POs, PSOs and COs of Graduation Programme

Department of Chemistry	
After successful completion of three years' degree program in Chemistry a student should be able to:	
Programme Outcomes	• Demonstrate, solve and an understanding of major concepts in all • disciplines of chemistry. • Solve the problem and also think methodically, independently and draw a logical conclusion. • Employ critical thinking and the scientific knowledge to design, carry out, record and analyse the results of chemical reactions. • Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community. • Find out the green route for chemical reaction for sustainable development. • To inculcate the scientific temperament in the students and outside the scientific community. • Use modern techniques, decent equipments and Chemistry soft wares
Programme Specific Outcomes	• Gain the knowledge of Chemistry through theory and practical. • Explain nomenclature, stereochemistry, structures, reactivity, and mechanism of the chemical reactions. • Identify chemical formulae and solve numerical problems. • Use modern chemical tools, Models, Chem-draw, Charts andEquipments. • Know structure-activity relationship. • Understand good laboratory practices and safety. • Develop research oriented skills. • Make aware and handle the sophisticated instruments/ equipments.
Course Outcomes	
After successful completion of this course in Chemistry a student should be able to:	
B.Sc. Part-I	
Inorganic Chemistry	• Know the discovery of electron, proton and neutron and their characteristics. • Understand the nature electromagnetic radiation and quantum theory. • Understand the periodic law and significance of atomic no and electronic configuration as the basic for periodic classification. • Classify elements into a s, p, d and f blocks and learn their main characteristics. • Explain the formation of different types of bonding. • Explain ionic bond, Born Lande equation, Born Haber cycle and Fajan's rules. • Explain the concepts of geometry of simple molecules as state VSEPR theory, hybridisation and shapes of various molecules. • Distinguish between intra and inter molecular hydrogen bonding. • Calculate the percentage of ionic character of molecules and solubility. • Explain MO Theory and draw the MO diagrams for H_2, He_2, B_2, N_2, O_2, CO and NO. • Compare MO and VB theory. • Explain fundamentals of the chemistry of the main group elements, and important real world applications of many of these species.

	• Understand types and structure of halogen compounds. • Understand types and structure of inorganic carbon compounds. • Classify acids as per-monosulphuric and disulphuric.
Organic Chemistry	• Apply their knowledge to problem-solve, deduce structures, and synthesize simple organic molecules using the studied reactions and relationships between organic chemistry and other disciplines are noted. • Know about the concepts of stereochemistry. • Explain the different types of structural and stereo isomers. • Represent organic molecules by Fischer, Flying wedge, Sawhorse and Newman projection formulas. • Conformational isomerism of ethane, n-butane, cyclohexane. • Explain optical isomerism in compounds containing asymmetric carbon like glyceraldehyde, lactic acid and tartaric acid. • Geometrical isomerism and the methods to distinguish the isomers. • Electron displacement effect with suitable examples. • Reaction intermediates, their stability and formation. • Explain the fundamentals of electronic structure and bonding in conjugated and aromatic systems along with the reactivity patterns of conjugated and aromatic molecules. • Aromaticity, Huckel's rule and its applications. • Preparation and properties of aliphatic and aromatic hydrocarbons. • Understand the mechanism of alkyl halides.
Physical Chemistry	• Apply gas laws in various real life situations. • Explain the postulates of kinetic theory of gases and derive the kinetic gas equation. • Describe Maxwell's distribution of molecular velocities. • Discuss the deviation of real gases from ideal behaviour, derive van der Waals' equation of state, and explain its significance. • Differentiate between gaseous state and vapour. • Explain critical phenomena and determination of critical constants • Explain the properties of liquids. • Describe condition required for liquefaction of gases. • Understand various types of colloids and its applications. • Understand solid state characteristics and miller indices. • Write an expression for rate constant K for different order reaction. • Solve the numerical problems based on Rate constant. • Study the energy of activation and second order reaction. • Derive of rate equations from mechanistic data.
B.Sc. Part-II	
Inorganic Chemistry	• Explain extraction, properties and uses of transition elements. • Understand the chemistry of transition metals of 3d, 4d and 5d series. • Understand the positions of lanthanide and actinide in the periodic table. • Correlate the optical and magnetic properties of lanthanide. • Understand the key features of coordination compounds, including: - the variety of structures. - oxidation numbers and electronic configurations. - coordination numbers. - ligands, chelates. - bonding, stability of complexes.

	• Name coordination compounds and to be able to draw the structure based on it's name. • Describe the shapes and structures of coordination complexes with coordination numbers ranging from 4 to 12. • Recognize the types of isomers in coordination compounds. • Chemistry of non aqueous solvents • Diagrammatic representations of standard reduction potentials using Ellingham diagram. Latimer and Frost diagrams. Pourbaix diagram
Organic Chemistry	• Describe the preparation and properties of organic compounds with different functional groups like halogens, alcohols, phenols, aldehydes, ketones, ethers, epoxides. • Write down chemical equations for the preparation of organo metallic compounds like Grignard reagent, dialkyl zinc, alkyl lithium and their important reactions. • Explain different methods for the preparation of important nitro, amino, diazonium and active methylene compounds and their important reactions • Identify a number of named reactions. • Write down the mechanisms of Pinacol–pinacolone rearrangement, Riemer-Tiemann reaction Kolbe electrolysis.
Physical Chemistry	• Understand laws of thermodynamics. • Understand The application of mathematical tools to calculate thermodynamics. • Understand the relationship between microscopic properties of molecules with macroscopic thermodynamic observables. • Write the expressions for equilibrium constants. • Study the laws of equilibrium. • Use of simple models for predictive understanding of physical phenomena associated to chemical thermodynamics and kinetics. • Define the importance of Phase Diagrams in the field of materials science and engineering. • Impart the knowledge on phase rule, its applications and alloys, their importance, composition and applications. • Explain the basic definitions and terms in a phase diagram. • Define phase, equilibrium, component, degree of freedom and phase rule concepts. • Know the Redox reaction. • State Faraday's law, Kohlrausch's law and Ostwald's dilution law and explain De Bye Huckel Onsagar equation. • Determination of transport number by Hittorf's and moving boundary methods. • Describe conductometric and potentiometric titrations. • Explain reversible cell and different types of reversible electrodes. • Explain the applicatoions of emf measurements. • Explain the theories of acids and bases and hydrolysis of salts of all types.To know about the acid bases concept of Arrhenius, Lowry and Bronsted. • Discuss the conductance and transferences. • Solve the cell reaction and various kind of cells.

	• Calculate EMF and stranded free energy change.
B.Sc. Part-III	
Inorganic Chemistry	• Understand the Hard-Soft Acid Base concept. • Use Crystal Field Theory to understand the magnetic properties (and in simple terms the colour) of coordination compounds. • Become familiar with some applications of coordination compounds. • Explain the thermodynamic and kinetic aspects of metal complexes. • Describe the stability of metal complexes by the use of formation constants and to calculate thermodynamic parameters from them. • Understand the basics organometallic chemistry. • Study about the concepts of Biochemistry and material chemistry. • To explain the role of various elements in various biological processes.
Organic Chemistry	• Determine the structure of organic molecules using IR and NMR spectroscopic techniques • Use nuclear magnetic resonance spectroscopy, mass spectrometry and infrared spectroscopy for organic structure elucidation • Explain the mechanism of few selected reactions using enolates. • Explain the nomenclature, synthesis and chemical properties of Heterocyclic compounds. • Use their understanding of organic mechanisms to predict the outcome of reactions • Describe the structure and properties of various types of carbohydrates, amino acids, proteins, lipids and nucleic acids. • Explain the fundamentals of electronic structure and bonding in conjugated and aromatic systems reactivity patterns of conjugated and aromatic molecules • Describe the methods of preparation and reactions of organosulphur compounds.
Physical Chemistry	• Describe black body radiation, Planck's Quantum Hypothesis and Photo Electric Effect. • Explain Bohr atom model and Sommerfield modification • Understand De-Broglie hypothesis and Uncertainty principle • Derive Schrodinger's time dependent and independent equations. • Know the Eigen function, Eigen value, operator and postulates of quantum mechanics. • Understand learn one to three dimensional box, mechanics of particle. • Understand the orbital system, hydrogen atom and chemical bonding though VBT and LCAO approaches. • Understand difference between thermal and photochemical reactions • Make familiar with a broad variety of photochemical systems and their applications. • Determine specific rotations and percentage of two optically active substances by polorimetrically. • Understand the term specific volume, molar volume and molar refraction. • Understand the various spectroscopic techniques and derive their physical expressions like ultraviolet and visible spectroscopy, infrared spectroscopy, Raman, fluorescence. • Understand the nature electromagnetic radiation and quantum theory.

	• Calculate molar and normal solution of various concentrations. • Define colligative properties of various ideal and non-ideal solutions and their applications.
Laboratory	• Use double burette method and burette –pipette methods for titration. • Prepare standard solutions. • Conduct acid base titrations, complexometric titrations and redox titrations like permanganometry, dichrometry and iodometric-iodimetric titrations. • Different indicators used in titrations. • Determination of COD of water samples. • Estimation of citric acid in lemon or orange. • Determine the viscosity of various liquids using Ostwald's viscometer • Determine cryoscopic constant (Kf) of solid solvent and molecular mass of the solute using cooling curve method. • Determine transition temperature • Learn systematic analysis of cations and anions • Can eliminate the interfering anions from the given mixture. • Prepare alums and complexes. • Quantitative estimation by gravimetry and colourimetry is utilized in research laboratories and industries. • Experiments based on Gravimetric and Colorimetric analysis
Department of Mathematics	
After successful completion of three years' degree program in Mathematics a student should be able to:	
Programme Outcomes	• Enabling students to develop a positive attitude towards mathematics as an interesting and valuable subject of study. • A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning. • Ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution. • Introduction to various courses like group theory, ring theory, field theory, metric spaces, number theory. • Enhancing students' overall development and to equip them with mathematical modeling abilities, problem solving skills, creative talent and power of communication necessary for various kinds of employment. • Ability to pursue advanced studies and research in pure and applied mathematical science.
Programme Specific Outcomes	• Think in a critical manner. • Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand. • Formulate and develop mathematical arguments in a logical manner. • Acquire good knowledge and understanding in advanced areas of mathematics and statistics, chosen by the student from the given courses.

	• Understand, formulate and use quantitative models arising in social science, Business and other contexts.
Course Outcomes	
After successful completion of this course in Mathematics a student should be able to:	
B.Sc. Part-I	
Discrete Mathematics	• To understand logical concepts and to show logical equivalences by using truth tables and rules in logics. • Learn concept related to Graph Theory. • Introduction to advanced counting.
Optimization Techniques	• Analyze and solve linear programming models of real life situations. • Provide graphical solutions of linear programming problems with two variables, and illustrate the concept of convex set and extreme points. • Understand the theory of the simplex method. • Know about the relationships between the primal and dual problems, and Duality.
Three Dimensional Geometry	• Explain the properties of three dimensional Geometry. • Recognize three-dimensional shapes, including spheres,cones, cylinders, paraboloid and ellipsoid in their environment. • Understand that shapes can be composed and decomposed to make new shapes. • describe attributes of original and composite shapes. • Find the polar equation of a line, circle , tangent and normal to conics • Explain the Generating lines of hyperboloid and their properties.
Calculus	• Assimilate the notions of limit of a sequence and convergence of a series of real numbers. • Learn to Calculate the Radius of Curvature for various curves of Cartesian,Polar ,Pedal and other curves. • To find Total Derivative and Partial derivative of Multi variable Functions. • Understand the consequences of various mean value theorems for differentiable functions. • Understand the concept of Asymptotes , Envelops & Evolute. • Sketch curves in Cartesian and polar coordinate systems. • Apply the techniques of double and triple integral to various problems of finding length of plane curves, surface areas and volumes of surfaces of revolution • Change variables in multiple integrals • Know about Beta and Gamma Functions.
B.Sc. Part-II	
Real Analysis and Metric Spaces	• Describe fundamental properties of the real numbers that lead to the formal development of real analysis. • Demonstrate an understanding of limits and how they are used in sequences, series, Construct rigorous mathematical proofs of basic results in real analysis

	• Understand Integrability and theorems on integrability. Recognize the difference between point wise and uniform convergence of a sequence of functions. • Illustrate the effect of uniform convergence on the limit function with respect to continuity, differentiability, and integrability. • To learn Riemann Integral and its properties in detail, leading to fundamental theorem of calculus and Mean value theorems. • Able to understand the Euclidean distance function on R n and appreciate its properties, and state and use the Triangle and • Reverse Triangle Inequalities for the Euclidean distance function on R n • Explain the definition of continuity for functions from R n to R m and determine whether a given function from R n to R m is continuous • Explain the geometric meaning of each of the metric space • Distinguish between open and closed balls in a metric space • Define convergence for sequences in a metric space and • Determine whether a given sequence in a metric space converges
Ordinary & Partial Differential Equations	• Student will be able to solve first order differential equations utilizing the standard techniques for separable, exact, linear, homogeneous, or Bernoulli cases. • Student will be able to find the complete solution of a nonhomogeneous differential equation as a linear combination of the complementary function and a particular solution. • Student will have a working knowledge of basic application problems described by second order linear differential equations with constant coefficients. • Be familiar with the modeling assumptions and derivations that lead to PDEs. • Recognize the major classification of PDEs and the qualitative differences between the classes of equations. • Be competent in solving linear PDEs using classical solution methods.
Numerical Analysis	• To apply appropriate numerical methods to solve the problem with most accuracy. • Learn about various interpolating and extrapolating methods to find numerical solutions. • Using appropriate numerical methods determine approximate solution of ODE and system of linear equation. • Compare different methods in numerical analysis w.r.t accuracy and efficiency of solution. • Apply various numerical methods in real life problems.
Vector Analysis	• Acquire the basic knowledge of vector differentiation and vector integration • Determine and apply, the important quantities associated with scalar fields, such as partial derivatives of all orders, the gradient vector and directional derivative • Determine and apply, the important quantities associated with vector fields such as the divergence, curl, and scalar potential • Calculate line integrals along piecewise smooth paths; interpret such quantities as work done by a force

	• Realize importance of Green, Gauss and Stokes' theorems in other branches of mathematics.
B.Sc. Part-III	
Complex Analysis	• Visualize complex numbers as points of $\mathbb{R}^3$ and stereographic projection of complex plane on the Riemann sphere. • Define and analyze limits and continuity for complex functions as well as consequences of continuity · • Conceive the concepts of analytic functions and will be familiar with the elementary complex functions and their properties · • Determine whether a given function is differentiable, and if so find its derivative. Applies the theory into application of the power series expansion of analytic functions · • Understand the basic methods of complex integration and its application in contour integration. • Analyze sequences and series of analytic functions and types of convergence. • Evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula. • Learn Taylor and Laurent series expansions of analytic functions, classify the nature of singularity, poles and residues and application of Cauchy Residue theorem.
Algebra	• Understand the importance of algebraic properties with regard to working within various number systems. • Extend group structure to Cyclic and finite permutation groups (Caley Hamilton Theorem). • Generate groups given specific conditions. • Introduction to Homomorphisms and their Properties. • Introduction and Properties of Ring,Field and Integral Domain. • Introduction to vector space, subspace, Basis ,Dimension and Linear Transformation.
Mechanics	• Understand necessary conditions for the equilibrium of particles acted upon by various forces and learn the principle of virtual work for a system of coplanar forces acting on a particle. • Deal with the kinematics and kinetics of the rectilinear and planar motions of a particle including the constrained oscillatory motions of particles. • Learn that a particle moving under a central force describes a plane curve and know the Kepler's laws of the planetary motions, SHM, Moment of Inertia which were deduced by the mathematical theory given by Newton.
Department of Physics	
Upon completion of the B.Sc. Physics programme students will be able to:	
Programme Outcomes	• Create a hypothesis and appreciate how it relates to broader theories. • Evaluate hypothesis, theories, methods and evidence within their proper contexts. • Solve complex problems by critical understanding, analysis and synthesis. • Demonstrate engagement with current research and developments in the subject. • Critically interpret data, write reports and apply the basics of rules of evidence.

	• Select, interpret and critically evaluate information from a range of sources that include books, scientific reports, journals, case studies and the internet. • Develop proficiency in the analysis of complex physical problems and the use of mathematical or other appropriate techniques to solve them. • Provide a systemic understanding of core physical concepts, principles and theories along with their applications. • Function on multidisciplinary teams by working cooperatively, creatively and responsibly as a member of a team. • Communicate effectively by oral, written, computing and graphical means. • Recognize the need to engage in lifelong learning through continuing education and research. • Inculcate skill component related to practical Physics in the mind of students.
Programme Specific Outcomes	This undergraduate course in Physics would provide the opportunity to the students: • To understand the basic laws and explore the fundamental concepts of physics. • To understand the concepts and significance of the various physical phenomena. • To carry out experiments to understand the laws and concepts of Physics. • To apply the theories learnt and the skills acquired to solve real time problems. • To acquire a wide range of problem solving skills, both analytical and technical and to apply them. • To enhance the student's academic abilities, personal qualities and transferable skills this will give them an opportunity to develop as responsible citizens. • To produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community. • To motivate the students to pursue PG courses in reputed institutions. • This course introduces students to the methods of experimental physics. Emphasis will be given on laboratory techniques specially the importance of accuracy of measurements. • Providing a hands-on learning experience such as in measuring the basic concepts in properties of matter, heat, optics, electricity and electronics.
Course Outcomes	
This undergraduate course in Physics would provide the opportunity to the students:	
Mechanics & Oscillations	The students would learn about the behaviour of physical bodies it provides the basic concepts related to the motion of all the objects around us in our daily life. The course builds a foundation of various applied field in science and technology; especially in the field of mechanical engineering. The course comprises of the study vectors, laws of motion, momentum, energy, rotational motion, gravitation, fluids, elasticity and special relativity.
Electromagnetism	It gives an opportunity for the students to learn about one of the fundamental interactions of electricity and magnetism, both as separate phenomena and as a singular electromagnetic force. The course contains vector analysis, electrostatics, magnetism, electromagnetic induction and Maxwell's equations. The course is very useful for the students in almost every branch of science and engineering.
Optics	The course comprises of the study of superposition of harmonic oscillations, waves motion (general), oscillators, sound, wave optics, interference,

	diffraction, polarization. The course is important for the students to make their career in various branches of science and engineering, especially in the field of photonic engineering.
Thermodynamics & statistical physics	The course makes the students able to understand the basic physics of heat and temperature and their relation with energy, work, radiation and matter. The students also learn how laws of thermodynamics are used in a heat engine to transform heat into work. The course contains the study of laws of thermodynamics, thermodynamic description of systems, thermodynamic potentials, kinetic theory of gases, theory of radiation and statistical mechanics.
Mathematical physics & special theory of relativity	Would learn mathematical methods to solve the various problems in physics. The topics include the calculus of functions, Fourier transform, special functions and special integrals, partial differential equations, complex analysis and variables.
Electronics & solid state devices	The students would gain the knowledge of Basic Electronics circuits, network theorems and measuring instruments: They would know about common solid state devices: Semiconductor diodes and transistors. The topics also include the Rectifiers, Filters and their applications, number systems and logic gates which are foundation blocks of digital electronics. Students would learn about electronic circuits such as Amplifiers and Oscillators. Various types of Amplifier and Oscillator circuits their working and applications in in domestic, industrial and scientific devices/ equipments.
Solid state physics	Students would be able to understand various types of crystal structures and symmetries and understand the relationship between the real and reciprocal space and learn the Bragg's X-ray diffraction in crystals. Would also learn about phonons and lattice.
Nuclear & particle physics	In this course students would know about the general properties of nuclei, nuclear forces and detectors, radioactive decay and nuclear reactions.
Quantum mechanics & spectroscopy	The course contains the study of Planck's hypothesis, photoelectric effect, Compton effect, matter waves, atomic models, Schrodinger wave equations. The course includes the study of Schrodinger equations, particle in one dimension potential, quantum theory of H like atoms, atoms/molecules in electric and magnetic fields.
LAB	Students would gain practical knowledge about electricity and magnetism and measurements such as: Resistance, Voltage, current, heat and radiation, thermodynamics, thermo emf , RTD etc. and perform various experiments. They would also learn optical phenomena such as interference, diffraction and dispersion and do experiments related to optical devices: Prism, grating, spectrometers.
Department of Zoology	
After successful completion of three years' degree program in Zoology a student should be able to:	
Programme Outcomes	• Describe general characters and classification of Phylum Arthropoda. • Write down the protozoa, metazoa concept, five animal kingdom theory, and basis of classification. • Describe the Natural selection, variation, Isolation and palaeontology. • Write down the structure and function of ribosome and mitochondria in animal cell.

	• Write in detail about Nucleus, Nucleolus, chromosome and genes. • Write the Mendals theory with the help of suitable examples. • Describe type of cleavage, fertilization and gametogenesis. • Describe about stem cell, aging and teratogenesis in human. • Write down in detail about locomotion in invertebrate animals. • Write down the mechanism of reproductive system in invertebrate animals. • Write down the physiology of digestion and excretory system. • Explain structure and function of carbohydrates, protein and lipids. • Explain the antigen, antibody reaction and mechanism of antigen and antibody. • Write an essay on Aids and Hepatitis B Virus. • Write down about cloning, protoplast fusion and transgenic animals. • Explain the development of heart in chordates. • Write about migration of fishes and birds. • Describe the biotic and abiotic factors of an ecosystem. • Write about biostatical application, uses, and scope of of biostatics. Write merits and demerits of mean, mode and median.
Programme Specific Outcomes	• Demonstrated a broad understood of animal diversity, including knowledge of thescientific classification and evolutionary relationships of major groups of animals. • Recognized the relationships between structure and functions at different levels ofbiological organization (e.g., molecules, cells, organs, organisms, populations, andspecies) for the major groups of animals. • Characterized the biological, chemical, and physical features of environments (e.g.,terrestrial, freshwater, marine, host) that animals inhabit. • Explained how animals function and interact with respect to biological, chemical andphysical processes in natural and impacted environments. • Explained how organisms function at the level of the gene, genome, cell, tissue, organand organ-system. • Drawing upon this knowledge, they are able to give specific examples of the physiological adaptations, development, reproduction and behavior of different forms of life. • Understood the applied biological sciences or economic Zoology such as sericulture, Apiculture, aquaculture, Industrial microbiology, rDNA technology and medicine for their career opportunities.
Course Outcomes	
After successful completion of three years' degree program in Zoology a student should be able to:	
Biodiversity Of Invertebrate	• Know the basic concept of biosystematics and procedure in taxonomy. • Identified the taxonomic status of the entire non-chordates up to annelids and discuss theevolutionary model of the group. • Described the general biology of few selected non-chordates useful to mankind. • Know about some of the important and common protozoans, helminthes of parasitic nature causing diseases in human beings. Understood the importance of metamerism in annelids.
Biodiversity of Invertebrate- I &II	• Understood the diversity and classification and functional aspects of different systems of phylum Arthropoda, Mollusca and Echinodermata.

	• Described the social life and economic importance of insects. Understood the physiology of pearl formation and pearl oyster formation. • Described the advanced characteristic features of cephalopod molluscs. • Came to know that the resemblance and evolutionary significance of larval forms of echinoderms.
Biodiversity of Invertebrate (Lab)	• Understood the anatomy and physiology of invertebrate animals by dissection. • Described the structural study and mounding of organs. Came to knowing the rules of taxonomy and the principle of animal classification. • Understood the diversity morphology, biological characters and taxonomical importance some selected museum specimens of different animal groups. • Came to know that internal skeletons and osteology of different bone structures.
Biodiversity of Chordates	• Identified the taxonomic status of the entire chordates and discussed the evolutionary model of the group. • Imparted the knowledge on ecology of some important fishes, amphibians reptiles, birds and mammals. • Impart knowledge in comparative anatomy and development systems of chordates. • Make able to discuss some and very important phenomena in Chordates. • Know about the conservation and management strategies of the chordate fauna.
Cell Biology and Instrumentation	• Understood the structure of cells and cell organelles in relation to the functional aspects and understanding of the working principles and applications of microscopes. • Described the composition of prokaryotic and eukaryotic cells. Understood the structure and functions of chromosome; mitotic and meiotic cell divisions and their significance. • Understood the properties and treatment of cancer cells. • Described the principle and applications of pH meter, centrifuge, chromatography and electrophoresis.
Developmental Biology and Evolution	• Understood the process of development of animals. • Understood the process of organogenesis of selected organs, development of extra embryonic membrane and the nature and physiology of placenta. • Came to know the inducer and inductor role in embryogenesis and knowledge about metamorphosis and the process of regeneration. • Understood the theories of evolution and highlighted the role of evidences in support of evolution. • Described the evolutionary knowledge through the concepts of coloration and mimicry.
Cell Biology and Developmental Biology	• Acquired knowledge of principles and working mechanisms of microscopes. • Understood the mechanism of mitosis and meiosis. Gained slide preparation to observe of Giant chromosome, epithelial and blood cells.

	• Understood the concept of chromatography and finding Rf values of different compounds. • Preparation, direct observation and appreciation of sperm motility and different stages of chick embryo development and placentation of animals.
Genetic and Molecular Biology	• Understood the theories of classical genetics and blood group inheritance in man. • Described the genetic variation through linkage and crossing over, chromosomal aberrations and sex determination. • Understood the genetic defects and inborn errors of metabolism and genetic counseling and role of inbreeding and out breeding. • Understood the molecular structure of genetic materials and understood the gene expression and regulation character formation.
Evolution, Genetics and Molecular Biology (Lab)	• Obtained the knowledge about direct observation of fossils and evolutionary important specimen by which evolutionary relationship of animal groups. • Understood the inheritance of mendelian traits by direct observation among students. • Acquired knowledge skill development and observation of blood group identification and pedigree chart preparations. Understood of the mechanism of phenotypic expression in Drosophila. • Gained genetic knowledge on the observation of specimens and models.
Animal Physiology	• Understood about the composition of food and mechanism of digestion absorption and assimilation. • Attained knowledge of respiration and excretion and understood the mechanism of transport of gages and urine formation. • Described the mechanism of circulation and composition of blood. • Knowledge of neuromuscular coordination and the mechanism of osmoregulation in animals and endocrine system and their function is attained. • Understood the menstrual cycle and the role of contraceptive in population control.

Department of Botany

After successful completion of three years' degree program in Botany a student should be able to:

Programme Outcomes	• Obtain quality education in the basic areas of Botany • Acquire practical skills to gather information, assess, create and execute new ideas to develop entrepreneurial skills • Receive training in pedagogy, research skills and methodology • Develop a local, regional, national and international perspective and be competent enough in the area of plant science, genetic engineering • Learn to respect and conserve nature and the environment • Identify the angiosperms by applying keys
Programme Specific Outcomes	• Acquire academic excellence with an aptitude for higher studies, research and to meet competitive exams • Become aware about plant diversity and its conservation through plant tissue Culture

	• Obtain Knowledge in the internal structure and functions of various plant components, inheritance of characters and techniques of plant breeding • Apply statistical skills and analyze the biological data • Acquire knowledge on traditional herbal plants for common ailments and aware of nutritive plant foods • Obtain Knowledge through taxonomical studies will help them to emerge as fundamental taxonomists
Course Outcomes	
After successful completion of this course in Botany a student should be able to:	
B.Sc. Part-I	
Paper I	• Describe the cell theory, ultrastructure of plant cell and its organelles. • Explain the cell cycle and types of cell division. • Discuss the changes in the chromosome. • Explain the structure of genetic material and the mechanism of DNA replication. • Explain the laws of Mendel in classical genetics and deviations from Mendelian ratios. • Describe the complementary factor, epistasis and duplicate factor. • Discuss linkage, crossing over and sex determination. • Explain the concepts of cytoplasmic inheritance andmutation • Evaluate the significance of Hardy Weinberg law. • Paraphrase the conventional methods of plant breeding. • Summarize the types of polyploidy • Describe the role of organizations involved in plantimprovement. • Develop the employability skills by understanding Mendel's ratios and deviation, linkage and crossing over and the conventional methods of plant breeding
Paper II	• Classifies microbe based on morphological characters • Describes the structure, nutrition and reproduction ofbacteria and viruses • Analyze the quality of milk and fermented foods • Relate the uses of microbes with reference to beverages, antibiotics, vaccines & tanning • Illustrate the disease cycle of bacterial and fungalpathogens of plants. • Develop the employability skills by learning the structure,reproduction and applied aspects of microbes • List the salient features of the main classes of fungi. • Describe the morphology and reproduction of the variousgenera of fungi. • Discuss the cultivation and identification methods of fungi
Paper III	• Explain the thallus organization in algae. • Describe the structure, reproduction and life cycles of various algae.

	• Discuss the techniques related to the cultivation of freshwater algae. • Explain the classification and different types of lichens • Summarize the economic importance of lichens • Develop the employability skills by cultivating the algae • Explain the classification, structure and reproduction ofthe main classes of bryophytes. • List the economic importance of bryophytes.
B.Sc. Part-II	
Paper IV	• Discuss the tissue culture techniques in micro propagation of rare and medicinal plants • Describe the alternative techniques for mass propagation • Distinguish the tools and techniques adopted inproduction of transgenic plants • Explain the production of recombinant plants • Enumerate the role of GMOs in the field of medicine, agriculture and bioremediation. • Central dogma, regulation of gene expression in prokaryotes and eukaryotes • Develop the employability skills by understanding the basic and recent trends of plant tissue culture, recombinantDNA technology
Paper V	• Explain the concept of water and mineral absorption inplant system and their role. • Explain the various pathways involved in respiration and photosynthesis • Differentiate C_3 and C_4 cycle • Explain CAM plants and factors affecting photosynthesis • Illustrate the mechanism of biological nitrogen fixation, nitrogen cycle, plant growth regulators and its applicationsrelated to various physiological activities. • Outline the structure of an atom • Explain the structure, properties and biological significance of carbohydrates • Describe the significance of amino acids and proteins • Discuss the importance of enzymes, vitamins andalkaloids • Developthe employability skills by learning the fundamentals of plant physiology and biochemistry
Paper VI	• Classify the Pteridophytes by their characteristic features • Describe the stellar evolution, types of fossils, geologicaltime scale • List the economic importance of Pteridophytes

	• Discuss the salient features of Gymnosperm morphology • Illustrate the reproductive characters of important genus ofgymnosperm • Explain the significance of important genus of fossilgymnosperm • Develop the Employability skills by learning the life cycle patterns of Bryophytes, Pteridophytes and Gymnosperms
B.Sc. Part-III	
Paper VII	• The basic body plan of the flowering plants • Diversity of plant forms • Internal structure of the plant • Tissues and tissue systems • Morphology and Anatomy leaf, Stem and Root • Structure and significance of seed • Vegetative reproduction
Paper VIII	• Plants and environment- atmosphere, adaptations and soil texture • Community, ecosystem and phytogeography • Analyze the sources and uses of vegetables, fruits, fiber,wood and rubber • Ecological succession, food chains, food webs and biogeochemical cycles • Basic concept of center of origin of cultivated plants • Food plants, oil plants, vegetables • Beverages, medicinal plants and fibers • General account with an emphasis on those cultivated in Rajasthan
Paper IX	• Explain the tissue systems, structure of stomata, sclereid,raphide and laticifers. • Describe the structure of root, shoot and nodal types ofdicot plants. • Illustrate the structure of anther. • Discuss the microsporogenesis and megasporogenesis. • Discuss the types of pollination, endosperm and embryo. • Explain the process of fertilization. • Describe the structure of monocot and dicot seed. • Explain the reserve food, longevity and viability. • Develop the employability skills by learning the anatomical features of different parts of plant and developmental stages of reproductive parts of plant • Differentiate the morphological variation of the plant parts
	• List the importance of botanical nomenclature • Indicate the importance of herbariums • Outline the classification of Bentham and Hooker andothers • Illustrate the salient features of plants belonging to thefamilies Annonaceae to Apiaceae • Distinguish the plants belonging to the families rubiaceaeto poaceae