



S.S.G. PAREEK P.G. COLLEGE



Estd.- 1906

(Affiliated to the University of Rajasthan)

UGC Approved "First Heritage College in Rajasthan"

Program: Bachelor of Science (Three Years Course)

Pass Course

2023-24

- **Program Educational Objective (PEO)**
- **Program Outcomes (POs)**
- **Program Specific Outcomes (PSOs)**
- **Course Outcomes (COs)**

Prof. N.M. Sharma

**Principal
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JAIPUR**



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S.No.	Particulars
1	Vision
2	Mission
3	Program Educational Objectives (PEOs)
4	Program Outcomes (POs)
5	Program Specific Outcomes (PSOs)
	B.Sc. Maths (Pass course) Year-I
6.1	Course Outcomes (COs)
6.2	CO-PO Mapping
	B.Sc. Maths (Pass course) Year-II
7.1	Course Outcomes (COs)
7.2	CO-PO Mapping
	B.Sc. Maths (Pass course) Year-III
8.1	Course Outcomes(COs)
8.2	CO-PO Mapping

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1. Vision of the Institute

- ❖ To provide education par excellence and make it accessible to all strata of society.
- ❖ TO produce leaders and not just the followers by instilling prudent, ingenious and righteous thinking.
- ❖ To promote gender, class, caste, creed and religious equality.
- ❖ To bring about a radical change in the society by empowering the spirit of entrepreneurship and innovation in the students.

2. Mission of the Institute

- ❖ To demonstrate a perfect synergy between tradition and modernity; scientific rationality and didactic wisdom
- ❖ To imbibe the spirit of inquiry, professional sagacity and deftness in the students
- ❖ To provide the students with requisite skills set to survive, sustain and succeed in cutting edge competition
- ❖ To catapult their carrier to reach at the top eight the corporate ladder
- ❖ To produce socially responsible global citizen bringing With rich cultural ethos and ethical values



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3. Program Educational Objectives(PEOs)

PEO 1: Students should demonstrate a strong foundation in core mathematical concepts, including algebra, calculus, geometry, discrete mathematics, chemistry, and physics.

PEO 2: Students should be able to apply mathematical reasoning and problem-solving techniques to analyze and solve complex problems in various contexts.

PEO 3: Students should possess a fundamental understanding of the core concepts and principles in various disciplines covered within the B.Sc. pass course.

PEO 4: Students should be prepared for advanced studies in mathematics or related disciplines, including pursuing research opportunities at the graduate level.

3. Program Outcomes (POs)

PO1: Knowledge acquisition : Acquire comprehensive understanding of the fundamental principles, theories, concepts and gain thorough knowledge in key areas of mathematics and science.

PO2: Problem Analysis: Develop the ability to identify, understand, analyze information critically and apply scientific methods to solve complex problems. Acquire scientific temper towards various day-to-day life phenomena.

PO3: Designing Solutions : Design solutions for complex issues and design components or process that meet the specified requirements with appropriate consideration on cultural, social and environment concerns.

PO4: Conduct Investigation of Complex Problems : Use scientific knowledge and methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

PO5, Modern Tool Usage : Create, select and apply modern techniques, resources and IT tools to complex scientific problems along with understanding the limitations.

PO6: The science and society: Understand the importance of modern branches of science for the improvement of society by participating in various social and cultural



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activities voluntarily, in order to spread knowledge, creating awareness about social evils, blind faiths, health, safety and legal issues.

PO7: Environment and Sustainability: Develop respect for environment. Understand the impact of scientific solutions in environmental context and acquire the ability to demonstrate the knowledge to achieve sustainable developments goals.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of scientific practices.

PO9: Individual and Team Work : Learn to function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary activities

PO10: Communication: Communicate effectively in scientific activities and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations.

PO11: Project Management and Finance :Demonstrate knowledge and understanding of the scientific and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environment.

PO12: Life Long Learning :It will enable the graduates to prepare for national as well as international competitive examination, especially UGC-CSIR-NET and UPSC Civil Services Examination. Students will acquire digital skills and integrate the fundamental concepts with modern tools.

4. Programme Specific Outcomes (PSO)

PSO1:Apply mathematical modeling techniques to address real-world problems in various fields, such as science, engineering, and finance.

PSO2:Demonstrate a deep understanding of core concepts in organic chemistry, inorganic chemistry, physical chemistry, and analytical chemistry.

PSO3:Apply principles to solve problems in industrial processes, environmental science, and research, demonstrating the practical applications of physics and chemistry.

PSO4:Students should be adequately prepared for entry into the workforce or further academic pursuits, depending on their career aspirations.



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6. COURSE OUTCOMES (COs)

6.1 B.Sc. Part Ist (Maths)	
Course	Course outcomes:-After completion of these courses students should be able to
Maths(Paper-I: Discrete mathematics)	<p>CO1: Apply the concept of set and relation on pure and applied mathematics.</p> <p>CO2: Simplify Boolean functions by using the basic Boolean algebraic properties.</p> <p>CO3: Skill to formulate problems and solve recurrence relations.</p> <p>CO4: Apply algorithms and theorems that are treated in the course for solving graph theoretical problems.</p> <p>CO5: Capability to solve the real world problems using trees.</p>
Maths(Paper-II: Calculus)	<p>CO1: Explain the significance of series.</p> <p>CO2: Apply their knowledge in Polar curves, pedal equation of a curve and partial differentiation.</p> <p>CO3: Solve the problem in evolutes and calculate curves tracing of standard curves.</p> <p>CO4: Evaluate integral using beta and gamma functions, change of order of integration.</p> <p>CO5: understand the coordinates. areas, Rectification in Polar.</p>
Maths(Paper-III: Analytic geometry & optimization theory	<p>CO1: Understand the concept of confocal Polar equation of conics section for classification of different conics</p> <p>CO2: Apply the concepts of sphere and Cone to solve related mathematical problems</p> <p>CO3:Analyse the properties of cylinder and central conicoids.</p> <p>CO4: Evaluate the Generating lines of hyperboloid of one sheet and its properties.</p> <p>CO5: Examine The graphical solution of LPP with only two variables, and illustrate the concept of convex set and extreme points. The theory of the Simplex method is developed.</p>



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<p>Physics (Paper-I: Mechanics and oscillations)</p>	<p>CO1: To recall laws of motion and their application to various dynamical situations, motion of inertial frames and concept of Galilean invariance.</p> <p>CO2: To explain conservative forces and recall the phenomena of collisions and analyze about center of mass and laboratory frames and their correlation.</p> <p>CO3: To describe law of gravitation and Apply Kepler's law to explain the motion of planets and satellite in circular & elliptical orbit, through the study of law of Gravitation.</p> <p>CO4: To understand the dynamics motion of a rigid body and evaluate the moment of inertia of different objects.</p> <p>CO5: To discuss the principles of elasticity through the study of Young Modulus, modulus of rigidity, torsion of a cylinder & Bending of beam and compare them.</p>
<p>Physics (Paper-II: Electromagnetis m</p>	<p>CO1: Understanding of Fundamental Laws: Students will demonstrate a thorough understanding of Maxwell's equations and their implications for the behavior of electric and magnetic fields.</p> <p>CO2: Ability to Apply Mathematical Tools: Students will be able to apply vector calculus, including gradient, divergence, curl, and line integrals, to solve problems in electromagnetism.</p> <p>CO3: Understanding of Electrostatics: Students will comprehend the principles of electrostatics, including Coulomb's law, Gauss's law, electric potential, capacitance, and the behavior of conductors and dielectrics.</p> <p>CO4: Understanding of Magnetostatics: Students will understand the principles of magnetostatics, including the Biot-Savart law, Ampère's law, magnetic materials, magnetic fields in matter, and the concept of magnetic induction.</p> <p>CO5: Electromagnetic Waves: Students will demonstrate an understanding of electromagnetic wave propagation, including the derivation and properties of plane waves, reflection, refraction,</p>



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	polarization, and the Poynting vector.
Physics (Paper-III: Optics)	<p>CO1: Understand the concept of Fermat's principle and apply it to prove laws of reflection and refraction.</p> <p>Acquire Knowledge of interference and Young's double slit experiment, Newton's rings, Michelson interferometer and its Applications.</p> <p>CO2: Demonstrate basic concepts of Diffraction: Superposition of wavelets diffracted from aperture, understand Fraunhofer and Fresnel Diffraction</p> <p>CO3: Gain the Knowledge of electromagnetic waves, Polarization , poleroid , poleriometer, and Optical activity to solve the problems.</p> <p>CO4: Learn how to Differentiate ordinary ray from LASER ray, acquire the knowledge of holography and Fiber optics knowledge about lasers and Holography</p> <p>CO5: Capability to solve the physical world problems and predict data, validity of ideas, capable to invent new tools</p>
Chemistry (Paper-I Inorganic chemistry)	<p>CO1: To make student understand the ionic solids, metallic bond and weak interactions.</p> <p>CO2: Student can understand covalent bond and molecular orbital theory.</p> <p>CO3: Student can understand S and P block elements in detail.</p> <p>CO4: Students can understand the behavior of the inert gases.</p> <p>CO5: To make student understand the concepts of nuclear and radio chemistry.</p>



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<p>Chemistry(Paper-III: Organic Chemistry</p>	<p>CO1: Students can analyze electrophilic and nucleophilic hemolytic and heterolysis fission. Electron mobility Inductive effect etc.</p> <p>CO2: To learn stereochemistry of chiral compounds arises due to presence of stereoaxis; concept of stereoisomerism and concept of conformations of stereo isomers</p> <p>CO3: Many of the daily used materials are organic compounds and majority of them are hydrocarbons therefore this topic makes the concept regarding their formation.</p> <p>CO4: Student can remember different organic compounds with respect to the functional group and become eligible to call the name of the organic compounds scientifically.</p> <p>CO5: Students become eligible to study the subject initially by understanding the basic things for chemical reactions i.e. substrate and reagents.</p>
<p>Chemistry(Paper-III: Physical Chemistry</p>	<p>CO1: To understand the basic knowledge of mathematical concepts and Liquid State.</p> <p>CO2: To learn the depth knowledge of gaseous state and its theory.</p> <p>CO3: To study the Term of Solid state and Laws of Crystallography, defects and band theory.</p> <p>CO4: To understand the concepts of Colloids and gels.</p> <p>CO5: Chemical kinetics and its theory like Arrhenius, collision these topics will help students to evaluate the physical properties of chemical reaction.</p>

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6.2 Mapping: B.Sc.(Maths) Part-I

Maths, Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	-	1	-	-	-	-	-	-	2
CO2	2	1	-	1	-	-	-	-	-	-	-	2
CO3	3	2	1	2	-	2	1	-	2	-	-	2
CO4	2	2	2	2	2	2	2	-	2	-	-	2
CO5	2	2	2	2	2	2	1	-	2	-	-	2

Maths, Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	1	-	-	-	-	-	-	-	-
CO2	2	2	1	1	1	2	1	-	1	-	-	-
CO3	2	2	-	2	-	-	-	-	2	-	-	1
CO4	2	3	1	3	2	-	-	-	2	-	-	2
CO5	3	3	2	3	3	2	2	-	2	-	-	2

Maths, Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	1	-	-	-	-	-	-	-	2
CO2	1	2	2	1	1	2	1	-	1	-	-	2
CO3	2	2	-	2	-	-	-	-	-	-	-	2
CO4	2	3	2	3	2	-	-	-	2	-	-	2
CO5	3	3	3	3	3	2	2	-	2	-	-	-



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Physics, Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	1	-	-	-	-	1
CO2	2	3	3	2	2	-	-	-	-	-	-	-
CO3	2	2	3	3	3	-	-	-	-	-	-	1
CO4	2	2	3	3	2	-	-	-	-	-	-	2
CO5	1	2	2	1	3	-	-	-	-	-	1	2

Physics, Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	2	2	1	-	1	-	-	-	-	1
CO2	3	2	3	3	2	-	-	-	-	-	-	-
CO3	2	2	3	3	3	-	2	-	-	-	-	1
CO4	2	2	3	3	2	-	2	-	-	-	-	2
CO5	2	2	2	2	3	-	2	-	-	-	1	2

Physics, Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	1	2	3	-	1	-	1	1	-	2
CO2	3	3	1	2	2	-	1	-	-	-	-	2
CO3	3	3	1	2	3	-	1	-	-	-	-	2
CO4	2	3	2	3	3	-	1	-	-	-	-	3
CO5	1	2	2	2	2	-	2	-	-	-	-	3

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Chemistry, Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	-	2	1	1	2	3	-	2	1	2
CO2	2	1	3	-	2	2	1	1	3	-	3	1
CO3	2	2	2	3	1	-	1	1	2	1	1	3
CO4	2	2	-	-	1	1	3	2	1	3	1	-
CO5	3	1	2	1	1	3	3	-	-	3	1	3

Chemistry, Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	1	2	-	-	2	2	3	2	1
CO2	1	1	2	3	3	2	-	-	2	-	1	1
CO3	2	2	3	1	2	3	1	-	1	2	3	1
CO4	1	2	1	1	-	2	1	3	1	2	3	1
CO5	2	-	-	2	1	2	3	2	2	1	-	-

Chemistry, Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	3	1	1	2	3	1	2	1	2
CO2	1	2	-	-	2	2	3	1	2	2	2	3
CO3	2	2	3	1	-	2	1	1	2	3	2	-
CO4	-	1	1	2	2	-	2	2	-	-	3	1
CO5	2	-	-	2	3	2	1	2	2	1	1	2

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7.1 B.Sc. Part IInd (Maths)	
Course	Course outcomes:-After completion of these courses students should be able to
Maths(Paper-I: Real analysis)	<p>CO1: Understand the Fundamental theorem of Game theory, Graphical method for 2×2 games.</p> <p>CO2: Evaluate the Economic ordering quantity (EOQ), EOQ models without shortage, EOQ models with shortage.</p> <p>CO3: Relate the concepts of Probability theory Probability distributions of a random variable.</p> <p>CO4: Properties of Probability distributions in queueing systems. Models-Erlang model.</p> <p>CO5: Examine for the Sequencing Models, Sequencing problems, processing n jobs through two machines.</p> <p>CO1: Describe the concepts of ordinary differential equations and different types ODEs.</p> <p>CO2: Explain and apply various forms of Ordinary differential equations in the different areas of day to day life problems and solve them.</p> <p>CO3: Effectively write mathematical derivation/ solutions of all types of ODE in homogeneous equations.</p> <p>CO4: Derive and apply the concept of method of variation of parameter, simultaneous linear differential equations.</p> <p>CO5: Explain various forms/types of Partial differential equations and their solution.</p>
Maths(Paper-II: Differential equations)	<p>CO1: Understand the fundamental concepts of finite differences.</p> <p>CO2: Find out the first and second derivatives formulae for numerical differentiation to solve problems.</p> <p>CO3: Derive quadrature formulae and to deduce various rule in numerical integration to solve problem</p> <p>CO4: Solve ordinary differential equations using various methods</p> <p>CO5: Understand concept of the integrals of functions and vector fields</p>
Maths(Paper-III: Numerical analysis)	



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	over parameterized surfaces and compute them in simple examples.
Physics (Paper –I): Thermodynamics and Statistical Physics)	<p>CO1: To Acquire working knowledge of the zeroth and first law of thermodynamics, identify the relationship and correct usage of infinitesimal work, work, energy, heatcapacity, specific heat, latent heat, and enthalpy.</p> <p>CO2: To Identify which procedure to be used to produce low temperature and to analyze the difference between Liquid He I and He II.</p> <p>CO3: To classify the concepts of microstate, macrostate, ensemble, phase space, thermodynamic probability and discuss partition function.</p> <p>CO4: To Explain advanced topics related to Quantum Statistical Mechanics and the partition function.</p> <p>CO5: To explain acquainted with advanced topics such as the Fermi energy of a system of Non-interacting Fermions and its relationship to the chemical potential.</p>
Physics (Paper-II): Mathematical Physics and Theory Of Relativity)	<p>CO1:Analyze and apply the concepts of vector calculus in different coordinate systems to determine gradients, divergences, and curls.</p> <p>CO2:Evaluate and demonstrate proficiency in tensor analysis techniques, including coordinate transformations, contractions, and the use of metric tensors for tensor transformations.</p> <p>CO3:Interpret and explain the principles of special relativity, including Lorentz transformations, time dilation, and relativistic kinematics, and apply them to solve problems in relativistic mechanics.</p> <p>CO4:Solve differential equations with variable coefficients and singular points using appropriate techniques such as series solutions, and apply them to physical problems in mathematical physics, including wave equations and Laplace equations.</p> <p>CO5:Evaluate and apply advanced mathematical techniques, such as the Dirac delta function and special functions (e.g., Hermite, Legendre, Laguerre), to model and solve physical phenomena, including those related to electric and magnetic fields, wave propagation, and heat</p>



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	conduction.
Physics (Paper-III): Electronics And Solid State Devices	<p>CO1: Student can be able to understand the biasing , illustrate the voltage -c urrent curve of diode, transistor , FET and various frequency response curve , compare BJT and FET.</p> <p>CO2: To apply mathematical formulation , circuit theory , junction theory , prove various theorems</p> <p>CO3: Students able to derive the various equations using previous Knowledge, and finding the gain of amplifiers.</p> <p>CO4: Student able to explain the experimental devices, Deigned oscillators , construction of logic gates and simplification of mathematical equation.</p> <p>CO5: Student Capable to solve the physical world problems and predict data and prepare for higher studies.</p>
Chemistry Paper-I: Inorganic chemistry	<p>CO1: To understand chemistry of elements first ,second and third transition series.</p> <p>CO2: To understand chemistry Transition Elements and their Coordination Compounds.</p> <p>CO3: To understand the chemistry of lanthanides and actinides .</p> <p>CO4: Students can able to analyses the redox reactions in inorganic compounds.</p> <p>CO5:To analyses study of Lewis and HSAB concepts of acids and bases and Study Non-aqueous solvents such as liquid ammonia and liquid Sulphur dioxide.</p>
Chemistry Paper-II: Organic chemistry	<p>CO1: To understand the knowledge about EMR with UV IR Spectroscopy</p> <p>CO2: Students can identify functional groups</p> <p>CO3: Students can identify and analyze Carbonyl compounds</p> <p>CO4:To learn the depth knowledge of Carboxylic acids and their</p>



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	derivatives. CO5: To study and learn the organic compounds of nitrogen.
Chemistry Paper-III: Physical chemistry)	CO1: Students can understand concepts of thermodynamics (First and second law) and thermochemistry CO2: To learn in detail about the first and second laws of chemical thermodynamics and the related terms; to get idea about thermo-chemistry and thermodynamic relationships and system of variable compositions And Understand Chemical and Phase Equilibrium. CO3: To evaluate the basic concepts of chemical equilibrium and understand about the spontaneity of the reaction. CO4: To demonstrate the laws of electrolysis ,ionic strength of electrolytic solutions, Nernst equation. CO5: Students can apply concepts of electrochemistry, electrochemical cells, buffers and corrosion in various practical method.


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7.2 Mapping: B.Sc. (Maths) Part-II

Maths, Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	1	-	-	-	-	-	-	-	2
CO2	2	2	2	1	1	2	1	-	1	-	-	2
CO3	2	3	-	2	-	2	-	-	-	-	-	3
CO4	3	2	2	3	2	-	-	-	2	-	-	3
CO5	3	3	3	3	3	2	2	-	2	-	-	3

Maths, Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	1	-	-	-	-	-	-	-	2
CO2	1	2	2	1	1	2	1	-	1	-	-	2
CO3	2	2	-	2	-	-	-	-	-	-	-	2
CO4	2	3	2	3	2	-	-	-	2	-	-	2
CO5	3	3	3	3	3	2	2	-	2	-	-	-

Maths, Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	1	-	-	-	-	-	-	-	-
CO2	2	2	2	1	1	2	1	-	1	-	-	-
CO3	2	2	-	2	-	2	-	-	-	-	-	-
CO4	3	3	2	3	2	-	-	-	2	-	-	2
CO5	3	3	3	3	3	2	2	-	2	-	-	2



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Physics, Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	1	-	-	-	-	1
CO2	2	3	3	2	2	-	-	-	-	-	-	-
CO3	2	2	3	3	3	-	-	-	-	-	-	1
CO4	2	2	3	3	2	-	-	-	-	-	-	2
CO5	1	2	2	1	3	-	-	-	-	-	1	2

Physics, Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	2	1	-	1	-	-	-	-	2
CO2	2	3	3	2	2	-	-	-	-	-	-	-
CO3	2	2	3	3	3	-	-	-	-	-	-	2
CO4	2	2	3	3	2	-	-	-	-	-	2	2
CO5	1	2	2	1	3	-	-	-	-	-	1	2

Physics, Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	2	1	-	-	1	2	2
CO2	3	3	2	2	2	1	-	-	-	1	1	2
CO3	3	2	3	3	1	2	-	-	-	1	2	2
CO4	2	3	3	3	3	2	2	-	-	1	3	3
CO5	2	2	2	1	3	2	1	-	-	1	2	3



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Inorganic Chemistry, Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	-	3	2	1	1	2	3	--	2
CO2	1	1	2	3	-	-	1	1	2	2	3	-
CO3	2	2	3	1	1	3	-	-	2	2	1	1
CO4	-	-	2	1	2	1	2	2	-	-	2	2
CO5	1	1	-	2	-	1	2	1	1	3	2	1

Organic Chemistry, Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2	1	3	-	2	2	1	3	-	2
CO2	-	2	1	1	3	2	1	3	-	1	1	2
CO3	1	1	2	3	1	2	1	2	1	1	3	-
CO4	2	1	3	2	1	1	2	1	2	2	2	1
CO5	2	2	1	3	1	2	3	-	-	2	1	1

Physical Chemistry, Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2	1	3	-	2	2	1	3	-	2
CO2	-	2	1	1	3	2	1	3	-	1	1	2
CO3	1	-	2	2	1	-	1	2	2	1	3	-
CO4	2	1	-	2	1	1	-	1	2	2	2	1
CO5	2	2	1	3	1	2	3	-	-	2	1	1

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8.1 B.Sc. Part III rd (Maths)	
Course	Course outcomes:-After completion of these courses students should be able to
Maths Paper-I: Algebra	<p>CO1: Understand the concept of relations and functions, Properties of groups</p> <p>CO2: Determine the given subsets of a group or cyclic and normal subgroup.</p> <p>CO3: Apply the fundamental concepts of ring theory such as the concepts of ideals, quotient rings</p> <p>CO4: Derive the condition for the group Z_n to be an integral Domain and Field</p> <p>CO5: Understand the basic concepts of vector space and subspaces.</p>
Maths Paper-II: Complex analysis	<p>CO1: Summarize the basic concepts of complex analysis like analytic functions and harmonic functions</p> <p>CO2: Determine the integrals of features using Cauchy's theorem and Cauchy integral formula.</p> <p>CO3: Solve problems using Taylors and Laurent's series expansion and find singularities of the function</p> <p>CO4: Examine the Singularities of an analytic function</p> <p>CO5: Explain bilinear transformation and compute fixed points of bilinear transformation.</p>
Maths Paper-III: Mechanics	<p>CO1: Evaluate Velocity and acceleration in Polar coordinates.</p> <p>CO2: Explain and solve analytical conditions of equilibrium of coplanar forces & Virtual work.</p> <p>CO3: Derive the formula for simple harmonic motion and Moment of inertia</p> <p>CO4: Solve the equilibrium of three forces acting on a body</p> <p>CO5: Define the common catenaries and tension at a point.</p>



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Physics Paper –I: Quantum Mechanics And Spectroscopy	<p>CO1: To Understand the concept of Wave mechanics and Schrodinger equation to solve problems And Apply the uncertainty principle .</p> <p>CO2: To Apply Schrödinger equation to solve problems using Boundary condition and continuity condition And to compare the various quantum mechanical problems.</p> <p>CO3: To Apply Schrödinger equation to solve problems 1-D And 3-D Infinite Potential Well, Square Well Potential, and Determine Reflection And Transmission Coefficient.</p> <p>CO4: To Apply Schrodinger equation to determine the solution of Simple harmonic oscillator and Rigid rotator. Estimate The effect of magnetic field on spectral lines.</p> <p>CO5: To Explain the different types of spectra. like pure rotational spectra and vibrational- rotational spectra and relate the spectra.</p>
Physics(Paper – II): Nuclear and Particle Physics)	<p>CO1: Understand the general properties and concepts of nuclei and different nuclear models.</p> <p>CO2: Learn and explain various type of radioactive decays, mechanism of nuclear fission and fusion.</p> <p>CO3: Understand interactions radiation with matter.</p> <p>CO4: design and analyze various detectors and particle accelerators</p> <p>CO5: Understand elementary particle and their interactions and elementary idea of Quark theory</p>
Physics Paper –III: Solid State Physics	<p>CO1: To categories the types of materials and bond formation in the crystal.</p> <p>To explain the concept of lattice, crystals and symmetry operations.</p> <p>CO2:To illustrate the main features of the physics of electrons in solids: origin of energy bands, and their influence electronic behavior.</p> <p>CO3: To build Einstein and Debye theory of specific heat of solids and criticize these theory.</p> <p>CO4:To perform experimental techniques to measure electrical conductivity and the hall set up to determine the Hall coefficient of a semiconductor.</p>



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	<p>To recall the electrical & magnetic properties of materials & applications.</p> <p>CO5: To explain the origin of dia-, para-, and ferro-magnetic properties of solids.</p> <p>To understand the basics of phase transitions and the preliminary concept and experiments related to superconductivity in solid.</p>
<p>Chemistry Paper-I: Inorganic chemistry</p>	<p>CO1: To analyses the study of Hardness and softness and HSAB concepts of acids and bases</p> <p>CO2: To learn the concept of Metal ligand bonding in transition metal complexes</p> <p>CO3: To evaluate and understand the magnetic properties of transition metal complexes</p> <p>CO4: To apply and demonstrate the kinetics aspects of metal complexes.</p> <p>CO5: Students can able to understand organometallic chemistry, inorganic polymers .</p>
<p>Chemistry Paper-II: Organic chemistry</p>	<p>CO1:To learn the study of NMR spectroscopy and identification of organic compounds.</p> <p>CO2:To Study the chemistry of quinoline, isoquinoline and indole.</p> <p>CO3:Student will study chemistry of carbohydrates with special reference to structure and configuration of glucose and fructose.</p> <p>CO4: To apply and demonstrate the concept of Nucleic acid.</p> <p>CO5: Students can able to understand chemistry of dyes and polymers.</p>
<p>Chemistry Paper-III: Physical chemistry</p>	<p>CO1: Student can recognize elementary Quantum Mechanics.</p> <p>CO2: Understand molecular structure and their physical properties</p> <p>CO3: Student can analyze rotational, Vibrational and Electronic Spectroscopy.</p> <p>CO4: To demonstrate the laws of Photochemistry</p> <p>CO5:Student will study the colligative properties of the solution and instrumentations.</p>



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Mapping 8.2: B.Sc. Part-III(Maths)

Maths, Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	-	1	-	-	-	-	-	-	-	2
CO2	2	2	2	1	1	2	1	-	1	-	-	2
CO3	2	2	-	2	2	-	-	-	-	-	-	2
CO4	3	3	2	3	2	-	2	-	2	-	-	3
CO5	3	3	3	3	3	2	2	-	2	-	-	3

Maths, Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	1	-	-	-	-	-	-	-	2
CO2	2	2	2	1	1	2	1	-	1	-	-	3
CO3	2	2	-	2	-	-	1	-	2	-	-	3
CO4	3	3	2	3	2	-	2	-	2	-	-	3
CO5	3	3	3	3	3	2	2	-	2	-	-	3

Maths, Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	1	-	-	-	-	-	-	-	2
CO2	2	2	2	1	1	2	1	-	1	-	-	2
CO3	2	2	1	2	-	-	1	-	-	-	-	2
CO4	2	3	2	3	2	-	-	-	2	-	-	1
CO5	3	3	2	3	3	2	2	-	2	-	-	1



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Physics, Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	1	-	-	-	-	1
CO2	2	3	3	2	2	-	-	-	-	-	-	-
CO3	2	2	3	3	3	-	-	-	-	-	-	1
CO4	2	2	3	3	2	-	-	-	-	-	-	2
CO5	1	2	2	1	3	-	-	-	-	-	1	2

Physics, Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	1	-	-	-	-	1
CO2	2	3	3	2	2	-	2	-	-	-	-	-
CO3	3	2	3	3	3	-	2	-	-	-	-	-
CO4	3	2	3	3	3	-	-	-	-	-	-	2
CO5	1	2	2	1	3	-	-	-	-	-	1	2

Physics, Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	1	-	1	-	-	-	-	1
CO2	2	3	3	2	2	-	-	-	-	-	-	-
CO3	2	2	3	3	3	-	-	-	-	-	-	1
CO4	2	2	3	3	2	-	-	-	-	-	-	2
CO5	1	2	2	1	3	-	-	-	-	-	1	2



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Chemistry, Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	3	1	-	2	1	-	-
CO2	2	1	1	1	2	3	2	1	-	2	2	1
CO3	1	-	-	2	3	2	2	1	2	3	1	1
CO4	2	2	1	3	-	-	-	2	3	1	2	2
CO5	2	1	3	2	1	3	2	1	2	1	-	2

Chemistry, Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	2	3	-	-	2	1	1
CO2	2	2	1	1	2	3	-	2	2	3	1	-
CO3	-	-	2	1	3	2	1	2	3	2	1	3
CO4	2	1	2	1	2	3	1	-	-	2	1	3
CO5	-	2	2	1	3	1	2	1	2	1	2	-

Chemistry, Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2	3	2	1	3	2	-	2	-	1
CO2	1	2	1	3	1	2	-	3	2	2	1	2
CO3	2	1	3	-	1	2	1	1	3	3	1	1
CO4	-	2	1	2	1	-	2	1	1	3	-	-
CO5	2	-	-	2	-	2	2	-	2	-	2	2



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Programme: B.Sc. (Biology) Part-I

1	Vision
2	Mission
3	Program Educational Objectives (PEOs)
4	Program Outcomes (POs)
5	Program Specific Outcomes (PSOs)
	B.Sc. Biology (Pass course) Year-I
6.1	Course Outcomes (COs)
6.2	CO-PO Mapping
	B.Sc. Biology (Pass course) Year-II
7.1	Course Outcomes (COs)
7.2	CO-PO Mapping
	B.Sc. Biology (Pass course) Year-III
8.1	Course Outcomes(COs)
8.2	CO-PO Mapping

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1. Vision of the Institute

- ❖ To provide education par excellence and make it accessible to all strata of society.
- ❖ TO produce leaders and not just the followers by instilling prudent, ingenious and righteous thinking.
- ❖ To promote gender, class, caste, creed and religious equality.
- ❖ To bring about a radical change in the society by empowering the spirit of entrepreneurship and innovation in the students.

2. Mission of the Institute

- ❖ To demonstrate a perfect synergy between tradition and modernity; scientific rationality and didactic wisdom
- ❖ To imbibe the spirit of inquiry, professional sagacity and deftness in the students
- ❖ To provide the students with requisite skills set to survive, sustain and succeed in cutting edge competition
- ❖ To catapult their carrier to reach at the top eight the corporate ladder
- ❖ To produce socially responsible global citizen bringing With rich cultural ethos and ethical values

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3. Program Educational Objectives (PEOs)

PEO1: Graduates should demonstrate proficiency in the fundamental principles and methodologies of biology, chemistry, botany, and zoology.

PEO2: Graduates should be able to apply their knowledge of biology, chemistry, botany, and zoology to analyze and solve problems in various contexts, including scientific research, healthcare, agriculture, and environmental conservation.

PEO3: Graduates should have the skills necessary to conduct independent or collaborative research in the fields of biology, chemistry, botany, or zoology.

PEO4: Graduates should recognize the importance of lifelong learning and professional development, staying abreast of new developments in biology, chemistry, botany, and zoology throughout their careers.

PEO5: Graduates should demonstrate ethical and professional behavior in their scientific endeavors, including respect for diversity, integrity, and responsible conduct of research.

4. PROGRAM OUTCOME (POs)

PO1: Understanding of Biological Concepts: Demonstrate a solid understanding of fundamental principles in biology, including genetics, evolution, ecology, physiology, and cellular biology.

PO2: Knowledge Integration: Integrate knowledge from chemistry, botany, and zoology to analyze complex biological systems and phenomena.

PO3: Laboratory Skills: Develop proficiency in laboratory techniques, including microscopy, DNA analysis, chemical assays, and fieldwork methodologies.

PO4: Critical Thinking and Problem-Solving: Apply critical thinking skills to analyze and solve problems in biological research, conservation, healthcare, and other relevant fields.

PO5: Experimental Design and Data Analysis: Design experiments, collect data, and apply statistical analysis to interpret results and draw valid conclusions.



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PO6: Communication Skills: Communicate scientific concepts effectively through written reports, oral presentations, and visual media to diverse audiences.

PO7: Ethical and Professional Conduct: Understand and adhere to ethical guidelines in scientific research and demonstrate professionalism in academic and professional settings.

PO8: Interdisciplinary Knowledge: Recognize the interdisciplinary nature of biological sciences and demonstrate proficiency in integrating knowledge from multiple disciplines.

PO9: Research Skills: Develop research skills including literature review, hypothesis formulation, experimental design, data collection, analysis, and interpretation.

PO10: Applied Knowledge and Practical Applications: Apply biological principles and techniques to address real-world problems in fields such as medicine, agriculture, environmental science, and biotechnology.

PO11: Teamwork and Collaboration: Collaborate effectively with peers, faculty, and professionals from diverse backgrounds to achieve common goals in scientific inquiry and problem-solving.

PO12: Life-long Learning: Cultivate a habit of continuous learning and professional development to stay updated with advances in the field and adapt to evolving scientific challenges and opportunities.

5.. Program Specific Outcomes (PSOs)

The UG curriculum caters an all-round development of the student, rolling out globally ready individuals into the fast-paced world. The program specific outcome includes:

PSO1.Apply various laboratory techniques and methodologies in chemistry, botany, and zoology to conduct experiments, analyze data, and draw conclusions.

PSO2.Identify and solve interdisciplinary problems in biology by applying knowledge and techniques from chemistry, botany, and zoology.

PSO3.Identify and classify different plant and animal species based on their morphological, anatomical, and biochemical characteristics.



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PSO4. Analyze the interrelationships between organisms and their environments, including the roles of chemistry, botany, and zoology in ecosystem dynamics.

PSO5. Understand the role of biology, chemistry, botany, and zoology in healthcare, including disease diagnosis, drug development, and medical treatments.

6.1 COURSE OUTCOMES (COs)

B.Sc. Part Ist(Biology)	
Course	Course outcomes:-After completion of these courses students should be able to
Botany Paper-I: Cell bio. Genetics and Plant Breeding	CO1: Learn, understand and develop skill and hands on training in basics of cell biology, genetics and plant breeding. CO2: The functions and structural properties of different types of cells and their organelles. Cycle of cell division, gene interactions, DNA damage and repair mechanisms. CO3: Principles of crop improvement strategies. CO4: Possibilities of mutations and mutagens. CO5: Role of gene interactions in phenotype development.
Botany Paper-II: Microbiology, Micolgy and Plant Pathology	CO1: Classify bacteria based on structure, Interpret the morphology and multiplication of viruses. CO2: Predict the bacterial growth pattern. CO3: Design the applications of microbes in industry. CO4: Perform the basic laboratory procedures in microbiology – sterilization techniques. CO5: Elucidate the role of plant pathology in agriculture, Discussion of the plant – pathogen interaction, Develop methods of Pathogen.





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<p>Botany Paper-III: Algae, Lichenes and Bryophyta</p>	<p>CO1: To learn about the morphology, structure of Algae, lichen and bryophyta in different water bodies and habitats. CO2: To learn about food reserves methods, reproduction. CO3: To understand about the economic importance of Algae, Bryophyta and Lichens. CO4: Students will be able to identify about various algae bryophytes and lichens. CO5: Students will have understanding about classification characteristic feature growth and reproduction of algae, lichen and bryophytes.</p>
<p>Zoology Paper-I: Diversity Of Animal</p>	<p>CO1: Define terms related to animal taxonomy and outline general taxonomic rules in animal classification CO2: Illustrate basis of classification of non chordata and chordate CO3: Classify Phylum Porifera to Chordata with taxonomic keys. CO4: Acquire knowledge about habit, habitat, organ and organ system, life cycle of different invertebrate animals (phylum protozoa to annelida</p>
<p>Zoology Paper-II: Cell Biology And Genetics)</p>	<p>Co1, explain cell structure and cell membrane structure, cell membrane transport Co2, explain about different cell organelles, nuclear organization and dna ,rna Co3, develop knowledge aboutgenetic code and translation, cell reproduction Co4, understand about mendalism, chromosomal mutation,genetic interaction Co5, describe multiple gene inheritance, sex determination and concept of gene</p>
<p>Zoology Paper-III: Gamets and Developmental</p>	<p>CO1:define scope and type of embryologyand gametogenesis CO2: Explain evolutionary significance of internal fertilization, neoteny and paedogenesis CO3:develop knowledge about gametogenesis, cleavage mechanisms,</p>



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Biology	gastrulation and embryonic adaptation CO4:analyze in vitro culturing of organism,and production of transgenic animals, stem cells
Chemistry Paper-I: Inorganic chemistry	CO1: To make student understand the ionic solids, metallic bond and weak interactions. CO2: Student can understand covalent bond and molecular orbital theory. CO3: Student can understand S and P block elements in detail. CO4: Students can understand the behavior of the inert gases. CO5: To make student understand the concepts of nuclear and radio chemistry.
Chemistry Paper-II : Organic chemistry	CO1: Students can analyze electrophilic and nucleophilic hemolytic and heterolysis fission. Electron mobility Inductive effect etc. CO2: To learn stereochemistry of chiral compounds arises due to presence of stereoaxis; concept of stereoisomerism and concept of conformations of stereo isomers CO3: Many of the daily used materials are organic compounds and majority of them are hydrocarbons therefore this topic makes the concept regarding their formation. CO4: Student can remember different organic compounds with respect to the functional group and become eligible to call the name of the organic compounds scientifically. CO5: Students become eligible to study the subject initially by understanding the basic things for chemical reactions i.e. substrate and reagents.
Chemistry Paper-III: Physical chemistry	CO1: To understand the basic knowledge of mathematical concepts and Liquid State. CO2: To learn the depth knowledge of gaseous state and its theory. CO3: To study the Term of Solid state and Laws of



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	<p>Crystallography, defects and band theory.</p> <p>CO4: To understand the concepts of Colloids and gels.</p> <p>CO5: Chemical kinetics and its theory like Arrhenius, collision these topics will help students to evaluate the physical properties of chemical reaction.</p>
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6.2. Mapping: B.Sc. (Biology) Part-I

Botany Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	3	2	-	2	2	-	3	1	-	-
CO2	2	-	2	1	-	-	2	-	1	2	-	-
CO3	2	3	-	2	-	1	3	1	-	2	-	-
CO4	3	1	2	3	-	-	2	2	3	1	-	-
CO5	-	2	1	-	-	2	-	1	2	-	-	-

Botany Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	3	2	-	2	2	-	2	-	-	-
CO2	2	-	-	1	2	-	2	2	-	-	-	-
CO3	3	2	2	3	-	1	2	-	-	-	-	-
CO4	3	1	-	3	-	-	2	-	-	1	-	-
CO5	-	-	1	2	-	2	2	-	-	3	-	-

Botany Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	3	1	2	2	3	2	-	3	1	-	-
CO2	2	-	3	3	1	1	3	2	-	3	-	-
CO3	3	-	3	2	3	3	3	-	-	3	-	-
CO4	-	3	1	1	-	-	2	-	3	1	-	-
CO5	1	2	2	3	2	-	3	1	1	1	-	-



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Zoology Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	2	-	-	-	-	-	2	1	-
CO2	2	3	2	2	-	-	-	-	-	3	1	-
CO3	3	3	2	2	2	-	2	1	-	3	1	-
CO4	3	3	2	3	3	-	1	-	-	3	2	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-

Zoology Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	2	-	-	2	2	2	1	-
CO2	2	3	2	2	2	-	-	2	-	3	1	-
CO3	3	3	2	2	2	-	2	2	-	3	1	-
CO4	3	3	2	3	3	-	1	-	-	3	2	-
CO5	3	1	-	2	-	-	-	-	-	2	1	-

Zoology Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	2	-	-	2	2	2	-	-
CO2	2	3	2	2	2	-	-	2	-	3	-	-
CO3	3	3	2	2	2	-	2	2	-	3	-	-
CO4	3	3	2	3	3	-	1	-	-	3	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-



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Chemistry, Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	3	1	-	2	1	-	-
CO2	2	1	1	1	2	3	2	1	-	2	2	1
CO3	1	-	-	2	3	2	2	1	2	3	1	1
CO4	2	2	1	3	-	-	-	2	3	1	2	2
CO5	2	1	3	2	1	3	2	1	2	1	-	2

Chemistry, Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	2	3	-	-	2	1	1
CO2	2	2	1	1	2	3	-	2	2	3	1	-
CO3	-	-	2	1	3	2	1	2	3	2	1	3
CO4	2	1	2	1	2	3	1	-	-	2	1	3
CO5	-	2	2	1	3	1	2	1	2	1	2	-

Chemistry, Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2	3	2	1	3	2	-	2	-	1
CO2	1	2	1	3	1	2	-	3	2	2	1	2
CO3	2	1	3	-	1	2	1	1	3	3	1	1
CO4	-	2	1	2	1	-	2	1	1	3	-	-
CO5	2	-	-	2	-	2	2	-	2	-	2	2



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7.1 COURSE OUTCOMES (COs)

B.Sc. Part IInd (Biology)	
Course	Course outcomes:-After completion of these courses students should be able to
Botany Paper-I:Molecular biology and biotechnology	CO1: The objective of this course is to learn about DNA replication, recombination, transcription, translation, regulation. CO2: To learn about Modern tools and techniques of genomic isolation, plant genome isolation CO3: To understand molecular process in biotechnology. CO4: To understand Tissue culture, Micro propagation process. CO5: To understand about Genetic modified crops and technical tolls in biotechnology
Botany Paper-II: Plant Physiology And Biochemistry	CO1: To recall the concept of different physiological processes including water potential, stomatal movement, different physiological responses express by plants in different stimulus. Growth, Transpiration, Ascent of Sap, Plant growth regulators and Nitrogen metabolism. CO2: To explain the processes of photosynthesis and respiration in plants. CO3: To Understand the role, structure and importance of the bio molecules associated with plant life, apply the basic concepts of plant physiology in other disciplines of agriculture, CO4: To identify the reasons behind plant growth and development, development the basic skills with techniques related to plant physiology, To make a relationship between plant growth, structure and their metabolic processes. CO5: To analyze the effects of different external and internal factors in plant growth and development by changing plant metabolism,compare the different types of plants according to their metabolic processes.
Botany Paper-III: Pteridophytes, Gymnosperm and Palaeobotany	CO1: To introduce knowledge about the morphology, occurrence, distribution, structure of pteridophytes, Gymnosperm and palaeobotany fossil plants. CO2: Students will learn about the role of coal excavation and the study of paleopalynology.



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	CO3: Students will be aware of the group of plants that have given rise to land habit and flowering plants. CO4: Knowledge of various cells and tissues and vascular system in lower plants
Zoology Paper-I: Structure And function Of Invertebrates Types	CO1: Describe different physiological activities in arthropods CO2: Explain structure and physiology of different animal of phylum Mollusca ,Echinodermata and hemichordates' CO3: Understand about canal system, parasitic adaptation and social organization in honey bee CO4: To take knowledge about development of insects, water vascular system of starfish
Zoology Paper-II: Animal Physiology And Biochemistry	CO1: Explain fundamental knowledge of animal physiology CO2: Describe understand the mechanisms that work to keep the animal body alive and functioning. CO3: Explain Interactions and interdependence of physiological and biochemical processes. CO4: Understand the detailed concepts of digestion, respiration, excretion, the functioning of nerves and muscles, cardiovascular system, endocrine system and reproductive system.
Zoology (Paper-III: Immunology, Microbiology And Biotechnology)	CO1, Locomotion, digestion,circulation ,nervous system ,reproduction and life cycle of prawn, scorpion,periplanata CO2, Locomotion, digestion,circulation ,nervous system ,reproduction and life cycle of grasshopper, Apis, peripatus CO3, Locomotion, digestion,circulation ,nervous system ,reproduction and life cycle of pila, unio,sepia,asterias,echinus,cucumaria CO4, Hemi chordata, canal system, honey bee,mouth parts
Chemistry Paper-I: Inorganic chemistry	CO1: To understand chemistry of elements first ,second and third transition series. CO2: To understand chemistry Transition Elements and their Coordination Compounds.



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Chemistry Paper-II : Organic chemistry	<p>CO3: To understand the chemistry of lanthanides and actinides .</p> <p>CO4: Students can able to analyses the redox reactions in inorganic compounds.</p> <p>CO5:To analyses study of Lewis and HSAB concepts of acids and bases and Study Non-aqueous solvents such as liquid ammonia and liquid Sulphur dioxide.</p>
Chemistry Paper-III: Physical chemistry	<p>CO1: To understand the knowledge about EMR with UV IR Spectroscopy</p> <p>CO2: Students can identify functional groups</p> <p>CO3: Students can identify and analyze Carbonyl compounds</p> <p>CO4:To learn the depth knowledge of Carboxylic acids and their derivatives.</p> <p>CO5: To study and learn the organic compounds of nitrogen.</p>
Chemistry Paper-III: Physical chemistry	<p>CO1:Students can understand concepts of thermodynamics (First and second law) and thermochemistry</p> <p>CO2: To learn in detail about the first and second laws of chemical thermodynamics and the related terms; to get idea about thermo-chemistry and thermodynamic relationships and system of variable compositions And Understand Chemical and Phase Equilibrium.</p> <p>CO3: To evaluate the basic concepts of chemical equilibrium and understand about the spontaneity of the reaction.</p> <p>CO4: To demonstrate the laws of electrolysis ,ionic strength of electrolytic solutions,Nernst equation.</p> <p>CO5: Students can apply concepts of electrochemistry, electrochemical cells, buffers and corrosion in various practical method.</p>

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7.2 Mapping: B.Sc. (Biology) Part-II

Botany Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	3	2	-	2	2	-	3	1	-	-
CO2	2	-	2	1	-	-	2	-	1	2	-	-
CO3	2	3	-	2	-	1	3	1	-	2	-	-
CO4	3	1	2	3	-	-	2	2	3	1	-	-
CO5	1	3	2	-	2	2	-	3	1	1	-	-

Botany Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	3	2	-	2	2	-	2	-	-	-
CO2	2	-	-	1	2	-	2	2	-	-	-	-
CO3	3	2	2	3	-	1	2	-	-	-	-	-
CO4	3	1	-	3	-	-	2	-	-	1	-	-
CO5	1	2	2	3	2	-	3	1	1	3	-	-

Botany Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	3	1	2	2	3	2	-	3	1	-	-
CO2	2	-	3	3	1	1	3	2	-	3	-	-
CO3	3	-	3	2	3	-	3	3	-	3	-	-
CO4	-	3	1	1	-	-	2	-	3	1	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-



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Zoology Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	2	-	-	-	-	-	2	1	-
CO2	2	3	2	2	-	-	-	-	-	3	1	-
CO3	3	3	2	2	2	-	2	1	-	3	1	-
CO4	3	3	2	3	3	-	1	-	-	3	2	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-

Zoology Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	2	-	-	2	2	2	1	-
CO2	2	3	2	2	2	-	-	2	-	3	1	-
CO3	3	3	2	2	2	-	2	2	-	3	1	-
CO4	3	3	2	3	3	-	1	-	-	3	2	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-

Zoology Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	2	-	-	2	2	2	-	-
CO2	2	3	2	2	2	-	-	2	-	3	-	-
CO3	3	3	2	2	2	-	2	2	-	3	-	-
CO4	3	3	2	3	3	-	1	-	-	3	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-



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Chemistry Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	-	3	2	1	1	2	3	--	2
CO2	1	1	2	3	-	-	1	1	2	2	3	-
CO3	2	2	3	1	1	3	-	-	2	2	1	1
CO4	-	-	2	1	2	1	2	2	-	-	2	2
CO5	1	1	-	2	-	1	2	1	1	3	2	1

Chemistry Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2	1	3	-	2	2	1	3	-	2
CO2	-	2	1	1	3	2	1	3	-	1	1	2
CO3	1	1	2	3	1	2	1	2	1	1	3	-
CO4	2	1	3	2	1	1	2	1	2	2	2	1
CO5	2	2	1	3	1	2	3	-	-	2	1	1

Chemistry Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2	1	3	-	2	2	1	3	-	2
CO2	-	2	1	1	3	2	1	3	-	1	1	2
CO3	1	-	2	2	1	-	1	2	2	1	3	-
CO4	2	1	-	2	1	1	-	1	2	2	2	1
CO5	2	2	1	3	1	2	3	-	-	2	1	1



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8.1 COURSE OUTCOMES (COs)

B.Sc. (Biology) Part-III	
Course	Course outcomes:-After completion of these courses students should be able to
Botany Paper-I: Plant Morphology And Anatomy	<p>CO1: To understand the fundamental concepts of plant morphology, branching pattern in plants, types of tissue system.</p> <p>CO2: To explain the Histological organisation of shoot and root, abnormal behaviour of cambium, Differentiate between normal and abnormal secondary growth.</p> <p>CO3: To apply the basic concepts of leaf and leaf arrangement, identify the reasons of Senescence and abscission, develop the basic skills with techniques related to plant morphology and anatomy.</p> <p>CO4: To study the morphology and anatomy of dicot and monocot root.</p> <p>CO5: To compare the different types vegetative propagation.</p>
Botany Paper-II:Ecology and Economic botany	<p>CO1: Discuss the basic concepts of biotic and abiotic factors in an ecosystem.</p> <p>CO2: Illustrate the different levels of plant succession in vegetation.</p> <p>CO3: Recognize the significance of biogeochemical cycles for a balanced ecosystem.</p> <p>CO4: Identify various ecological adaptations in plants.</p> <p>CO5: Discover the impact of human interference in an ecosystem. Criticize the adverse effects of different types of pollutants on a healthy environment.</p>
Botany Paper-III: Angiosperm Taxonomy And Embryology	<p>CO1: To understand the concept of taxonomy, diversity, structure and development of Angiosperm.</p> <p>CO2: Students will learn about fertilization and its significance.</p> <p>CO3: Students will aware about the flowering plants through field study. They will be able to see these plants grow in nature.</p> <p>CO4: Understanding of systematics and its importance, nomenclature pattern, phylogeny, classification systems of plants which will boost their knowledge of plants.</p> <p>CO5: Students will have the knowledge of reproductive parts, their</p>



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	structure and fertilization process. They will understand the embryo development and various issues related to embryo.
Zoology Paper-I Structure And Functions Of Chordate Types	CO:1 Explain general characteristics and classification of different classes of vertebrates CO2: Relate the morphology, physiology and anatomy of primitive chordates. CO3: Compare Integumentary, Digestive, Circulatory, Urinogenital, Nervous and Skeletal system of various classes of vertebrates. CO4: Discover conceptual knowledge of vertebrates, their adaptations and associations in relation to their environment.
Zoology Paper-II:Ecology, Environment Biology And Evolution	CO1: Define the basic concepts of ecology, environmental biology and evolution. CO2: Explain ecosystem and its types, ecological succession, biogeochemical cycles. Also extend the role of ecosystem on human. CO3: Develop knowledge in student regarding environment and conservation biology, pollution and urbanization. CO4: Discuss the nature of genetic variation, theories of evolution, mutation and evolution of man
Zoology Paper-III: Applied Zoology, Ethnology and Biostatistics	CO1: Vermiculture,sericulture,lac culture, apiculture,apiculture CO2: Prawn culture,poultry keeping, coral and coral reefs,pearl culture CO3: Fixed action pattern, sign stimulus,innate releasing mechanism,motivation CO4: Societies,biological clocks, methods of studying behaviour CO5: Biostatistics mean , mode, median, SD, SE



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Chemistry Paper-I: Inorganic chemistry	CO1: To analyses the study of Hardness and softness and HSAB concepts of acids and bases CO2: To learn the concept of Metal ligand bonding in transition metal complexes CO3: To evaluate and understand the magnetic properties of transition metal complexes CO4: To apply and demonstrate the kinetics aspects of metal complexes. CO5: Students can able to understand organometallic chemistry, inorganic polymers.
Chemistry Paper-II :Organic chemistry	CO1: learn the study of NMR spectroscopy and identification of organic compounds. CO2: To Study the chemistry of quinoline, isoquinoline and indole. CO3: Student will study chemistry of carbohydrates with special reference to structure and configuration of glucose and fructose. CO4: To apply and demonstrate the concept of Nucleic acid. CO5: Students can able to understand chemistry of dyes and polymers.
Chemistry Paper-III :Physical chemistry)	CO1: Student can recognize elementary Quantum Mechanics. CO2: Understand molecular structure and their physical properties CO3: Student can analyze rotational, Vibrational and Electronic Spectroscopy. CO4: To demonstrate the laws of Photochemistry CO5: Student will study the colligative properties of the solution and instrumentations

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8.2 Mapping: B.Sc. (Biology) Part-III

Botany Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	-	2	2	2	3	1	-	-
CO2	3	2	2	1	-	-	2	2	1	2	-	-
CO3	2	3	-	2	-	1	3	1	-	2	-	-
CO4	3	1	2	3	-	-	2	2	3	1	-	-
CO5	2	2	1	-	-	2	2	1	2	2	-	-

Botany Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	-	2	2	-	2	-	-	-
CO2	2	3	-	2	2	-	2	2	2	-	-	-
CO3	3	2	2	2	-	1	2	-	2	-	-	-
CO4	3	1	-	2	-	-	2	-	2	1	-	-
CO5	2	-	1	2	-	2	-	2	3	2	-	-

Botany Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	2	2	2	-	3	1	-	-
CO2	2	2	3	3	1	2	3	2	-	3	-	-
CO3	3	2	3	2	3	2	3	3	-	3	-	-
CO4	-	2	1	1	-	-	2	-	3	1	-	-
CO5	3	2	3	3	-	3	3	2	1	-	-	-



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Zoology Paper-I	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	-	-	1	-	1	1	2	2	1	-
CO2	3	3	3	2	3	-	-	-	-	2	-	-
CO3	3	3	3	1	3	-	1	1	1	1	-	-
CO4	2	3	1	2	-	-	3	-	-	2	2	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-

Zoology Paper-II	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	3	-	2	2	1	-	-	2	-
CO2	-	1	-	2	-	1	3	2	-	1	1	-
CO3	-	-	-	1	-	-	3	2	-	2	1	-
CO4	1	-	2	3	-	2	3	1	-	1	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-

Zoology Paper-III	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	2	3	1	2	2	1	-	-	2	-
CO2	2	1	2	2	1	1	3	2	-	1	1	-
CO3	2	-	2	1	1	-	3	2	-	2	1	-
CO4	2	-	2	3	1	2	3	1	-	1	-	-
CO5	3	1	2	3	1	-	1	2	2	3	1	-



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Chemistry (Paper-I)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	3	1	-	2	1	-	-
CO2	2	1	1	1	2	3	2	1	-	2	2	1
CO3	1	-	-	2	3	2	2	1	2	3	1	1
CO4	2	2	1	3	-	-	-	2	3	1	2	2
CO5	2	1	3	2	1	3	2	1	2	1	-	2

Chemistry (Paper-II)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	2	2	3	-	-	2	1	1
CO2	2	2	1	1	2	3	-	2	2	3	1	-
CO3	-	-	2	1	3	2	1	2	3	2	1	3
CO4	2	1	2	1	2	3	1	-	-	2	1	3
CO5	-	2	2	1	3	1	2	1	2	1	2	-

Chemistry (Paper-III)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2	3	2	1	3	2	-	2	-	1
CO2	1	2	1	3	1	2	-	3	2	2	1	2
CO3	2	1	3	-	1	2	1	1	3	3	1	1
CO4	-	2	1	2	1	-	2	1	1	3	-	-
CO5	2	-	-	2	-	2	2	-	2	-	2	2



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