CO 5.	Introduction to chordate adaptation
CO 6.	Introduction to parental care with reference to Amphibia
CO 7.	Introduction to flight adaptations, types of feathers, bird migration for Aves
CO 8.	Adaptive radiation & dentition in Mammals

#### Z-308: Ecology, Environmental Biology and Evolution

CO 1.	Introduction to concepts of ecology, concepts of limiting factors and ecosystem: biotic and abiotic factors
CO 2.	Detailed account of ecosystem: production, consumption & decomposition in ecosystem
CO 3.	Introduction to Biogeochemical cycles of O <sub>2</sub> , CO <sub>2</sub> , H <sub>2</sub> O, N, P.
CO 4.	Detailed account of ecosystem, population ecology, community ecology, habitat ecology & ecological succession
CO 5.	Introduction to environment and its concepts, hydrosphere, lithosphere and atmosphere
CO 6.	Detailed concepts of natural resources, environmental pollution, greenhouse effect, ozone layer depletion
CO 7.	Concepts of bioaccumulation, biomagnification, impact of urbanisation.
CO 8.	Introduction to Darwinism, variations, isolations, mutations, concept of species and speciation
CO 9.	Detailed account of adaptations, polymorphism, evolution of man
CO 10.	Understand Zoogeography, zoogeographical realms and faunal peculiarities

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. (Zoology) Part-III</b>	
<b>Z-309: Applied Zoology, Ethology and Biostatistics</b>	
<b>CO 1.</b>	Detailed account of Vermiculture, Sericulture, Lac culture, Apiculture, Prawn culture, and Poultry keeping
<b>CO 2.</b>	Introduction to economic importance of Protozoa, Corals & Coral Reefs, Helminthes, Arthropods, Molluscs
<b>CO 3.</b>	Concepts of insects and their management
<b>CO 4.</b>	Understanding of behaviour through Ethology
<b>CO 5.</b>	Concepts of Pheromones, Societies, Biological Rhythms & Biological Clocks
<b>CO 6.</b>	Detailed concepts of biostatistics



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<b>Course Outcomes (COs)</b>	
<b>B.Sc. Economics Part-I</b>	
<b>P1: Microeconomic Theory</b>	
<b>CO 1.</b>	Introduction to the Nature and Scope of Economics.
<b>CO 2.</b>	Analysis of Consumer Behaviour Theory.
<b>CO 3.</b>	Knowledge about types of production function.
<b>CO 4.</b>	Knowledge about Analysis of Cost and Revenue concepts.
<b>CO 5.</b>	Introduction to the different types of markets.
<b>CO 6.</b>	Knowledge about the determination of Factor pricing.
<b>CO 7.</b>	Application of the Theories of Rent, Interest, and Profit.

<b>P2: India Economy</b>	
<b>CO 1.</b>	Demonstrate the study of basic features and issues of Indian Economy, like Population and demographic features, major trends, and Human Resource Development
<b>CO 2.</b>	Demonstrate the study of national income concepts composition and trends in India
<b>CO 3.</b>	Understanding about natural resources, land reforms, and growth of modern inputs in agriculture
<b>CO 4.</b>	Demonstrate the concepts & terminologies, and development of the agriculture sector in India
<b>CO 5.</b>	Knowledge about the industrial sector in India, public-private sector relevance, and disinvestment in India
<b>CO 6.</b>	Understanding of foreign capital movement in India
<b>CO 7.</b>	Examine the role of globalization in the economic development of India
<b>CO 8.</b>	Knowledge about labour issues and labour reforms

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. Economics Part-II</b>	
<b>P3: Macroeconomic Theory</b>	
<b>CO 1.</b>	Demonstrate the nature & scope of macroeconomics, circular flow of income, and concepts of national income
<b>CO 2.</b>	Demonstration of Classical & Keynesian model of income & employment determination
<b>CO 3.</b>	Knowledge about the Income-Consumption relationship, and different consumption hypotheses and laws.
<b>CO 4.</b>	Understanding of the simple Keynesian model of income determination and concept of Multiplier
<b>CO 5.</b>	Demonstrate the classical, Keynesian, and post-Keynesian quantity theory of money and theory of money supply
<b>CO 6.</b>	Analysis of the Phillips curve and Inflation theory
<b>CO 7.</b>	Knowledge about the IS-LM Model of income and rate of interest determination
<b>CO 8.</b>	Knowledge about Trade Cycle: Meaning, Types, and Theories

<b>P4: History of Economic Thought</b>	
<b>CO 1.</b>	Knowledge about the study of economic thoughts of Mercantilism and Physiocracy
<b>CO 2.</b>	Understanding of thoughts of classical economists: Adam Smith, Ricardo, and Malthus and their critics
<b>CO 3.</b>	A detailed study of economics thoughts of J.S. Mill, Utopian Socialists and the critic of classicism and socialism
<b>CO 4.</b>	Understanding economic thoughts of Karl Marx, German school and mathematical school
<b>CO 5.</b>	Demonstrate knowledge about the Thoughts of Neo-Classical Economist
<b>CO 6.</b>	Understanding Keynesian economics concepts of Underemployment Equilibrium, Effective Demand, and the Role of Fiscal Policy
<b>CO 7.</b>	Demonstrate the study of Indian economic thought

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. Economics Part-III</b>	
<b>P5: Introduction to International Trade, Public Finance, and Development</b>	
<b>CO 1.</b>	Study of International Trade: Need and Importance
<b>CO 2.</b>	Knowledge about the Trade Theories (Classical, Modern Theories and Factor Price Equalization Theorem)
<b>CO 3.</b>	Understanding the theories of Economic Growth and development and the concepts of poverty and inequality
<b>CO 4.</b>	Knowledge of international institutions such as IMF, ADB, and WTO
<b>CO 5.</b>	Meaning and Measurement of Development – GDP and PCI as indicators of development, HDI - Structural Changes in the Development Process, and Obstacles to Development
<b>CO 6.</b>	Understand the meaning of public finance; its nature, subject matter, the differences between public finance and private finance, and differentiate between the public and private goods

<b>P6: Environmental Economics</b>	
<b>CO 1.</b>	Study about the Relationship between Environment and Economy
<b>CO 2.</b>	Analysis of Market Failure: Externalities, Non-Exclusion, Non-Rivalry, Non-Convexities, Asymmetric Information
<b>CO 3.</b>	Environment and Development: Natural Resources, Sustainable Development, Green GDP
<b>CO 4.</b>	Knowledge about Environmental Legislation
<b>CO 5.</b>	Understand the nature and scope of environmental economics, Interaction of the Economy and the environment.
<b>CO 6.</b>	Analyse Market failure, externality, public good environment as a public good, Tragedy of Commons
<b>CO 7.</b>	Understand Environmental Kuznets's Curve, Pollution Control Policies: Command and Control Approach, Incentive-based approach: Taxes, Liability Law and tradable permits
<b>CO 8.</b>	Understanding Global Environmental Issues: Climate Change – Implications and Mitigation

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. Statistics Part-I</b>	
<b>P1: Probability Theory</b>	
<b>CO 1.</b>	To provide a clear definition of probability and its basic properties
<b>CO 2.</b>	To develop the skills to calculate probability for various types of events
<b>CO 3.</b>	To develop problem-solving skills
<b>CO 4.</b>	Identify the type of statistical situation to which different distributions can be applied

<b>P2: Descriptive statistics</b>	
<b>CO 1.</b>	To learn to summarise data through statistical measures
<b>CO 2.</b>	To develop the ability to visually present data through graphs, charts, and tables
<b>CO 3.</b>	To have the ability to organize data in a meaningful way
<b>CO 4.</b>	To understand various characteristics within data viz. shape, spread, and central values, make comparisons, draw conclusions, and comment on findings
<b>CO 5.</b>	To explore the relationship between variables
<b>CO 6.</b>	To understand the concept of Interpolation and Extrapolation of data
<b>CO 7.</b>	To enhance students' analytical reasoning with decision-making skills after analysing and evaluating statistical data

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. Statistics Part-II</b>	
<b>P3: Statistical Inference</b>	
<b>CO 1.</b>	To understand sampling in various distributions, that is Binomial, Poisson, and Normal Distribution
<b>CO 2.</b>	Gain statistical knowledge to make informed decisions in research, data analysis, and hypothesis testing
<b>CO 3.</b>	To understand the concepts of the Theory of Estimation and distinguish various types of estimation, know the properties of estimators and the construction of point and interval estimators
<b>CO 4.</b>	Develop practical proficiency in both parametric and non-parametric statistical techniques for drawing meaningful inferences from data

<b>P4: Statistical Application in Society and Industry</b>	
<b>CO 1.</b>	Learn to collect, interpret, and analyse demographic data to measure and compare mortality and fertility rates using life tables
<b>CO 2.</b>	Understand and compute different types of index numbers using various methods for price, quantity, and value comparisons
<b>CO 3.</b>	Gain skills in identifying trends and seasonal fluctuations in data, employing different models to predict future patterns
<b>CO 4.</b>	Understand the principles of statistical quality control and construct control charts for maintaining product and process quality
<b>CO 5.</b>	Apply statistical knowledge across diverse fields such as demographics, economics, and quality control to support data-driven decisions

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. Statistics Part-III</b>	
<b>P5: Sample Survey</b>	
<b>CO 1.</b>	Understand how to design and conduct effective surveys, including selecting samples and creating good survey questions
<b>CO 2.</b>	Learn different ways to select samples, like simple random sampling, stratified sampling, and cluster sampling
<b>CO 3.</b>	Understand how to estimate population parameters using survey data and different estimation methods
<b>CO 4.</b>	Identify and minimise errors and biases in surveys to improve data quality and the accuracy of results
<b>CO 5.</b>	Apply survey methods to real-world problems in various fields such as market research, social science, and public policy

<b>P6: Design of Experiment and Computational Techniques</b>	
<b>CO 1.</b>	Learn how to plan and conduct experiments with control and randomisation to obtain reliable results
<b>CO 2.</b>	Gain knowledge to analyse data using statistical methods like ANOVA, regression, and hypothesis testing
<b>CO 3.</b>	Interpret results from experiments and effectively report findings, through data visualisation and interpretation
<b>CO 4.</b>	Use statistical software and computational techniques to manage, analyse, and interpret experimental data efficiently
<b>CO 5.</b>	Apply experimental design and computation techniques in real-world scenarios like scientific research, industry, and product testing

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. Geography Part-I</b>	
<b>P1: Physical Geography</b>	
<b>CO 1.</b>	Identify and recall key physical geography concepts, including landforms, climate types, and geological processes
<b>CO 2.</b>	Demonstrates an understanding of the cause-and-effect relationships in physical geography, explaining how various processes contribute to the formation of landscapes and climate patterns
<b>CO 3.</b>	Comprehensive understanding of the fundamental principles and processes governing oceanography, including the dynamics of ocean currents, the role of oceanography in climate regulation, and the interactions between marine ecosystems
<b>CO 4.</b>	Apply physical geography principles to analyse real-world scenarios, such as the impact of natural disasters on human settlements or the influence of physical geography on biodiversity
<b>CO 5.</b>	Analyse geographic data, maps, and satellite imagery to interpret spatial patterns and draw conclusions about the interactions between physical and human phenomena
<b>CO 6.</b>	Critically evaluate the environmental impact of human activities on different physical landscapes and propose sustainable solutions based on their understanding of physical geography

<b>P2: Rajasthan Geography</b>	
<b>CO 1.</b>	An understanding of geographical features of Rajasthan, including its geological structure, rivers and drainage system, deserts, and prominent landmarks
<b>CO 2.</b>	An understanding of the climatic conditions and natural resources of Rajasthan, explaining how these factors influence the state's agriculture, economy, and culture
<b>CO 3.</b>	Analyse the impact of water scarcity on different regions of Rajasthan, check desertification and propose sustainable solutions for water management
<b>CO 4.</b>	Analyse the historical evolution of settlement patterns in Rajasthan, examining how geography has influenced the distribution of cities, towns, and rural areas
<b>CO 5.</b>	Critically evaluate the environmental conservation policies, special development programmes and initiatives in Rajasthan, considering their effectiveness in preserving the state's unique biodiversity

  
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## Course Outcomes (COs)

### B.Sc. Geography Part-I

#### Practical

CO 1.	Apply basic cartographic skills, including map reading, scale interpretation, and understanding the legend
CO 2.	Skillfully interpret and create insightful one-dimensional graphs, enhancing data representation
CO 3.	Proficiently depict atmospheric features, refining meteorological analysis for comprehensive understanding
CO 4.	Demonstrate mastery in representing relief, with a focus on interpreting contours
CO 5.	Demonstrate expertise in generating profiles using serial, projected, and superimposed techniques



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<b>Course Outcomes (COs)</b>	
<b>B.Sc. Geography Part-II</b>	
<b>P3: Resource Geography</b>	
<b>CO 1.</b>	Identify key natural resources, including minerals, energy sources, water bodies, and agricultural lands, along with their distribution across different regions
<b>CO 2.</b>	Demonstrate an understanding of the factors influencing the distribution and utilisation of natural resources, including geological processes, climate, and human activities
<b>CO 3.</b>	Apply principles of resource management to analyse case studies related to sustainable development, exploring ways to balance resource utilisation with environmental conservation
<b>CO 4.</b>	Analyse the impact of resource extraction and utilisation on local and global economies, ecosystems, and communities, considering both positive and negative effects
<b>CO 5.</b>	Critically evaluate policies and strategies for resource conservation and sustainable development, assessing their effectiveness and proposing improvements

<b>P4: Human Geography</b>	
<b>CO 1.</b>	Understand key concepts in human geography, including population dynamics, migration patterns, cultural landscapes, and urbanisation
<b>CO 2.</b>	Demonstrate an understanding of the theories and models that explain human spatial patterns, such as the demographic transition model, urban models, and cultural diffusion
<b>CO 3.</b>	Apply demographic analysis techniques to interpret population pyramids, migration trends, and other demographic data, making connections to real-world scenarios
<b>CO 4.</b>	Analyse the impact of globalisation on cultural, economic, and social processes, examining how it has influenced cultural identities, trade patterns, and urbanisation
<b>CO 5.</b>	Critically evaluate the role of human geography in addressing contemporary global challenges, such as environmental sustainability, social inequality, and geopolitical conflicts

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. Geography Part-II</b>	
<b>Practical</b>	
<b>CO 1.</b>	Explore cartography's definition and principles for comprehensive spatial mapping insights
<b>CO 2.</b>	Understand two-dimensional diagrams for effective representation and spatial communication insights
<b>CO 3.</b>	Analyse traffic flow diagrams for efficient urban transportation planning insights
<b>CO 4.</b>	Explore isochronic charts for analysing travel time and transportation planning
<b>CO 5.</b>	Understand thematic maps for insights into spatial patterns and relationships

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. Geography Part-III</b>	
<b>P5: World Geography</b>	
<b>CO 1.</b>	Identify the locations of continents, major countries, capitals, and geographic features across the world
<b>CO 2.</b>	Demonstrate an understanding of global patterns and trends in population distribution, cultural diversity, and economic development
<b>CO 3.</b>	Analyse the impacts of global issues such as climate change, migration, and geopolitical conflicts on different regions
<b>CO 4.</b>	Analyse the spatial organisation of global trade, migration patterns, and geopolitical events, examining the interconnections of regions and countries
<b>CO 5.</b>	Critically evaluate the role of international organisations and policies in addressing global issues, considering their impact on social, economic, and environmental aspects

<b>P6: Geography of India</b>	
<b>CO 1.</b>	Identify the major physical features of India, including mountain ranges, rivers, and climate zones
<b>CO 2.</b>	Demonstrate an understanding of the cultural diversity in India, including language, religious practices, and traditional customs
<b>CO 3.</b>	Apply geographical knowledge to analyse the regional variations in economic development, agriculture, and urbanisation within India
<b>CO 4.</b>	Analyse the impact of human activities on the environment in different regions of India, examining issues such as deforestation, water scarcity, and pollution
<b>CO 5.</b>	Critically evaluate the effectiveness of government policies and initiatives in addressing geographical challenges in India, considering their impact on social, economic, and environmental aspects

  
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<b>Course Outcomes (COs)</b>	
<b>B.Sc. Geography Part-III</b>	
<b>Practical</b>	
<b>CO 1.</b>	Explore definition and principles of cartography for comprehensive spatial mapping insights
<b>CO 2.</b>	Understand three-dimensional diagrams for effective representation and spatial communication insights
<b>CO 3.</b>	Demonstrate an understanding of different map projections, their characteristics, and the distortions inherent in each type
<b>CO 4.</b>	Apply map projection techniques to create maps that effectively represent specific geographical regions, considering the purpose and audience of the map
<b>CO 5.</b>	Demonstrate an understanding of the principles and techniques of plane table surveying and clinometer surveying, including the use of the instrument, basic surveying calculations, and the importance of accurate field notes

  
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