Dharampeth Education Society's
DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE,
North Ambazari Road, Near Ambazari Lake, Nagpur-440033

Program Outcome, Program Specific Outcome & Course Outcome

For B. Sc. (Science & Home Science) and M. Sc. (Mathematics)

Internal Quality Assurance Cell (IQAC)

MATHEMATICS

PROGRAM OUTCOME FOR B. SC. MATHEMATICS

Department of Mathematics	After successful completion of three years degree program in the subject Botany the students are able to:
Program Outcomes	**PO1:** To develop creative and critical thinking. **PO2:** To develop effective communication. **PO3:** To build strong leadership qualities and develop team spirit. **PO4:** To learn to become better and effective citizens of the country. **PO5:** To develop moral maturity and ethical behavior. **PO6:** To learn about the environment and sustainability process. **PO7:** To self-direct a life-long learning system. **PO8:** To learn knowledge application. **PO9:** To learn analytical, scientific reasoning and problem solving. **PO10:** To gain Information / Digital Literacy.
Program Specific Outcomes	**PSO1:** Construct mathematical arguments, proofs and develop mathematical as well as analytical thinking **PSO2:** Critically interpret numerical data, graphical data and develop models **PSO3:** Apply mathematical knowledge to a career and research related to mathematical sciences PSO4: Apply critical thinking skills to solve problems which can be modelled mathematically.
Course Outcomes B. Sc . Mathematics	
Course Outcome for Semester-I & II	
Sem. I & II Paper-I: Algebra & trigonometry, Differential and difference equations	**CO1:** Understand the applications of De Moiver's theorem, properties of groups and subgroups **CO2:** Learn basic properties of first order, higher order differential equations and solve them with different methods. **CO3:** Understand to find unknown solution by using known solution, the formation of difference equation, solution of homogeneous and non-homogeneous linear equation. **CO4:** Understand the concepts of rank, Eigen values of matrices, solution of homogeneous and non-homogeneous system of equations.
Sem I & II Paper-II: Calculus, Vector calculus & improper integrals	**CO1:** Understand basic properties of limit, continuity and derivability of functions, expansion of functions in terms of infinite series by using different methods. **CO2:** Find indeterminate forms and partial differentiation of functions with two or more variables **CO3:** Understand basics of directional derivatives, gradient, divergence and curl **CO4:** Evaluation of double and triple integral, improper

	integrals and their convergence.
Course Outcome for Semester-III & IV	
Sem III & IV Paper-I: Advanced calculus, Partial Differential equations & calculus of variations	**CO1:** Understand concept of limit and continuity of functions of two variables, application of Mean value theorems **CO2:** Study of convergence, divergence of sequences and series using various tests. **CO3:** Understand ordinary differential equation in more than two variables and methods of finding solution **CO4:** Study Lagrange's method, Charpit's method, Jacobi's method to solve PDE, homogeneous and non-homogeneous PDE with constant coefficients
Sem III & IV Paper-II: Differential equations & group homomorphism, Mechanics	**CO1:** Understand basic properties of Laplace transforms, inverse Laplace transforms and solution of ordinary differential equation using Laplace transform. **CO2:** Study of group homomorphism, isomorphism in details. **CO3:** Understand kinematics in two dimensions, mathematical exposition and geometrical representation of simple harmonic motion. **CO4:** Study mechanics of system of particles and Lagrange's equations.
Course Outcome for Semester-V & VI	
Sem V & VI Paper-I: Analysis, Abstract algebra	**CO1:** Study Fourier series and it's convergence, existence of Riemann-Stieltjes integral, construction of analytic function, harmonic function etc. **CO2:** Understand conformal mapping, bilinear transformation. **CO3**: Study Group automorphism, inner automorphism, vector spaces and it's properties, subspaces, basis, dimensions etc. **CO4:** Understand algebra of linear transformation and its inverse, matrix associated with linear map and vice versa, properties of inner product space.
Sem V & VI Paper-II: Metric space, complex integration & Algebra, Special theory of relativity	**CO1:** Understand concepts of countable, uncountable sets, completeness, compactness, connectedness of metric space. **CO2:** Calculation of zeros and different types of singularities of analytic function, application of Cauchy's residue theorem to evaluate integral. **CO3:** Study geometrical interpretation, group properties of Lorentz transformations and basics of tensors, metric tensors etc. **CO4:** Understand equivalence of mass and energy, transformation formulae for mass, momentum and energy, relativistic equations of motion, Maxwell's equations etc.

PROGRAMME OUTCOME FOR M. SC. MATHEMATICS

Department of Mathematics	**After successful completion of two years post-graduation degree program in the subject Mathematics the students are able to:**

Program Outcomes	**PO1:** To acquire the strong foundation of basic concepts, this will benefit them to become good academicians. **PO2:** To apply the concept of mathematical tools to address real life problems. **PO3:** To pursue research in reputed institutions and solve the existing mathematical problems using the knowledge of pure and applied mathematics. **PO4:** To qualify various competitive exams like CSIR-UGC NET, SET, GATE, MPSC, UPSC, etc.
Program Specific Outcomes	**PSO 1:** To imbibe problem-solving and computational skills **PSO 2:** To understand the motivation behind the statements and proofs **PSO 3:** To enhance self-learning and improve own performance. **PSO 4:** To inculcate abstract mathematical thinking.
Course Outcomes M. Sc . Mathematics	
Course Outcome for Semester-I	
1T1 Algebra	**CO1:** To assimilate the concept of automorphism, conjugacy, G-set, etc. **CO2:** To analyse properties of solvable group, alternating group, etc. **CO3:** To study Sylow's theorem and related concepts. **CO4:** To understand maximal and prime ideals. Develop knowledge of R-homomorphism and quotient modules.
1T2 Real Analysis-I	**CO1:** To attain mastery in concept of uniform convergence, continuity, differentiation and integration. **CO2:** To understand theorems on inverse function, implicit function, and Rank theorem. **CO3:** To study Topological manifolds, Differentiable manifolds, Real Projective space, Grassman manifolds. **CO4:** To study in detail about Lie groups.
1T3 Topology-I	**CO1:** To understand basics of cardinality and Topological Spaces. **CO2:** To study open set, closed set, limit point, etc. **CO3:** To assimilate the concept of Connected set, Compact and countably compact spaces. **CO4:** To attain mastery in concept of and -spaces.
1T4 Ordinary Differential Equations	**CO1:** To solve first order linear differential equations. **CO2:** To understand second order equations with regular singular points and work out its applications. **CO3:** To study existence and uniqueness of solutions of first order differential equations. **CO4:** To analyse system of differential equations.
1T5 Integral Equations	**CO1:** To know the relation between differential and integral equations, and how to change from one to another. **CO2:** To understand different kinds of kernels and use techniques for solving problems on each kind. **CO3:** To explain types of Voltera equations and solve linear Volterra and singular integral equations using appropriate methods.

	CO4: To use Hilbert transform a general and finite one for solving a wide range of differential and integral equations.
Course Outcome for Semester-II	
2T1 Algebra -II	**CO1:** To understand the unique factorization domains, principal Ideal domains and Euclidean domains. **CO2:** To analyze properties of algebraically closed fields, splitting fields. **CO3:** To compute Galois groups in simple cases and apply the group-theoretic information to comprehend results about fields. **CO4:** To develop knowledge of Ruler and compass constructions.
2T2 Real Analysis -II	**CO1:** To gain knowledge of measurable sets and measurable functions. **CO2:** To acquire mastery on Lebesgue Integral. **CO3:** To study Convex functions, Lp-spaces. **CO4:** To learn Baire category theorem and its application. **CO5:** To understand Riesz-Fischer theorem and approximation in Lp-spaces.
2T3 Topology-II	**CO1:** To study continuous functions, product topology and metric topology. **CO2:** To gain knowledge of connectedness, compactness. **CO3:** To achieve the zenith in treating Countable Axioms, and Separable, Regular and Normal spaces. **CO4:** To understand theorems like The Urysohn's Lemma, Urysohn's Metrization Theorem.
2T4 Differential Geometry	**CO1:** To study the theory of curves and surfaces in three spaces. **CO2:** To analyse global properties of curves such as the four-vertex theorem. **CO3:** To understand the fundamental quadratic forms of a surface, intrinsic and extrinsic geometry of surfaces, and the Gauss-Bonnet theorem. **CO4:** To understand two dimensional Riemannian manifolds. **CO5:** To analyse problem of metrization and of continuation.
2T5 Classical Mechanics	**CO1:** To learn D-Alemberts principle and formulate Lagranges equation of motion. **CO2:** To understand Legendre transformations and solve different problems. **CO3:** To formulate Hamiltonian equation and understand its physical significance. **CO4:** To gain knowledge of Canonical transformations and solve problems on it.
Course Outcome for Semester-III	
3T1 Complex Analysis	**CO1:** To explain the concepts of Analytic Functions, and Elementary Functions. **CO2:** To understand Mobius Transformation and mappings of regions under some special transformations. **CO3:** To construct the proofs of Cauchy Integral Formula, Liouvellis Theorem, and solve problems related to Taylor and Laurent series.

	CO4: To identify different types of singularities, zeros of analytic function. **CO5:** To study the maximum principle and Schwarz's lemma.
3T2 Functional Analysis	**CO1:** To understand Banach Spaces, The Hahn-Banach Theorem. **CO2:** To study the open Mapping Theorem, Hilbert Spaces. **CO3:** To analyse different operators and their properties **CO4:** To understand Category theorem, uniform boundedness theorem, strong and weak convergence.
3T3 Mathematical Methods	**CO1:** To attain mastery in Fourier integral theorem and its application. **CO2:** To attain mastery in application of Laplace and Fourier transform. **CO3:** To study applications of finite Sturm-Liouville transforms. **CO4:** To study application of finite Hankel transform, finite Legendre transform and finite Mellin transform.
3T4 Core Elective General Relativity	**CO1:** To describe Riemannian geometry in tensor formalism. **CO2:** To define energy momentum tensor of various fluids and understand gravity due to curved spacetime. **CO3:** To obtain Einstein's field equations by different approach and Poisson's equations as an approximation to Einstein field equations. **CO4:** To solve Einstein's field equations for static spherically symmetric Schwarzschild space-time and calculate the advances of perihelion, relativistic frequency shifts for sources moving in a gravitational field, as well as the bending of light passing through a spherical mass distribution.
3T5 - Operational Research-I	**CO1:** To understand basics and formulation of linear programming problems and revised simplex method (with and without artificial variables). **CO2:** To apply simplex method to solve real life problems. **CO3:** To study integer programming and its application. **CO4:** To understand the concept of Bounded variable technique for L.P.P. and unconstrained optimization. **CO5:** To study of Queuing Theory and Poisson queueing models- M/M/1, M/M/C for finite and infinite queue length.
Course Outcome for Semester-IV	
4T1 - Dynamical Systems	**CO1:** To attain mastery in Dynamical systems, vector fields, its fundamental theorem, and Existence & uniqueness of a solution. **CO2:** To study of Stability and Liapunov function of dynamical system. **CO3:** To understand the Poincare Bendixson theorem and its applications. **CO4:** To analyze Autonomous equations and differentiability of flows.
4T2 – Partial Differential Equations	**CO1:** To classify partial differential equations and transform into canonical form.

	CO2: To solve linear partial differential equations of both first and second order. **CO3:** To solve boundary value problems for Laplace's equation, the heat equation, the wave equation by separation of variables, in Cartesian, polar, spherical and cylindrical coordinates.
4T3 – Advanced Numerical Methods	**CO1:** To obtain the solutions of Transcendental and polynomial Equations. **CO2:** To find solutions of system of equations using direct methods and Iteration methods. **CO3:** To attain mastery to solve problems using polynomial interpolation theory. **CO4:** To acquire knowledge of Numerical methods to find solution of integral Equations.
4T4 Core Elective-Cosmology	**CO1:** To study Einstein and de-Sitter static models and their comparison with actual universe. **CO2:** To study Cosmology, master the concepts of Cosmological principle, Hubble law, Weyl's postulate, deceleration parameter, etc. **CO3:** To understand the nature of Robertson-Walker metric in view of closed, open and flat models of the universe. **CO4:** To acquire knowledge about steady state universe and its viability vis-a-vis actual universe.
4T5 - Operations Research–II	**CO1:** To identify and develop operations research model describing a real-life problem. **CO2:** To understand the mathematical tools that are needed to solve various optimization problems. **CO3:** To solve various linear programming, transportation, assignment, queuing, inventory, and game problems related to real life.

PHYSICS

Department of Physics	After successful completion of three years degree program in the subject Physics the students are able to:
Programme Outcome:	**PO1:** Gain a thorough understanding of the subject. **PO2:** Lay the groundwork for future learning. **PO3:** Learn the fundamentals of research. **PO4:** Instill good moral and ethical ideals in yourself. **PO5:** Recognize your societal and environmental responsibility. **PO6:** Develop communication and professional skills. **PO7:** Acquire the ability to accept a wide range of ideas and points of view. **PO8:** Empower yourself to meet the demands of a changing universe.
Program Specific Outcomes	**PSO1:** Understand the principles of physics, matter characteristics, and electrodynamics, as well as the basic notions of scientific process. **PSO2:** Understanding the theoretical foundations of quantum mechanics, relativistic physics, nuclear physics, optics, spectroscopy, solid state physics, astrophysics, statistical physics, photonics, and thermodynamics. **PSO3:** Understand and apply electrical ideas in the design of various analogue and digital circuits. **PSO4:** Understand the fundamentals of computer programming and numerical analysis with PSO4. **PSO5:** Use laboratory experiments to test and apply theoretical principles.
Course Outcomes of B.Sc. Physics	
B. Sc. Semester-1	
Paper – I: Properties of Matter and Mechanics: Learning Outcomes:	**CO1:** The curriculum covers general characteristics of matter, which include solid and liquid. Elasticity is a solid property that offers a notion of material strength in three forms, as well as liquid viscosity and its relevance. Surface tension in a liquid's geometrical form. **CO2:** Mechanics covers the fundamentals. Newton's laws of motion and how they're used. Students' imagination is improved by geometrical descriptions of rules, and the study of restrictions leads to the area of physics known as classical mechanics. The relationship between M.I. and body movements is given by rotational motion.
Paper-II: Electrostatics, Time varying fields & Electric Currents:	Students will be able to: **CO1:** State and express Coulomb's law in vector form and apply it to solve for E due to stationary charges, Electric potential due to point charge, owing to dipole, and field due to dipole at any place after finishing this course.

	CO2: Able to establish that potential is force per unit charge and to describe V and its link to energy conceptually. **CO3:** Able to explain the similarities and differences between a conductor and a dielectric, the action of an electric field, dielectric polarisation, polar and non-polar molecules, and the Classius-Mossoti equation. **CO4:** When given epsilon and the free charge on the dielectrics, be able to determine the E field inside the dielectric. **CO5:** Able to grasp the fundamental concepts of parallel plate capacitors, including capacity derivation with or without the use of a calculator. When given epsilon and the free charge on the dielectrics, it is possible to determine the E field inside the dielectric. **CO6:** Able to grasp the fundamental concepts of parallel plate capacitors, including capacity derivation with and without dielectrics, as well as solve numerical issues. **CO7:** Able to articulate and explain Faraday's laws of electromagnetic induction, self and mutual induction, transformers and their operation, transformer losses and applications, and Kirchhoff's laws. **CO8:** Able to study series resonance, frequency derivation, power in an ac circuit, and solve mathematical problems.
B. Sc. Semester- II	
Paper-I: Oscillations, Kinetic theory of gases and Thermodynamics:	**CO1:** Students will be able to grasp linear and angular S.H.M., as well as the S.H.M. differential equation and its solution. Also capable of developing damped oscillation differential equations and energy dissipation via damped oscillations. **CO2:** The basics and applications of forced vibrations, resonance, and its energy and quality factor will be understood by the students. Also included are gas laws and their applications. **CO3:** Students will learn about gas transportation phenomena and the thermodynamics that underpin it. Also, the role of thermodynamic laws in engine efficiency.
Paper-II: Gravitation, Astrophysics, Magnetism and Magneto statics:	**CO1:** The students get an understanding of the fundamental rules of classical mechanics, which improves their understanding of planetary motion and interactions. **CO2:** An introductory course in astrophysics piques students' curiosity in space science. **CO3:** Studying atomic magnets at a microscopic level improves students' intellectual abilities in material research and provides insight into the relationship between electric and magnetic fields as a future key to power consumption.
B. Sc. Semester-III	
Paper-I: Sound waves, Applied acoustic, Ultrasonic and Power supply Learning	**CO1:** Students learn about the many types of waves and their properties. They also learn about harmonics, sound quality, and the human ear's reaction and audibility to sound. Students may learn about sound intensity measurement and the influence of temperature on sound. **CO2:** Students are familiar with various sound measurement

	instruments such as transducers, sound recording, and sound reproduction. **CO3:** Students learn about ultrasonic waves, their characteristics, ultrasonic wave generating methods, and research applications. **CO4:** Students learn about the necessity of voltage, current, and load management, as well as power supply and conversion from alternating current to direct current.
PHYSICS - Paper-II: Physical optics and Electromagnetic waves:	**CO1:** Students are able to explain how light behaves as a wave. **CO2:** Examine how light intensity varies owing to interference and diffraction. • Understand Michelson and Fabry-Parot Interferometer Applications **CO3:** Examine the concept of polarisation and how it is used. **CO4:** Understand electromagnetic waves, Maxwell's field equations, and their transverse nature. **CO5:** Explain Poynting's theorem and its significance.
B. Sc. Semester IV	
PHYSICS - Paper-I: Solid state physics, X-ray and Laser:	**CO1:** Students will have a fundamental understanding of crystal systems and spatial symmetry, Miller indices, and how different diffraction methods are used to study crystalline materials. **CO2:** Be familiar with the notion of a reciprocal space lattice and the meaning of Brillouin zones. **CO3:** Students will be able to identify the different types, characteristics, and uses of X-rays. **CO4:** Students explain the fundamentals of lasers, how they are made, and how they are used.
PHYSICS - Paper-II: Solid state electronics, and Molecular physics:	**CO1:** Students will learn the fundamentals, manufacturing, and applications of LED, Solar Cell, and BJT in everyday life, as well as the concepts, applications, and special characteristics of FET, JFET, and MOSFET. **CO2:** Students will be able to explain and quantify vibrational and rotational energy, kinds of molecules, diatomic molecules as harmonic and anharmonic oscillators, rotational-vibrational spectra, and the Born Oppenheimer approximation. **CO3:** Students who understand the relevance and applicability of Raman spectroscopy in molecular physics are also familiar with the Frank-Condon principle, the fundamentals of NMR and ESR, and their spectroscopic applications.
B. Sc. Semester –V	
Paper-I: Atomic physics, free electron theory and Statistical physics:	**CO1:** Students comprehend the many theories of the atomic model, as well as the various quantum numbers. The student also investigates how the momentums and magnetic moments associated with various electron motions are orientated, as well as their interactions. **CO2:** Students learn about electron conduction, both electrical and thermal. Fermi temperature band, Fermi energy. Free

	electron theory: different theorems, models, and experiments Material classification is also important. **CO3:** The student gains an understanding of - space, Gamma space, probability distribution, and thermodynamic probability, Principle of a priori probability, Boltzmann's entropy relation, different states, Maxwell Boltzmann distribution law, and its application; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann's entropy relation; Boltzmann' Students will also study Bose-Einstein statistics, as well as the Fermi Dirac distribution and how to use it.
Paper-II: Quantum mechanics, Nanomaterials and Nanotechnology:	Students will be able to: **CO1:** Understand the major components of quantum mechanics' historical evolution, as well as wave characteristics of matter, after finishing this course. **CO2:** Capable of relating classical mechanics to quantum mechanics. **CO3:** Able to solve Schrodinger equations in one to three dimensions and understand them physically. **CO4:** Familiarity with the fundamentals of nanoscience and nanotechnology, as well as their relevance in everyday life.
B. Sc. Semester VI	
Paper-I: Relativity, Nuclear physics and Bio Physics	**CO1:** Students comprehend frame of reference, special theory of relativity postulates, and relativistic variation in length, time, mass, velocity addition, and mass energy equivalence. **CO2:** They can design radiation detectors, charge accelerators, and nuclear reactions, as well as the many types of nuclear processes and their significance in modern technology. **CO3:** Students are able to describe and grasp the essential ideas of decay particles. **CO4:** Students will be able to understand bio physics and its significance in the medical profession.
Paper-II: Electronics, Fiber optics, Communication and Digital electronics	**CO1:** Students will understand the construction and operation of amplifiers and oscillators, as well as their applications. **CO2:** Students will be able to understand the fundamental principles and operations of fiber optics, as well as the importance of optical fibre, light wave propagation in optical fiber, and its role in communication. **CO3:** They will also be familiar with communication kinds such as AM and FM, as well as their core theory and how television is broadcast using these methods. **CO4:** The students will be able to understand how large amounts of data are kept in current times utilizing technologies such as Number Systems, as well as the theory behind it.

CHEMISTRY

Department of Chemistry	After successful completion of three years degree program in the subject Chemistry the students are able to:
Program Outcomes	**PO1:** The Programme enables the students to understand basic facts and concepts in Chemistry. **PO2:** To develop the ability to apply the principles of Chemistry, to develop problem solving skills, to become familiar with the emerging areas of Chemistry and their applications in various spheres of Chemical sciences and to apprise the students of its relevance in future studies. **PO3:** Students know about importance of Qualitative and Quantitative analysis used for different samples like soil samples, alloys estimation, water analysis. New technological world using nanomaterials, properties of nano materials magnetic properties of materials. **PO4:** Thermodynamic and Thermochemistry useful in our daily life and related with our surrounding atmosphere. **PO5:** Nuclear Magnetic resonance spectroscopy allows the molecular structure of a material to be analyzed by observing the measuring the interaction of nuclear spins when placed in a powerful magnetic field and extensively used in medicine in the form of magnetic resonance imaging and for analysis of chemicals. **PO6:** Bioinorganic chemistry provides knowledge about significant role of metal ions in biological system which is required for the maintenance of life. **PO7:** Student can describe the process It also develops skills in the proper handling of apparatus and chemicals and also gets exposure to the different processes used in industries and their applications. **PO8:** Use modern techniques used in analysis of materials and handling of the new equipment during the practical. **PO9:** To inculcates the scientific temperament in the students during the experiments and how to corelate with outside the scientific community.
Program Specific Outcomes	**PSO1:** The B.Sc. programme enabled the students to enhance their critical thinking, during the three years period of study and the curriculum motivates the mental thoughts and suppositions of the students. This helps the students to take up practical work and compare the results with their assumptions, there by leading to accuracy and validity of the practical knowledge. This Analysis leads to take decisions at intellectual, directorial and personal from different perspectives of life.

	PSO2: Understand the basic principles and concepts underlying the inorganic, organic and physical chemistry. **PSO3:** Comprehend the applications of chemistry in various walks of life. **PSO4:** Students gained functional knowledges of the fundamental theoretical concepts and experimental methods of Chemistry. **PSO5:** The students will be benefited to equip themselves to job requirements in the quality control, analytical laboratory or production wing of any Chemical or Pharmaceutical industry. **PSO6:** Able to use instrumental methods of chemical analyses. Students acquire fundamental Botanical knowledge through theory and practical.
Course Outcomes B. Sc. Chemistry	
Course Outcome for Semester-I	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** Basic knowledge of atomic structure, inorganic fundamental of a periodic property. **CO2:** Conceptualization of Valence bond theory (VBT) and Molecular Orbital theory (MOT), and VSPER theory. **CO3:** Differentiation in ionic and metallic bond, and S-block elements. **CO4:** A study of P-block elements, oxyacids of Sulphur, hydride of Phosphorus, and noble gases. **CO5:** Food adulteration process and detection, test for detection physical adulteration and chemical adulteration and how to identify the food adulterant which are used various food products
PAPPER-II:PHYSICAL CHEMISTRY	**CO1:** Basic knowledge of thermodynamics and calculations of problems related to Thermo-chemistry. **CO2:** Difference between Ideal gas and Real gas and their related equation. **CO3:** Understanding of Liquid State with emphasis on properties of liquid. **CO4:** Concept of adsorption isotherm and principles of catalysis. **CO5:** Types of colloidal, electrophoresis and electro-osmosis, emulsion and gels
Course Outcome for Semester-II	
PAPPER-I: ORGANIC CHEMISTRY	**CO1:** Understand the concept structure, bonding in organic compounds and different types of reaction mechanisms. **CO2:** Understand the concept of stereochemistry in detail. **CO3:** Understand the nomenclature, synthesis, chemical and physical properties of alkanes, cycloalkanes and alkenes **CO4:** Understand the nomenclature, synthesis, chemical and physical properties of dienes, alkynes and also the concept of aromaticity of organic compounds. **CO5:** Fuels and its calorific values properties and uses application of lubricants in industries

PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** CO1: Second law of thermodynamics and free energy work functions. **CO2:** CO2: Understanding of Phase rule and liquid-liquid mixture. **CO3:** Insight into Nuclear Chemistry and Molecular Structure. **CO4:** laws of Chemical kinetics. **CO5:** Types of pollutions and its control measures, types of pollutants, adsorption techniques
Course Outcome for Semester-III	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** Diagrammatic representation of molecules according to MOT, and properties of interhalogen compounds **CO2:** Chemistry of first transition elements and non-aqueous solvents **CO3:** Comparative study of the second and third transition series and error in chemical analysis **CO4:** Chemistry of lanthanides and actinides, and lanthanide contraction
PAPPER-II: ORGANIC CHEMISTRY	**CO1:** Understand nomenclature, synthesis, chemical properties of alkanes in aryl, alkyl halides. **CO2:** Understand nomenclature, synthesis, chemical properties of dihydric, trihydric alcohols and phenols in detail **CO3:** Understand nomenclature, synthesis, chemical properties of aldehydes and ketones and mechanisms of nucleophilic addition **CO4:** Understand nomenclature, synthesis, chemical properties of carboxylic acids and their derivatives along with reactive mechanisms.
Course Outcome for Semester-IV	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** A detail study of coordination compounds and its applications. **CO2:** Isomerism and redox process in inorganic compounds. **CO3:** The concept organometallic and metal carbonyl compounds. **CO4:** Applications of inorganic macromolecules in the biological concept, and acid-bases principles.
PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** Insight into laws of crystallography and Bravais lattices **CO2:** Debye-Huckel theory and concepts related to electrochemistry **CO3:** Introduction to Rotational and Vibration Spectroscopy. **CO4:** Basics of Quantum Chemistry, Operators and Schrodinger wave function
Course Outcome for Semester-V	
PAPPER-I: ORGANIC CHEMISTRY	**CO1:** The students will understand some fundamental aspects of organic chemistry. They will learn mechanism of some organic reactions, classification of polymers, structure and uses of some commercial and natural polymers. **CO2:** To know stereochemistry and various possible conformations of organic compounds and how it affects

	the reaction outcome. **CO3:** To be familiarize with the important photochemical reactions in Organic Chemistry. **CO4:** To understand the functions and applications of bioorganic compounds.
PAPPER-II: PHYSICAL CHEMISTRY	**CO1:** To study the basic postulates of quantum mechanics. **CO2:** To enable the students to solve the simple quantum mechanical models such as simple harmonic oscillator, particle in a 1D- box, rigid rotor, H atom etc. **CO2:** To understand the quantum mechanical aspect of angular momentum and spin. **CO3:** Enable the students to predict the point group of important molecules and to know how they are classified **CO4:** To understand the idea of space groups and to learn the theory of molecular symmetry. **CO5:** To gain skill to apply group theory to vibrational and electronic spectroscopy.
Course Outcome for Semester-VI	
PAPPER-I: INORGANIC CHEMISTRY	**CO1:** To know the structure and bonding of important coordination compounds. **CO2:** To understand the magnetic properties of complexes and to know how magnetic moments can be employed for the interpretation of their structure **CO3:** To get an overview about the stereochemistry of coordination compounds **CO4:** To get an idea about the basic coordination chemistry of Lanthanides and Actinides. **CO5:** Ability to prepare inorganic complexes. Ability to prepare inorganic complexes. **CO6:** To know about VBT, CFT and MOT of co-ordination complexes
PAPPER-II: ORGANIC CHEMISTRY	**CO1:** To impart the students a thorough knowledge about the mechanisms of reactions of some selected functional groups in organic compounds **CO2:** To give an outline of applied organic chemistry and the applications of organic chemistry in various spheres of chemical sciences. **CO3:** To give an elementary idea of chemotherapy, organic spectroscopy and photochemistry. **CO4:** To analyze organic compound using UV, IR and NMR spectroscopic techniques, which provides platform for students to work in industries.

ELECTRONICS

Department of Electronics	After successful completion of three years degree program in the subject Electronics the students are able to:
Program Outcomes	**PO1:** Ability to design and conduct electronics experiments, as well as to analyze and interpret data. **PO2:** Utilize the basic knowledge of science Electronics and Communication. **PO3:** To provide opportunity to students to learn the latest trends in Electronics. **PO4:** To satisfy the needs of the core Electronics Industry useful for the society in all walks of life. **PO5:** To provide opportunities to the students to formulate, analyze and resolve the problems in Electronics Industry.
Program Specific Outcomes	**PSO1:** After completing the program, interested students can pursue in research field or in development field. **PSO2:** Students can become entrepreneur and can work on multidisciplinary projects.
Course Outcomes for B. Sc. ELECTRONICS	
Course Outcome for Semester-I	
PAPER-I: BASIC CIRCUIT COMPONENTS & NETWORK ANALYSIS	**CO1:** To enrich the students with the basic requirement of electronic circuits. **CO2**: To describe the theorems useful for circuit operation. **CO3:** To explore the use of energy sources for circuit operations. **CO4:** To familiarize about the use of transducers in instrumentation systems
PAPER-II: FUNDAMENTALS OF DIGITAL ELECTRONICS	**CO1:** To enrich the students with the basic requirement of digital electronics. **CO2:** To describe the use of Boolean Algebra for circuit operations. **CO3:** To elaborate the use of flip flops as memory in data processing system. **CO4:** To explore the use of binary circuits in digital system. **CO5:** To familiarize about the basic building blocks required for digital system.
Course Outcome for Semester-II	
PAPER-I: SEMICONDUCTOR DEVICES	**CO1:** To explain about semiconductors used for the fabrication of semiconductor devices. **CO2:** To acquire the knowledge of transistor used in many electronic circuits. **CO3:** To familiarize about the field effect transistor and its operation. **CO4:** To explore the use of power devices required in electronics circuits. **CO5:** To familiarize about the applications of diode, transistor and power devices.
PAPER-II:	**CO1:** To enrich the students with the digital ICS used in

ADVANCED DIGITAL ELECTRONICS	electronics circuits. **CO2:** To enhance the use of Flip-Flops in the construction of counters. **CO3:** To familiarize the use of Counters & Registers in data processing system. **CO4:** To explore the use of binary memory in digital system. **CO5:** To disseminate about the building blocks required for digital system.
Course Outcome for Semester-III	
PAPER-I: ANALOG CIRCUITS	**CO1:** To illustrate applications of diode as clippers, clamper and rectifier. **CO2:** To describe the role of transistor in amplification, signal analysis and two port hybrid circuit for testing amplifier parameters. **CO3:** To elaborate the concept of feedback and construction of feedback amplifier and oscillators. **CO4:** To explore the use of power amplifier in electronics circuits. **CO5:** To familiarize about the applications of diode and transistor.
PAPER-II: LINEAR INTEGRATED CIRCUITS	**CO1:** To study DC & AC characteristics of operational amplifier. **CO2:** To elucidate and design linear and nonlinear circuits of OP-AMP. To study timer IC and its applications. **CO3:** To elaborate the role of filters in electronics circuits. **CO4:** To explore the knowledge of linear integrated circuits and its uses.
Course Outcome for Semester-IV	
PAPER-I: BASIC COMMUNICATION ELECTRONICS	**CO1:** To understand functioning of basic processes in communication systems. **CO2:** To understand analogue modulation & demodulation techniques. **CO3:** To Understand transmission and reception systems. **CO4:** To understand propagation of radio waves in communication systems. **CO5:** To understand the process of analogue signal communication system.
PAPER-II: ANALOGUE AND DIGITAL CIRCUITS	**CO1:** To study DAC and ADC used for data conversions in electronics system. **CO2:** To elucidate and design regulated DC power supply for operating electronic devices. **CO3:** To study PLL IC 565 and its applications. **CO4:** To elaborate the role of transducers in Bioelectronics circuits. **CO5:** To explore the knowledge of Analogue and Digital circuits and its uses.
Course Outcome for Semester-V	
PAPER-I: Modern Communication Systems	**CO1:** To understand the concept optical communication and its operation **CO2:** To understand various digital modulation and

	demodulation techniques. **CO3:** To analyse the performance of digital communication system in terms of error rate and spectral efficiency. **CO4:** To understand the telecommunication traffic, channel and cellular capacity **CO5:** To understand various application of cellular technology.
PAPER-II: INTRODUCTION TO MICROPROCESSOR	**CO1:** To understand importance of Microprocessors as a programmable digital system element in computer system. **CO2:** To understand architecture and features of 8085 Microprocessor. **CO3:** To explore some basic concepts of microprocessors through assembly language programming. **CO4:** To augmented the knowledge of interfacing the peripheral to increase the flexibility of microprocessor. **CO5:** To grown-up the in-depth understanding of the operation of microprocessors and machine language programming & interfacing techniques.
Course Outcome for Semester-VI	
Paper-I: Programming in "C"	**CO1:** After completion of course, Students are able to Develop their programming skills **CO2:** Familiar with elements of C language **CO3:** Understand operators, Expression and Preprocessors **CO4:** Understand different decision making and concept of looping in C **CO5:** Understand Array, Structure, Function and Pointers, their declaration and use
Paper-II: MICROCONTROLLER 8051 AND ITS APPLICATIONS	**CO1:** To understand architecture and features of 8051 Microcontroller. **CO2:** To learn Programming of 8051 microcontroller. **CO3:** To learn interfacing of 8051 Microcontroller with real world input and output devices. **CO4:** To understand the coding and interfacing of 8051 with various IO devices. **CO5:** To understand importance of Microcontrollers in atomization and control system

COMPUTER SCIENCE

Department of Computer Science	**After Successful completion of three year degree program in Computer Science a student should be able to know:**
Program Outcomes	**PO1:** To develop problem solving abilities using a computer. **PO2:** To build the necessary skill set and analytical abilities for developing Computer based solutions for real life problems. **PO3:** To implement quality software development practices. **PO4:** To create awareness about process and product standards. **PO5:** To train students in professional skills related to Software Industry. **PO6:** To prepare necessary knowledge base for research and development in Computer Science **PO7:** To help the students to build-up a successful career in Computer Science.
Program Specific Outcomes	**PSO1:** Demonstrate understanding of the principles and working of the hardware and software aspects of computer systems. **PSO2:** Design, implements, test, and evaluate a computer system, Component or algorithm to meet desired needs and to solve a computational problem. **PSO3:** To Enhance skills and adapt new computing technologies for attaining professional excellence and carrying research. **PSO4:** Apply fundamental principles and methods of Computer Science to a wide range of applications. **PSO5:** Impart an understanding of the basics of our discipline. **PSO6:** Practice for continued professional development.
Course Outcomes B. Sc Computer Science	
Course Outcome for Semester-I	
Paper-I: (Programming in C)	**CO1:** To illustrate the flowchart and design an algorithm for a given problem. They understand the basic concept of programming structure. **CO2:** Students learnt the knowledge of fundamentals of writing C program which include data types, keywords, tokens, variables, and operators. Develop conditional and iterative statements to write C programs **CO3: T**o solve user defined functions with real time problems. **CO4:** Students developed their concepts to write C program that uses Pointers, Arrays, and Strings. **CO5:** Understand the knowledge of user defined data types that include structure and union to solve problems. **CO6:** Students can write the programs which includes file concept to show input and output of files in C.
Paper-II: (Fundamentals of IT)	**CO1:** Bridge the fundamental concepts of computers with the present level of knowledge of the students. **CO2:** Familiarize operating systems, programming languages, peripheral devices, networking, multimedia and internet **CO3:** Understand binary, hexadecimal and octal number systems and

	their arithmetic. **CO4:** Understand how logic circuits and Boolean algebra forms as the basics of digital computer **CO5:** Demonstrate the building up of Sequential and combinational logic from basic gate.
Course Outcome for Semester-II	
Paper-I: (Object Oriented Programming Using 'C++')	**CO1:** To understand the object-oriented methodology which involves elements and features of object-oriented programming. **CO2:** Students developed the concept of class, object and structure of class which includes definition of class members and also, they learned how to write the programs using class. **CO3:** Students learnt the basic concept of constructor and destructor. Also, they were able to overload the unary and binary operators using the concept of operator overloading. **CO4:** Understand how to reuse code by implementing the OOPs Inheritance concept in C++. Also, they got knowledge of dynamic objects. **CO5:** Students were able to understand how inheritance and virtual functions implement dynamic binding with polymorphism. **CO6:** Students learnt how to use exceptional handling in C++ programs
Paper-II: (System Analysis and Design)	**CO1:** Identify various types of information systems concepts and terminologies **CO2:** Discuss the initial phase of system Development Life Cycle (SDLC) using analytical tools and quantitative technique used to identify problem **CO3:** Define problem and opportunities that initiate projects **CO4:** Evaluate information systems projects to identify various aspects of feasibility of these projects **CO5:** Apply at least one specific methodology or tool for analyzing business situation by modeling using a formal technique.
Course Outcome for Semester-III	
Paper-I: (Data Structures)	**CO1:** To be able to implement the abstract data type list as a linked list using the node and reference pattern. **CO2**: Select appropriate data structures as applied to specified problem definition. Analyze run-time execution of previous learned sorting methods, including selection, merge sort, heap sort and Quick sort and also calculates the complexity of all sorting and searching methods. **CO3:** To understand the abstract data type stack and notation like prefix infix and postfix expression formats. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures and design applications based on it. **CO4:** Determine and analyze the complexity of given Algorithms. **CO5:** Ability to have knowledge of tree and graph concepts.
Paper-II: (Operating Systems)	**CO1:** Describe and explain the fundamental components of a computer operating system **CO2:** Define, restate, discuss, and explain the policies for scheduling,

	deadlocks, memory management, synchronization, system calls, and file systems. **CO3:** Describe and extrapolate the interactions among the various components of computing systems. **CO4:** Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems.
Course Outcome for Semester-IV	
Paper-I: (Java Programming)	**CO1:** **E**xplain the Use of java programming language Concept and programming technologies in software development. **CO2:** Demonstrate the Concepts of Thread and Applets **CO3:** Identify classes, objects, members of the class and relationships among them needed for a specific problem. **CO4:** Able to understand basic Concepts of java like variables, operators and tokens etc. **CO5:** Design and Develop Applications using AWT controls in Java.
Paper-II: (Linux Operating System)	**CO1:** To understand the basic commands and directory structures use in Linux OS and explain the use of all these commands to make the effective use of the environment to solve problems. **CO2:** Design and develop applications using Vi Editor in Linux OS. **CO3:** Able to identify the differences between processes and shells use in Linux OS. **CO4:** Able to Understand the basic set of Communication utilities commands and other commands use in Linux OS. **CO5:** To learn Graphical user Interfaces like KDE and GNOME.
Course Outcome for Semester-V	
Paper-I: (Visual Basic Programming)	**CO1:** Explain the basic Concepts of Program building block control statements and the basic concepts of function and procedure. **CO2:** Discuss about graphics handling related control and properties and Develop a Graphical User Interface (GUI) based on problem description. **CO3:** Discuss about the fundamental functions and properties of Advanced ActiveXControl. **CO4:** Design and Develop the programs which are based on events that retrieve input from a file as opposed to input only provided by user. **CO5:** Explain the procedure of creating menus and how to use these menus while designing applications in VB. (Menu Editor). **CO6:** Describe the concepts of database handling using DAO, ADO and RDO control with data report concepts.
Paper-II: (Database Management System)	**CO1:** To learnt the fundamental elements of traditional file processing system, objective of database system. **CO2:** Students learnt the basic concept of different data models which includes Hierarchical, Network, and E-R and Relational model. **CO3:** Students are able Design E-R model to represent simple database application **CO4:** Students developed the concept of how to convert E-R model into relational tables and how to perform relational operation on

	tables through relational algebra. **CO5:** Students developed the concept of functional dependency and improve the database design by the concept of Normalization.
Course Outcome for Semester VI	
Paper-I: (Compiler Construction)	**CO1:** Students learnt the major concept areas of language translation and compiler design **CO2:** Students got an awareness of the function and complexity of compilers. **CO3:** Students were able to understand the role of Lexical analyzer, its design, and implementation. Students got knowledge of context free grammars, Derivation and parse trees. **CO4:** Students are able to identify the similarities and differences among various parsing techniques and grammar transformation techniques
Paper-II: (SQL and PL/SQL)	**CO1:** Able to Understand the basics of SQL with control structure and sublanguages like DDL, DML and DCL/TCL. **CO2:** Able To identify the differences between integrity constraints and value constraints. **CO3:** Explain how functions, triggers, cursors and stored procedure work in PL/SQL**.** **CO4:** Compare SQL with PL/SQL and integrate the concept of procedural language with SQL to build advance applications. **CO5:** Able to understand the basics of PL/SQL Programming: PL/SQL Data Types, Identifiers, Operators and Expressions, Iterative Statements, Conditional Statements,

STATISTICS

Department of Statistics	After successful completion of three years degree program in Statistics a student should be able to:
Programme Outcomes	**PO1:** Demonstrate, solve and an understanding of major concepts in all disciplines of statistics **PO2:** Solve the problem and also think methodically, independently and draw a logical conclusion. **PO3:** Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of statistical experiments. **PO4:** Create an awareness of the impact of statistics on the society, and development outside the scientific community. **PO5:** Use modern techniques and different Statistical software
Programme Specific Outcomes	**PSO1:** Make aware and handle the sophisticated data. **PSO2:** Gain the knowledge of Statistics through theory and practical. **PSO3:** To learn about basic principles of design of experiment. **PSO4:** To gain knowledge about official statistics; purpose and functions of CSO, NSSO **PSO5:** Understand basic concepts of Statistical Quality Control and Uses of SQC **PSO6:** To study applications of statistics in the field of industrial statistics, operation research, survey sampling technique etc. **PSO7:** Use modern statistical tools, Models, Charts and Equipment. **PSO8:** Develop research-oriented skills.
Course Outcomes B. Sc I Statistics Semester-I	
Paper-I: Probability Theory	**CO1:** Understand the Theory of Probability. **CO2:** Able to apply additive and multiplicative laws of probability **CO3:** Obtain the various results on theorems in probability CO-4. Distinguish between measures of location and measure of dispersion. **CO4:** Identify Conditional Probability, Bayes theorem, and Chebyshev's inequality **CO5:** Concept of Random variable, pmf, pdf, pgf, distribution function, mgf and its uses
Paper-I**: Descriptive Statistics-I**	**CO1:** Able to plan, execute and analyze a data **CO2:** Use and understand basic concepts of Descriptive statistics **CO3:** Analyze data and understand concept of population census

	CO4: Analysis of categorical data using various techniques and draw conclusions. **CO5:** Apply statistics to draw different types of diagrams and graphs
Course Outcomes B. Sc I Statistics Semester-II	
Paper-I: Probability Distribution	**CO1:** Understand various Discrete and Continuous distributions. **CO2:** Able to have the knowledge of Discrete Distributions such as Bernoulli, Binomial, Poisson, Uniform, Hyper geometric and Geometric, Negative Binomial with their properties and applications **CO3:** Able to have the knowledge of Continuous Distributions such as Uniform, Beta, Gamma, Normal and their properties **CO4:** Distinguish between Bernoulli distribution and Binomial distribution **CO5:** Understand concept of Lack of memory property of Geometric distribution.
Paper-I**: Descriptive Statistics-II**	**CO1:** Able to plan, execute and analyze a data. **CO2:** Use and understand concepts of central tendency and location. **CO3:** Understand different concepts and measures of dispersion **CO4:** Analysis the concept of bivariate data and correlation coefficient as well as regression. **CO5:** Apply different types of partition values and the concepts of skewness and kurtosis The concepts of central tendency and location.
Course Outcomes B. Sc II Statistics Semester-III	
Paper-I: Statistical Methods	**CO1:** Drawing random samples from uniform and normal distribution. **CO2:** Able to find moments and correlation coefficient of bivariate probability distribution. **CO3:** Obtain a joint probability distribution of random variable (one or two dimensional) in the given situation. **CO4:** Distinguish between t- distribution and F- distribution. **CO5:** Identify the type of Statistical situation in which different Transformation of variable technique can be applied.
Paper-II: Economics Statistics	**CO1:** Construction of Price and Quantity index number by simple aggregative method **CO2:** Construction and uses of Wholesale Price Index number. **CO3:** Able to determine concept of purchasing power of money **CO4:** Fitting of Pareto curve to income data. **CO5:** Analyze data pertaining to seasonal Indices and to interpret the results. **CO6:** summarize and analyze the data using Economic time series.

	CO7: Apply statistics in the various fields.
Course Outcomes B. Sc II Statistics Semester-IV	
Paper-I: Statistical Inference	**CO1:** To solve problems on chi-square for testing independence of attributes. **CO2:** To solve problems on t-tests and construction of confidence intervals for single mean and difference of two means, paired t-test. **CO3:** Identify the characteristics properties of good estimator. **CO4:** Identify the type of statistical situation to which central limit theorem can be applied. **CO5:** Understand the construction of confidence interval.
Paper-II: Applied Statistics	**CO1:** Explain the sources of demographic data. **CO2:** Calculation of Percentile scores and T-scores for a given frequency distribution of raw scores. **CO3:** Comparison of raw scores on the basis of (i) Percentile, (ii) Z scaling, (iii) T scaling. **CO4:** Able to solve numerical problems on construction and use of life tables. **CO5:** Can do computation of CDR and Standardized death rates by direct and indirect methods. **CO6:** Be able to compute and interpret Gross Domestic rates
Course Outcomes B. Sc III Statistics Semester-V	
ST-301: Paper-! - Statistical Quality Control and Linear Programming Problem	**CO1:** Use tools of SQC, draw control charts for mean, standard deviation and range **CO2:** Able to draw conclusion about whether process is in statistical quality control or not. **CO3:** Obtain the optimum solution of Linear programming problem. **CO4:** Distinguish between Process and product control **CO5:** Identify the General form of LPP and Standard form of an LPP.
ST-302: Survey Sampling Techniques	**CO1:** Able to plan, execute and analyse a sample survey **CO2:** Use and understand basic concepts of sample survey, sampling and types of sampling and non-sampling errors **CO3:** Analyze data and understand concept of stratified sampling, systematic sampling and cluster sampling and compare various sampling techniques. **CO4:** Analyse data using various sampling techniques and draw conclusions.24 **CO5:** Apply statistics in the various fields of sampling techniques
Course Outcomes B. Sc III Statistics	

Semester-VI	
ST-311: Operations Research	**CO1:** To solve and understand different concepts of Network Analysis and Construct Network Diagram **CO2:** Able to understand concept of Duality in LPP, relationship between primal and dual problem and its economic interpretation **CO3:** Identify the balanced transportation problem and unbalanced transportation problem, **CO4:** Identify two-person zero sum game and solution of game. **CO5:** Understand concept of Duality in LPP, relationship between primal and dual problem and its economic interpretation
ST-312: -Experimental designs	**CO1:** Able to explain factorial experiments, Yates' method to calculate main effects and interaction effects in 2^2 and 2^3 factorial experiments **CO1:** Analyse data using various experimental designs CRD, RBD, LSD and draw conclusions. **CO1:** Comparison of theory of linear estimation, analysis of variance (ANOVA) **CO1:** Able to analyse data using various ANOVA techniques and draw conclusions. **CO1:** Understand basic principles of designs of experiments. **CO1:** Be able to compute and interpret ANOVA for one way and two-way classified data.

BOTANY

Department of Botany	After successful completion of three years degree program in the subject Botany the students are able to:
Program Outcomes	**PO1:** Students know about different types of lower & higher plants their evolution in from algae to angiosperm &also their economic and ecological importance. **PO2:** Cell biology gives knowledge about cell organelles & their functions. **PO3:** Molecular biology gives knowledge about chemical properties of nucleic acid and their role in living systems. **PO4:** Genetics provides knowledge about laws of inheritance, various genetic interactions, chromosomal abrasions & multiple alleles. **PO5:** Structural changes in chromosomes. **PO6:** Student can describe morphological & reproductive characters of plant and also identified different plant families and classification. **PO7:** They know economic importance of various plant products & artificial methods of plant propagation. **PO8:** Various concepts in ecology and phytogeography. **PO9:** Use modern Botanical techniques and decent equipment. **PO10:** To inculcates the scientific temperament in the students and outside the scientific community.
Program Specific Outcomes	**PSO1:** Students acquire fundamental Botanical knowledge through theory and practical. **PSO2:** To explain basis plant of life, anatomy, reproduction and their survival in nature. **PSO3:** Helped to understand role of living and fossil plants in our life. **PSO4:** Understand good laboratory practices and safety. **PSO5:** To create awareness about cultivation, conservation and sustainable utilization of biodiversity. **PSO6:** To know advance techniques in plant sciences like tissue culture, plant disease management, artificial gene transfer etc. **PSO7:** Students understand about the phytogeography of India, ethnobotanically important plants and their use.
Course Outcomes B. Sc Botany	
Course Outcome for Semester-I	
PAPPER-I: **VIRUSES, PROKARYOTES, ALGAE & BIOFERTILIZERS**	**CO1:** Study of Microbes and algae to understand their Diversity. **CO2:** Know the systematics, morphology and structure of Viruses, bacteria, Mycoplasma and algae. **CO3:** To know life cycle pattern of microbes and their economic importance.

	CO4: To know evolution of microbes and algae. **CO5:** To learn skill of preparation and use of biofertilizers for sustainable development.
PAPPER-II: **FUNGI, LICHEN, PLANT PATHOLOGY, BRYOPHYTA & MUSHROOM CULTIVATION**	**CO1:** Study of Fungi, Lichens, plant pathology and Bryophyta. **CO2:** To know the systematics, morphology and structure of fungi, Lichens, plant pathogens, hosts and Bryophytes **CO3:** To know life cycle pattern of fungi, lichens, plant pathogens and bryophytes. **CO4:** To know economic importance of fungi, lichens and Bryophytes. **CO5:** To know evolution of fungi, lichens and Bryophytes. **CO6:** To learn skill of cultivation and importance of mushrooms for human consumption.
Lab Work:	• To get acquainted with ultrastructure of viruses and bacteria, to study staining method of bacteria • To study structure and reproduction of *Nostoc* • To study the structure and reproduction in Algae, like *Chara, Vaucheria, Ectocarpus* and *Batrachospermum* • To learn the method of identification and characterization of bacteria useful in biofertilizers • To learn staining method of fungi and bryophytes. • To get acquainted with different plant pathogens and lichens • To learn the technique of mushroom cultivation
Course Outcome for Semester-II	
PAPPER-I: **PALAEOBOTANY, PTERIDOPHYTA, GYMNOSPERMS & SOIL ANALYSIS**	**CO1:** Study of Palaeobotany, geological time scale and morphology of angiosperms. **CO2:** To know life cycle pattern of Pteridophyta and Gymnosperms. **CO3:** To know the systematics, morphology and structure of Pteridophyta and Gymnosperms. **CO4:** To know economic importance of Pteridophyta and Gymnosperms. **CO5:** To know evolution of Pteridophyta and Gymnosperms. **CO6:** To learn the skill of soil analysis for cultivation of variety of plants.
PAPPER-II: **MORPHOLOGY OF ANGIOSPERMS & FLORICULTURE**	**CO1:** To study the morphology of angiosperms with respect to evolution of plants. **CO2:** To the evolution of different floral organ for sexual reproduction in angiosperms. **CO3:** To know the variation among the reproductive organs of the angiosperms. **CO4:** To know the systematics, morphology and structure of angiosperms. **CO5:** To know the adaptive pollination and reproductive biology of angiosperms. **CO6:** To learn the skill of floriculture and its tools and techniques.

Lab Work:	• Observation and study of types of fossils • Study of structure and reproduction pteridophytes like, Selaginella & Equisetum and gymnosperms like, Cycas & Pinus • To get acquainted with types, physical and chemical properties of soil • Study of morphology of angiosperms, • Study of identification and commercial aspects of cut flowers
Course Outcome for Semester-III	
PAPPER-I: **ANGIOSPERM SYSTEMATICS, EMBROLOGY & INDOOR GARDENING**	**CO1:** To Study vegetative and floral characters of angiosperms. **CO2:** To know the preparation of floral formulae and floral diagrams of angiosperms. **CO3:** To know economic importance of angiosperms families. **CO4:** To know the pattern of embryogenesis in various angiosperms plants. **CO5:** To learn the skill for development of indoor gardening and its importance.
PAPPER-II: **ANGIOSPERM ANATOMY & HORTICULTURE**	**CO1:** To gain knowledge of different plant tissue and tissue systems. **CO2:** To understand structure and type of cells and tissues in plants, type of vascular bundles and stellar systems. **CO3:** To know the simple and complex tissues and its functions. **CO4:** To know the process of secondary growth and its role in formation of wood and periderm **CO5:** To learn the skill for horticultural practices used.
Lab Work:	• To Study fossil angiosperms • To learn the anatomy of dicot and monocot • To study embryology of angiosperms • To get acquainted with the techniques used in landscaping and indoor gardening • To study various horticultural crops
Course Outcome for Semester-IV	
PAPPER-I: **CELL BIOLOGY, PLANT BREEDING, EVOLUTION & SEED TECHNOLOGY**	**CO1:** Gain knowledge about cell and its function. **CO2:** Learn the scope and importance of Cell and Molecular biology. **CO3:** To understand ultrastructure of cell wall, plasma membrane and cell organelles **CO4:** To understand the morphology and structure of chromosomes. **CO5:** To understand the different techniques used in plant breeding. **CO6:** To know the process of evolution of plants in universe **CO6:** To learn the skill used in seed technology
PAPPER-II: **GENETICS, MOLECULAR**	**CO1:** To study structure, biochemical nature and role of nucleic acids.

BIOLOGY & PLANT NURSERY	**CO2:** To understand the type and applications of mutations. **CO3:** Understand the Mendelian and neo-Mendelian genetics. **CO4:** Know about interaction of genes, multiple alleles and linkage and crossing over. **CO5:** To learn the skill for preparation of plant nurseries and its importance for nature conservation
Lab Work:	• To study ultrastructure of cell organelles • To study cell division, mitosis and meiosis with use nuclear stain • To learn the different biostatistics methods • To study seed dormancy, viability and percentage of germination • To prove Mendel's laws of inheritance with the help of coloured beads • Study of interaction of genes through different genetics problems • To study sterilization for plant nursery and methods of propagation
Course Outcome for Semester-V	
PAPPER-I: **PLANT PHYSIOLOGY, MINERAL NUTRITION & HYDROPONICS**	**CO1:** To know the scope and importance of plant physiology. **CO2:** To understand plant & water relation and mineral nutrition. **CO3:** Understand process of photosynthesis, C_3, C4, CAM pathways. **CO4:** Understand the process of respiration, nitrogen metabolism and plant movement **CO5:** To learn the technique of development of hydroponics.
PAPPER-II: **PLANT ECOLOGY & ORGANIC FARMING**	**CO1:** To study concept of ecology and ecosystems. **CO2:** To understand climatic and edaphic factors. **CO3:** To know physiographic factors and interrelations among the living organisms. **CO4:** To understand the components of ecosystems, autecology, synecology and plant succession. **CO5:** To know the adaptations of plants. **CO6:** To learn the skill and importance of organic farming for healthy life.
Lab Work:	• To study the plant physiology experiments, like photosynthesis, respiration, permeability, RQ, photoperiodism, plant movements, etc. • To get acquainted with mineral nutrition and hydroponics • Study of different qualitative and quantitative methods used in plant ecology • To learn the techniques used in organic farming
Course Outcome for Semester-VI	
PAPPER-I: **BIOCHEMISTRY, BIOTECHNOLOGY &**	**CO1:** To study carbohydrates, lipids, amino acids and enzymology. **CO2:** To know the plant tissue culture techniques and

HERBAL TECHNOLOGY	applications. **CO3:** To understand tools and techniques used in genetic engineering. **CO4:** To know the artificial gene transfer techniques. **CO5:** To learn the skill used in formation of dye and cosmetics from plants. **CO6:** To know the basic concept of herbal technology.
PAPPER-II: **PHYTOGEOGRAPHY, UTILIZATION OF PLANTS, TECHNIQUES & PHARMACOGNOSY**	**CO1:** To know the phytogeography of India and world **CO2:** To know the natural resources and various types of pollutions and its impact on living organism. **CO3:** To study the natural resources and its conservation strategies. **CO4:** To know the economic importance of plants and ethnobotany. **CO5:** To study microscopy, electrophoresis, centrifugation and chromatography. **CO6:** To learn the basics of pharmacognosy and skill for used of plants in pharmacognosy.
Lab Work:	• To study the biochemical experiments • To study the different instruments and equipment used in biotechnology • To study the different techniques used in herbal technology • To learn types of pollution parameters. • To get acquainted with ethnobotany and economic botany with suitable examples • To study the techniques used in pharmacognosy

ZOOLOGY

Department of Zoology	After successful completion of three years degree program in the subject Zoology the students are able to-
Program Outcome	**PO1:** classification and Identification of organisms according to their characteristic features. **PO2:** Correlates the Morphology, physiology and biology of invertebrate and vertebrates**.** **PO3:** Gain the knowledge of Micro-technique for preserving tissue and specimens. **PO4:** Analyse interactions among the various organisms of different phylas, their distribution and relationship with the environment. **PO5:** Gain knowledge about economic importance and application of knowledge agro based small industries like sericulture, apiculture, aquaculture, fish breeding, pear-culture. **PO6:** Understand concept of genetics and its importance in human health**.** **PO7:** Understand the use of biotechnology, biostatistics and bioinformatics.
Program specific Outcome	**PSO1:** Students are able to understand the basic concept of cell biology, environmental biology, genetics, physiology, taxonomy and applied zoology. **PSO2:** Understand the application of biological sciences in aquaculture, sericulture, vermin-culture, pearl-culture and apiculture. **PSO3:** Perform procedures as per laboratory standards in the area of physiology, cell biology, environmental biology, genetics, entomology, Biotechnology fisheries. **PSO4:** Gain knowledge about research methodology i. e. skills of micro technique which consists of preservation of tissue and specimens, their staining techniques
Course Outcome of B.Sc. Zoology	
Zoology SEM I	
Paper-I: Life and Diversity of Animals – Non-chordates (Protozoa to Annelida)	**CO1:** Students get knowledge about unity and diversity of life on the earth. **CO2:** Students will be able to identify and classify non-chordates on the basis of their peculiar characteristics. **CO3:** students will be able to understand phylum wise structural features, morphology, anatomy, physiology, habit and Habitat. **CO4:** Students will be able to explain how organisms' function at different level of grade of Organization like cellular, tissue, organ and organ system. **CO5:** They will be able to give examples of the physiological adaptation, development, behavior of

	different forms of life. **CO6:** Students understand economic importance of non-chordates as well as life cycle of pathogenic organisms.
Paper – II: Environmental Biology	**CO1:** Students get knowledge and understand about different strata of atmosphere. **CO2:** Students able to understand /recognize biological, chemical, physical components of earths system. **CO3:** Students will also understand how natural system human designed system work together and conflict with each other. **CO4:** Students understood about environmental issues like water pollution, Air pollution, soil pollution and noise pollution. **CO5:** Students able to understand and gain knowledge about renewable and non-renewable energy sources.
Lab. Work	• Studied museum specimen (classification and structural features0 • Learn about estimation of Dissolved oxygen and carbon dioxide PH and hardness of water • Studied pond ecosystem • Learn about dissection and perform mounting of biological material
Zoology - SEM II	
Paper – III: Life and Diversity of Animals – Non-chordates (Arthropoda to Hemichordata)	**CO1:** Students understood role of insect vectors in spreading diseases, mode of infection and symptoms. **CO2:** Students also understood economic importance of molluscans. **CO3:** Students understood affinities of hemichordates with different phyla. **CO4:** Students get knowledge about indirect development through various larval stages.
Paper – IV: Cell Biology	**CO1:** Students will be able to understand structure and functions of cell and cell organelles. **CO2:** Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells and cell organelles **CO3:** Students will understand how these cellular components are used to generate and utilize energy in cells **CO4:** Students will understand types of cell division that is mitosis and meiosis **CO5:** Students will apply their knowledge of cell biology to study environmental or physiological responses of cell
Lab Work:	• Studied Museum specimen (classification and structural features) • Studied permanent slides of larva of different animals and sections through different organs

	• Perform cell biology experiments, mounting and studied dissection.
Zoology - SEM III	
Paper-V: Life and diversity of Animals - Chordates (Protochordata to Amphibia	**CO1:** Students are able to understand diversity of earlier chordate from Protochordata to amphibian. **CO2:** Students are also studied about growth and development, evolution of different system of chordates. **CO3:** Students also get knowledge about adaptations, parental care and sexual dimorphism in chordates
Paper – VI: Genetics	**CO1:** Students are able to understand Mendel's laws of inheritance, basic concepts of gene, transmission of hereditary characters. **CO2:** Students also understand about interaction of genes. **CO3:** Students also understand concept of lethal genes, chromosomal disorder and syndrome caused due to abnormal chromosomal no. **CO4:** Students also understand about population genetics and application of genetics
Lab Work:	• Studied museum specimen of chordates (classification and structural features) • Observed and studied permanent slides of developmental biology and sections through different organs • Perform genetic experiments and studied karyotype of genetic traits.
Zoology - SEM IV	
Paper - VII: Life and Diversity of Animals – Chordates(Reptilia, Aves and Mammals)	**CO1:** Students understand about classification of reptiles, Aves and mammals based on structural variation. **CO2:** Get knowledge about Biting mechanism in snakes, adaptations in Aves and mammals. **CO3:** Get information about modern evolution theories, genetic basis of evolution **CO4:** Understand comparative study of development of heart and aortic arches in birds, Aves and mammals. **CO5:** Study different aspects of chick development
Paper - VIII: Molecular Biology and Immunology	**CO1:** Understand detail structure of DNA and RNA as a genetic material, structure of gene. **CO2:** Students are able to understand different processes like replication, transcription, protein synthesis. **CO3:** Able to understand concept of immunity, types of antigen antibody and their interaction **CO4:** Get information about types of immune response and about immune deficiencies.
Lab Work:	• Studied classification and identification of chordates • Studied skeleton of rabbit and fowl • Studied permanent slides of chick embryology and permanent slides. • Perform staining and immunology and molecular biology experiments.

Zoology - SEM V	
Paper-IX: General Mammalian Physiology I	**CO1:** It gives knowledge about structural features and functions of different systems like digestive, respiratory and circulatory. **CO2:** General properties of enzymes, enzyme activity **CO3:** Digestive glands, respiratory pigments, respiration mechanism and in detail circulatory system.
Paper-X: Aquaculture and Economic entomology and	**CO1:** This paper gives knowledge about-application of zoology and economic importance of zoology like fresh water aquaculture, prawn culture, pearl culture, apiculture, sericulture, and lac culture. **CO2:** Gives information about economic entomology and methods of pest control.
Lab Work:	• Perform physiology experiments i.e. estimation of carbohydrates, proteins, fats and vitamins. • Perform counting of red blood cells and white blood cells. • Studied histological slides • Perform mounting, • Collection and identification of local fishes. • Studied different insect pests.
Zoology - SEM VI	
Paper-XI: General Mammalian Physiology II	**CO1:** Get knowledge about nerve and muscle physiology, **CO2:** Studied in detail structure and function of different endocrine glands. **CO3:** Understood reproductive system, causes of infertility in male and female.
Paper-XII: Applied Zoology II (Bio-techniques ,micro techniques, Biotechnology, Bioinformatics and Biostatistics	**CO1:** Students are able to understand methods of separation of biomolecules, micro techniques (different staining methods **CO2:** Understand importance and role of bioinformatics **CO3:** Understand application of statistics in biology and biotechnology.
Lab Work:	• Detection of urea albumin sugar and creatinine in urine • Perform biotechnology experiments and micro-technique methods • Perform and studied application of bioinformatics and biostatistics. • Observed histological slides.

MICROBIOLOGY

PROGRAMME OUTCOME FOR B. SC. MICROBIOLOGY	
DEPARTMENT OF MICROBIOLOGY	**After successful completion of three years degree program in the subject Microbiology the students will be able to:**
PROGRAM OUTCOMES	**PO1:** Demonstrate laboratory skills applicable to Microbiological and Clinical methods including laboratory safety. **PO2:** Acquire skills for accurately reporting observations and findings through oral, written and digital formats. **PO3:** Apply the knowledge of microbiology from multiple fields to critically analyse and evaluate microbiological, environmental and health related issues and to create awareness and impact of microbiology outside the science community. **PO4:** Practice flexible professional skills needed for careers in microbiology & related professional and scientific fields like-Health sector, medical laboratory technology (MLT), Water testing labs, Dairy and food Industry as quality assurance and quality control professional etc, can opt for either post graduate study program, research, or for various competitive exams and professional courses. Exposure provided to the students during the add-on bioinformatics certificate course would help students gain awareness of career options in the software industry too. **PO5:** Students will be able to expand their learning horizons through use of multidimensional learning resources to keep themselves at par with the pace of scientific and research development worldwide.
PROGRAM SPECIFIC OUTCOMES	**PSO1:** The subject helps to gain knowledge about all types of microbial world, living as well as non-living, its harmful & useful interactions with human, animals, plants, bacteria and the environment **PSO2:** Students will be able to recognize structural & functional relationship of all living beings at molecular & cellular level. **PSO3:** They will get acquainted with importance of microorganisms as model systems in Genetics & Molecular Biology. **PSO4:** Students will be able to demonstrate basic microbiological techniques & acquire experimental and quantitative skills encompassing preparation of laboratory reagents, media, conducting experiments, handling different instruments, analysing samples& interpreting results.

COURSE OUTCOME FOR B SC MICROBIOLOGY	
Title of the Paper	**COURSE OUTCOME FOR SEMESTER -I**
Paper-I: FUNDAMENTALS OF MICROBIOLOGY (New Syllabus)	**By the end of this course, the students will be able to:** **CO1:** Get knowledge about basic branches of microbiology, they will understand the contribution of eminent scientists in the development of microbiology. **CO2:** Acquainted with the ultrastructure of bacterial cell, concepts of prokaryotic and eukaryotic cell's, their differences with examples. **CO3:** They will acquire the knowledge about nutritional requirements, classification of bacteria on the basis of nutritional habits. **CO4:** Learn about the growth of microbes, cell cycle and reproduction processes, various environmental parameters affecting their growth & different techniques used for their detection & quantification.
Paper-II: BASIC TECHNIQUES IN MICROBIOLOGY (New Syllabus)	**CO1:** Understand the basic principles and applications of various types of microscopic techniques. **CO2:** The students learn different techniques of Cultivation and preservation of bacteria, yeast and fungi. They are acquainted with various culture collection centres in India and abroad. **CO3:** Understand different staining techniques, role of reagent and dyes principles involved in these staining techniques. **CO4:** Get acquainted with various disinfectants, antiseptic and antimicrobial agents used in microbial control. They come to know about its mode of action and mechanism involved in microbial control.
Lab Work:	**By the end of this semester students will be able to demonstrate:** • Trained for handling various basic as well as advanced instruments used in microbiology laboratory. • Know about preparations of different types of media and methods to cultivate the microbes. • Able to demonstrate different staining procedures, stains & reagents used and microscopic observations of various types of bacteria. • Able to isolate different types of bacteria from samples of milk, water, soil etc. • Able to demonstrate sensitivity of bacteria to antibiotics, and UV radiation effect
COURSE OUTCOME FOR SEMESTER -II	
Paper-I: MICROBIAL	**By the end of this course, the students will be able to:** **CO1:** Know about the Prokaryotic microbial diversity with

DIVERSITY	examples, general characters & their life cycle. **CO2:** Get acquainted with Eukaryotic microbial diversity with examples, general characters & their life cycle. **CO3:** Understand the general characters, morphology and classification of viruses, mode of replication and methods of cultivation. **CO4:** Conceptualize various kind of positive and negative microbial interactions.
Paper-II: FOOD MICROBIOLOGY & MILK MICROBIOLOGY	**CO1:** Get acquainted with various food and milk products, their production techniques, various diseases caused, prevention of spoilage and its preservation. **CO2:** Gain knowledge about food safety and food standards
Lab Work:	**By the end of this semester students will be able to demonstrate:** • Demonstrate Slide culture techniques for the cultivation and study of mould. • Get Acquainted with SPC method to determine quality of food. • Learn to visualize under Microscope different characteristics of Fungi (*Aspergillus, Penicillium* and *Mucor*) Protozoa *(Plasmodium vivax, Trypanosoma* and *Amoeba*) & Algae (*Spirullina, Anabena* and *Euglena*), *Mycoplasma, Rickettsia* and *Chlamydia*. • Know the method of Coliform detection in food as per BIS. • Enumeration of total aerobic viable count from raw and pasteurized milk by serial dilution method. • Can demonstrate MBRT and Phosphatase test. • Know the technique to study the Effect of salt and sugar on microbial growth. • Demonstrate to find out MIC of preservative compound.
COURSE OUTCOME FOR SEMESTER III	
Paper-I: CHEMISTRY OF ORGANIC CONSTITUENTS AND ENZYMOLOGY (Old syllabus)	**By the end of this course, the students will be able to:** **CO1:** Acquire knowledge about classification of organic compounds like Carbohydrates and lipids and get acquainted with their structures and various bonds involved in them. **CO2:** Understand classification & structures of amino acids& proteins. **CO3:** Concept building about classification, structures and functions of enzymes, their mode of action and reaction mechanism. Understand steady state kinetics. **CO4:** Gain knowledge about nucleic acids, structures and their differences. Can describe importance of vitamins to human body and their deficiency syndrome.
Paper-II: INDUSTRIAL	**CO1:** Know the scope of industrial microbiology and

MICROBIOLOGY	screening methods used for isolation of industrially important microbes. **CO2:** Gain knowledge about different Fermenter configurations& designs. **CO3:** Scale up and DSP. **CO4:** Concept building about industrial production of SCP, Baker's yeast, ethanol, penicillin and semisynthetic penicillin, citric acid, Vit B12, beer and wine.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate and Identify carbohydrates and lipids from unknown samples. • Demonstrate enzyme activity by bacteria (amylase, catalase, gelatinase, lipase) • Estimate proteins, DNA and RNA by spectrophotometric method • Get knowledge and hands on training on- production of ethanol and methods of estimation. • Get acquainted with the isolation procedure of amylase producer from soil. • Demonstrate Leavening capacity of yeast and Immobilization of yeast for invertase activity.
COURSE OUTCOME FOR SEMESTER IV	
Paper-I: **METABOLISM**	**By the end of this course, the students will be able to:** **CO1:** Understand the general strategy of metabolism and conceptualize various metabolic processes operating in living cells. **CO2:** Gain knowledge about methods of DNA replication, models of replication, enzymes involved and Prokaryotic transcription process and mechanism. **CO3:** Acquainted with deamination processes, Urea cycle, glucogenic and ketogenic amino acids Genetic code and Prokaryotic translation **CO4:** Understand the mechanism by which energy is generated.
Paper-II: **APPLIED MICROBIOLOGY**	**CO1:** Get acquainted with multiple tube dilution technique, IMViC classification and understand the significance of bacteriological analysis of drinking water. **CO2:** Gain knowledge about various methods applied for treatment of water and waste water & understand the importance of disposal of industrial wastes and techniques used in its disposal. **CO3:** Understand the techniques of air analysis, various samplers used & methods involved. Know the role of soil microbes and methods involved in biofertilizer & biopesticide productions. Conceptualize PSB, mycorrhiza & microbial leaching process. **CO4:** Gain knowledge about Food spoilage, pathogens involved and methods of preservations. Food borne diseases and food intoxications.

Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate the techniques to isolate microbes from water and waste water. • Know the techniques to find out MPN, DO, COD, BOD, alkalinity of water and IMViC tests. • Understand the methods of chlorination of water and Chlorine demand. • Hands on Knowledge about MBRT and Phosphatase test
COURSE OUTCOME FOR SEMESTER V	
Paper-I: **MEDICAL MICROBIOLOGY**	**By the end of this course, the students gain knowledge about:** **CO1:** Concept building about various epidemiological concepts and definitions. Various modes by which infections spread in community, portal of entry& exit and their control. **CO2:** Microbial mechanism of Pathogenicity and virulence, exaltation and attenuation methods, MID, MLD, ID 50, LD50. **CO3:** Acquire knowledge about methods used in isolation and identification of various pathogenic organisms, based on their morphology, cultural characteristics, biochemical characteristics, serology and lab diagnosis. **CO4:** Understand the Basic principles of drug designing, the role of these drugs and antimetabolites in disease control.
Paper-II: **MOLECULAR BIOLOGY AND BIOINSTRUMENTATION**	**CO1:** Acquainted with various concepts – related to gene, different types of mutation and its regulation. **CO2:** Concept building about various processes by which gene transfer occurs amongst microbes **CO3:** Understand the principles, methodology and application of various bio instruments like spectrophotometer, electrophoresis, chromatography, centrifuge etc **CO4:** Get acquainted with Isotopic tracer technique and its applications.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate bacterial and plasmid DNA isolation techniques. • Gain knowledge and hands on training on restriction digestion technique. • Demonstrate spectrophotometrically creatinine estimation. • Demonstrate gel filtration, paper chromatography and TLC. • Knowledge and hands on training on isolation and identification of pathogenic bacteria (*E coli, S aureus, Salmonella, Proteus*).

COURSE OUTCOME FOR SEMESTER VI	
Paper-I: IMMUNOLOGY	**By the end of this course, the students will be able to:** **CO1:** Concept building about defensive mechanism of host against diseases, various terminologies used and definitions of epidemic, endemic, pandemic, nosocomial infection, zoonotic infection, vector, types and role of vectors, portal of entry portal of exit of pathogens. **CO2:** Knowledge about Haematopoiesis, Cells of immune system, general characters of B and T cells, cellular and humoral immunity. **CO3:** Understand the structures, properties, types and importance of Antigens and Immunoglobulins, Ag-Ab reactions in Diagnostic immunology. **CO4:** Gain knowledge about ELISA test, its application and various Hypersensitivity reactions and their types.
Paper-II: BIOTECHNOLOGY	**CO1:** Know the tools and techniques of genetic engineering **CO2:** Knowledge about DNA, fingerprinting and its application in forensic science **CO3:** Acquainted with the methods of production of insulin, interferon. Vaccines, monoclonal antibody. Understand the applications of biotechnology in agriculture **CO4:** Acquire knowledge about the advantages /disadvantages of genetic engineering for humans & comprehend the production and importance of genetically modified foods and animals, know about the ethics to be followed.
Lab Work:	**By the end of this course, the students will be able to:** • Demonstrate VDRL test, Widal test, immunodiffusion technique And Western blot technique. • Perform PCR • Development of spheroplast • Get the knowledge of lab production of biofertilizer and soya sauce

ENGLISH

COMPULSORY ENGLISH
SUPPLEMENTARY ENGLISH
ENGLISH AND COMMUNICATION SKILLS

Department of English	**After successful completion of three years degree program in the subject English the students are able to:**
Program Outcomes	**PO-1:** Students will be able to develop Life skills through the different life lessons incorporated in the prose and characterisation. **PO-2:** Students will be able to make sensible and ethical decisions and inculcate moral values those that are demonstrated in the literature. **PO-3**: Comprehensive skills are developed through reading and writing exercises. **PO-4:** Students will learn effective use of formal and informal use of English language **PO-5:** Students will be able to learn their critical faculties required in personal and professional life. **PO-6:** Students will be able to tap the intrinsic and extrinsic motivational theories through the text prescribed. **PO-7:** Students should be able to write business communication and other formal writings required in their professional life. **PO-8:** Students will be able to understand the concepts and strategies of communication skills with special reference to writing and listening skills. **PO-9:** Students will be able to write and appreciate different types of prose such as essay, paragraph writing, dialogue writing etc. **PO-10:** Students will be able to understand the different state of minds for example humour, struggle, resilience, success, innovation and the strategies to deal in such situations through motivational and inspiring stories.
Program Specific Outcomes	**PSO1:** Students will acquire fundamentals of formal writing skills required in a workplace. **PSO2:** Students will be able to use correct grammar to improve their writing and speaking skills. **PSO3:** Students will review and inculcate moral and ethical values as discussed in the prescribed prose. **PSO4:** Students will improve their analytical power through reading and writing exercises. **PSO5:** Students will learn important business communication through accurate use of language and formats. **PSO6:** Students will be able to demonstrate concepts of creative skills and innovative presentation skills

Course Outcomes B. Sc Compulsory English	
Course Outcome for Semester-I	
UNIT-I: **PROSE** **1. My struggle for an Education: Booker T Washington** **2. Florence Nightingale: Lytton Strachey**	**CO1:** To motivate student to understand the importance of education in one's life. **CO2:** To inspire students through the real-life examples of struggle and success. **CO3:** To inculcate the concept of community service and philanthropy among the youth. **CO4:** To set examples of benevolence and strength through self- worth, self -image and self -identity.
UNIT-II: **PROSE** **1. The Birth of Khadi: Mahatma Gandhi** **2. Go, Kiss the World: Subroto Bagchi**	**CO1:** To integrate and revive the idea of swadeshi moment as a contribution to the development of Indian nationalism. **CO2:** To extend the concept of self-generation and self-reliance and considering clothing as a power changing mechanism in freedom struggle. **CO3:** To introduce the model of Child -Parent Relationship in shaping the life of an individual. **CO4:** To help students identify their role models to learn life skills through them.
UNIT-III: **POETRY** **1. Ulysses: Alfred Tennyson** **2. Yussouf: James Russel Lowell** **3. If: Rudyard Kipling**	**CO1:** To extend the idea of resilience, vigor and self-determination in the youth. **CO2:** To help students understand and incorporate life skills such as bravery, fearlessness, heroism in the times of struggle and hardships. **CO3:** To make students learn the importance of forgiveness and moving ahead in their lives. **CO4:** To help students to evolve as Samaritans and spread the word of fraternity among individuals. **CO5:** To help students to have determination in the face of failure. **CO6:** To provoke students in the direction of sportsmanship in the competitive world.
UNIT-IV: **1. Comprehension of Unseen Passage** **2. Prepositions** **3. Subject-Verb Agreement** **4. Summarizing**	**CO1:** To improvise the comprehension skills through reading and writing. **CO2:** To revise the use of grammar in day-to-day life. **CO3:** To make students explain the idea briefly in their own words.
Course Outcomes B. Sc Compulsory English	
Course Outcome for Semester-II	
UNIT-I: **PROSE** **1.Grassroot innovation and Social Enterprise: Changing Lives**	**CO1:** To introduce the students about inventions through innovations. **CO2:** To inspire students towards innovation through real time success stories. **CO3:** To teach students the life-skills such as focus and

2. The Two Gentlemen of Verona	self-control, facing challenges, making connections etc. **CO4:** To inculcate the habit of hard-work and diligence irrespective of their age.
UNIT –II: **PROSE** **1. The Verger** **2. Synthesis of Science and Spirituality**	**CO1:** To involve students in understanding the basic principles of value education. **CO2:** To impart reasoning of conventional and non-conventional education in one's life. **CO3:** To institute the concept of science and spirituality in the minds of youth. **CO4:** To foster the young minds with connection between science and spirituality.
UNIT -III: **POETRY** **1. Richard Cory** **2. Allow sanity a little space** **3. Refugee Blues**	**CO1:** To share the idea of resilience in face of adversity. **CO2:** To unveil the learners about the evil and dark forces prevalent in this millennial and how one should deal with it. **CO3:** To bring forth the stories of refuges focusing on their accommodating and tolerant behaviors.
UNIT-IV: **WRITING SKILLS** **1. Paragraph Writing** **2. Application and C.V. Writing** **3. Phrasal Verbs**	**CO1:** To inculcate writing skills through idea development strategies. **CO2:** To teach students the skill of writing applications and C.V. **CO3:** To make appropriate use of phrasal verbs to improve language skills.
Course Outcomes B. Sc Supplementary English	
Course Outcome for Semester-I	
UNIT-I: **PROSE** **Short Stories**	**CO1:** To revise the learners with the concepts of compassion, love and care. **CO2:** To convey the students the purpose of life through enlightenment and wisdom. **CO3:** To promote the importance of humour
UNIT -II: **Short stories**	**CO1:** To revise the concepts of wisdom and knowledge in the constant changing world. **CO2:** To expand and explore on the idea freedom and responsibility. **CO3:** To share the views on duality concept of real and fake.
UNIT-III: **Vocabulary Expansion**	**CO1:** To introduce the varied words used in English Language. **CO2:** To maximize the use of different use of vocabulary in reading and writing.
UNIT -IV: **1. Essay writing** **2. Email**	**CO1:** To develop the critical thinking and writing among students on various current issues. **CO2:** To develop email writing skills as a part of formal communication.
Course Outcomes B. Sc Supplementary English	
Course Outcome for Semester-II	
UNIT-I: **Short Stories**	**CO1:** The stories teach how healthy sense of humour can help one deal with tough times. **CO2:** The students learn the pros and cons of having and

	lacking integrity in one's life. **CO3:** To teach the learners the meaning of 'Luxury' and connotations attached to it.
UNIT- II: **Short stories**	**CO1:** To teach the learners how the serious things can also be leant through dark humor. **CO2:** To impart philosophical lessons through the technique of storytelling. **CO3:** To impart that reading can also be an experiential learning process.
UNIT-III: **1. Writing Advertisements** **2. Letter writing**	**CO1:** To make students aware of strategies of Advertisement writing. **CO2:** To guide students how to write different types of formal letters.
UNIT-IV: **1. Story writing based on given outline** **2. Reporting an event**	**CO1:** To develop the creative writing skills through development of story. **CO2:** To develop critical thinking and decision making of the students. **CO3:** To improve report writing skills of the students. **CO4:** To develop comprehension skills of any situation.

HOME SCIENCE

Department of Home Science	After successful completion of three years degree program in the subject Home Science the students are able to:
Program Outcome	**PO1:** Develop sensitivity towards the needs of family and society and cater to them. **PO2:** All round development of the personalities of the members in home & family. **PO3:** Ddevelop in the learner an understanding of the need for healthy environment and skills. **PO4:** Efforts are taken to create and maintain the above attributes amongst students. **PO5:** Develop in them the ability to take care of the nutritional needs of the family members and ensure good, 'Food handling practices **PO6:** Impart in the learner the basic knowledge related to textiles used in the home and develop skills for their optimum utilization **PO7:** Make learners aware of the rights of consumers and instill in them wise purchasing habits **PO8:** Foster understanding of human developmental process and use it to strengthen interpersonal relationships. **PO9:** Orientation with the educational and vocational scope of Home Science and the need to practice/develop entrepreneurship **PO10:** Sensitivity towards some of the major psychological and health problems of the community and the programs of the government to overcome these.
Program Specific Outcomes	**FOOD SCIENCE AND NUTRITION** **PSO1:** Enable to pursue higher education **PSO2:** Understand the role of food and nutrition for the welfare of the community **PSO3:** Excel in the area of personal & public health nutrition **PSO4:** Apply skill-based knowledge in food industry **PSO5:** Acquire entrepreneurial skills in the field of food science & nutrition **PSO6:** Public health nutrition for employment in state & central government **HUMAN DEVELOPMENT** **PSO1:** Describe how individuals change from Womb to Tomb **PSO2:** Relate principles of human development with self, family & society **PSO3:** Apply methods of teaching and training towards administration of early learning centers **PSO4:** Appraise & identify life situations in need to referral services **PSO5:** Manage life crisis at every life span **PSO6:** Demonstrate skills to assess human behavior

	PSO7: Advocate domain specific programs& policies **PSO8:** Become Entrepreneurs in establishing learning center **TEXTILES & LAUNDRY** **PSO1:** Gain knowledge in Textile Production Techniques **PSO2:** Acquire skill in textile dyeing and printing **PSO3:** Equipped with skill as a designer **PSO4:** Acquire dexterity in Surface Design & Apparel Construction **PSO5:** Acquire entrepreneurial skills in textiles & fashion **FAMILY RESOURCE MANAGEMENT** **PSO1:** Students exhibit efficient resource use at home & work as they learn management of resources **PSO2:** Act as proactive agents of change **PSO3:** Career options like Hotel Management, Event Management, Front Office Management, Designing Interiors **PSO4:** Role of able designers **PSO5:** Achieve social advancement through value education and family management concept. **PSO6:** Acquire professional skills in financial management and control, designing of interiors and work places and equipment, institutional management and rendering consumer services. **PSO7:** Develop entrepreneurship skills and self-employment potential. **EXTENSION EDUCATION** **PSO1:** Competency in Rural Development Practices Impart skill training programmes **PSO2:** Get sensitized on issues of society **PSO3:** Acquire skill and attitude to work with communities
Course Outcome for Semester-I	
PAPER-I: FUNDAMENTALS OF FOOD SCIENCE AND NUTRITION-1	**CO1:** To study the introduction of food and nutrition, basic terms used in Food and Nutrition. Definitions-Foods, Nutrition, Optimum nutrition, Nutritional status, Nutrients and Health **CO2:** To know the functions of food-Physiological, psychological and social **CO3:** To learn characteristics of basic food groups and their contribution to the diet **CO4:** To know about nutrients and their type (Macronutrient / Micronutrient) **CO5:** To study thermodynamic effect of food (SDA) and Scope of Nutrition. **CO6:** To study definition, Concept and factors affecting balanced diet **CO7:** To learn Recommended Dietary Allowances (RDAs) of the ICMR for the different food groups for various life stages. **CO8:** To understand the term Energy: Definition and factors affecting BMR. Units of measuring food energy: Calorie, kilo-calorie, joule, kilo-joule and mega- joule **CO9:** To study Energy measurement of food (Bomb calorimeter) **CO10:** To study Carbohydrates – Definition, classifications,

	functions, sources, digestion and absorption and deficiency states. **CO11:** To learn about Fiber- Definition, Types of dietary fiber and sources. Role of fiber in prevention of diseases **CO12:** To study Protein- Definition, classifications, functions, sources, digestion and absorption and deficiency states Protein sparing action of carbohydrates **CO13:** To learn Fats - Definition, classifications, functions, sources, digestion and absorption and deficiency states.
PAPER-II: FUNDAMENTALS OF HUMAN DEVELOPMENT	**CO1:** Students learn basic concepts, meaning and definitions to study the relevance &scope of the subject of Human Development. **CO2:** Acquire the knowledge of Governmental level projects, schemes and centers where the Human Developmentalist can apply and use knowledge. **CO3:** Concept of child and family welfare Schemes. **CO4:** children with special needs **CO5:** Students learn the twin processes namely growth and development to understand how human beings undergo changes. **CO6:** theoretical perspective and biological and environmental aspects responsible for the developmental changes. **CO7:** Students gain the Knowledge of important life span and stages **CO8:** Importance of prenatal stage, imp of prenatal care, factors governing the prenatal Development. **CO9:** Concept of WHO concept of Child friendly hospitals. **CO10:** Students understand the term neonatal Stage of Development. CO11: Concepts like caring the new born, health and well- being are dealt with special emphasis and relevance.
PAPER-III: FUNDAMENTALS OF TEXTILES AND CLOTHING	**CO1:** To study the basic knowledge of Textiles **CO2:** To know the scope and importance of clothing. **CO3:** To learn more about classification of textiles fiber manufacturing process. **CO4:** To know different factors affecting clothing. **CO5:** To study the various tools required for garment construction and drafting methods **CO6:** To learn different parts, functions and care of sewing machine. **CO7:** To acquire knowledge for preparation of cloth for clothing construction.
PAPER-IV: FUNDAMENTALS OF FAMILY RESOURCE MANAGEMENT	**CO1:** Exercise and demonstrate use and mastery of the elements of design, recognize elements of design in works of art **CO2:** Develop aesthetic sense and to be good art consumer, selecting appropriate concepts and forms of art **CO3:** Understand the significance of management **CO4:** Develop the ability to evaluate the management efficiency and effectiveness in the family and other organizations. **CO5:** Successful integration of the three objectives of aesthetic

	planning which are beauty, expressiveness and functionalism
PAPER-V: FUNDAMENTAL OF HOMES CIENCE EXTENSION	**CO1:** To gain the knowledge regarding types of education **CO2:** To understand the field of extension education& objectives principle, fields & essential links in the chain of Rural Development. **CO3:** To know Philosophy of Home Science & it's scope **CO4:** To understand Home Science Extension Objectives and Characteristics **CO5:** To learn Rural Sociology - Meaning of sociology and Rural Sociology, Scope of Rural Sociology **CO6:** To know Rural Society - Characteristics of Rural Society, rural social groups, Classification of Social groups. **CO7:** To know Social Problems, studying social problems. **CO8:** To understand Social Problems like poverty, Problems of population explosion, Caste tension, Problem of Unemployment, Poor Health & sanitation, Problems of tribal and solutions to the problems faced.
PAPPER-VI: ECOLOGY AND ENVIRONMENT-I	**CO1:** To get acquainted with the physical environment and its components. **CO2:** To know the methods to protect the environment and conserve natural resources **CO3:** To know the ecosystem, ecology, food chain, food web and ecological pyramids. **CO4:** To get acquainted with various biogeochemical cycles, like oxygen cycle, carbon cycle, nitrogen cycle, hydrological cycle, etc. **CO5:** To know the renewable and non-renewable natural resources, national parks and sanctuaries and conservation of wild life. **CO6:** To know the various types of pollutions and its control measures.
Lab Work:	• To understand the determination of hydrogen ion concentration (pH) and DO • To study the estimation of acidity and chlorosis of water • To get acquainted with the lay-out and plan of a garden
PAPER-VII: BASIC CHEMISTRY-I	**CO1:** To know the importance of pure water, impurities present in water, sources of water pollution, ions responsible for hardness of water **CO2:** Methods used for purification of water for domestic purpose and commonly used methods are sterilization: boiling, chlorination **CO3:** To understand the use of Alloy: Classification of alloy (ferrous and Non-ferrous), purpose of making an alloy **CO4:** To gain knowledge of Effect of alloying various elements on properties of steel, composition and uses of stainless steel and brass. **CO5:** To know how to prepared Solutions during practical's: Types of solutions, different ways of expressing concentration of

	solution (equivalent weight, molecular weight, normality and molarity) **CO6:** To understand Physical Properties of Liquids: Surface tension (definition, determination of surface tension by Stalagmometer method). Viscosity (definition, determination by Ostwald‟s Viscometer). **CO7:** To gain knowledge about the Colloids: Definition, types of colloidal systems, Types of colloidal solution, methods of preparation, properties (Tyndall Effect, Brownian Movement, Electrophoresis, Electro-osmosis) and colloids in daily life (applications) **CO8:** To know the Emulsion and gel: definition, types, methods of preparation, properties and its applications.
Lab Work:	• To know the • Types of analysis used in chemistry analysis • A) Volumetric analysis: 1. Single acid base titration, Determine the Normality and weight per litre 2. Determination of total and permanent hardness of water by EDTA titration. B) Physical Experiments 1) Determination of viscosity of given liquid by Ostwald‟s Viscometer. 2) Determination of Surface tension of given liquid by Stalagmometer. 3) Preparation of colloidal solution of starch
Paper –VIII: Applied Physics and Basic Computer-I	**CO1:** Measurements, system for measurements, basic concepts and least count of any instrument, scalar and vector quantities. **CO2:** To know the fundamental and derived quantities and their units. **CO3:** Basic Newtonian mechanics, concept of centripetal and centrifugal forces and their uses. **CO4:** Concept of friction and related applicability. **CO5:** Computer basics and its characteristics. Unit of memory, working of individual computer peripherals and related concepts.
Paper-IX: English and Communication Skills	**CO1:** To prepare the students to communicate effectively and fluently in English. **CO2:** To enable students listening, speaking reading and writing. **CO3:** To strengthen grammatical accuracy **CO4:** To prepare the students to deal with customers, professional, counselors in correct grammatical, idiomatic English. **CO5:** To provide personality development training through situational role play, interview techniques, group discussions, seminar presentation etc.
Course Outcome for Semester-II	
PAPER-I: FUNDAMENTALS OF	**CO1:** To study Vitamins - Classification of Vitamins **CO2:** To learn Fat Soluble Vitamins: Functions, Sources and

FOOD SCIENCE AND NUTRITION-II	Deficiency **CO3:** To learn Water Soluble Vitamins: To study their Functions, Sources and Deficiency **CO4:** To study Minerals, Functions, Sources and Deficiency **CO5:** To learn about Major Mineral and trace elements **CO6:** Learn functions of water in human body, water balance, sources of water, effect of dehydration and its prevention. **CO7:** Methods of Cooking: Objectives of cooking food, advantages of cooking food, different cooking methods and different cooking media and effect of different cooking methods on nutritive value of food
PAPER-II: DEVELOPMENT IN EARLY YEARS	**CO1:** Concept of Early years of child development as important years of life, Infancy stage of development - students understand the terms development tasks &milestones in reference with different developmental aspects. **CO2:** Students gain the knowledge of the growing capacities of infants and the overall developmental changes. **CO3:** Students gain the knowledge of norms and associated changes in physical, social, cognitive, language, emotional, intellectual capacities with change in moral aspects. **CO4:** Students gain the concept of ECCE, objectives and importance cognitive & language growth and conditions facilitating for healthy growth & development.
PAPER-III: SEWING TECHNIQUES	**CO1:** To understand the importance and necessity of various construction techniques for different fabrics. **CO2:** To acquire knowledge the skills to apply those construction techniques in a sample from. **CO3:** To acquire knowledge and skill regarding stitching techniques for various garment components such as plackets, pockets, cuffs, collars and fasteners which are ultimately used for stitching of any garments. **CO4:** To learn different fashion accessories like headgears, footwear, Handbags. **CO5:** To study types and use of jewelry.
PAPER-IV: INTERIOR DECORATION & DESIGN	**CO1:** Develop skill in using colour to create different effects in pace, with the use of various colour schemes. **CO2:** Gain knowledge of flowers / floral decoration and arrangement. **CO3:** Development of efficient and cost-effective room and floor plans that meet the needs of residential and/or commercial clients. **CO4:** Create a space that is stylish and is comfortable. A functional space that ticks off the ergonomic requirements of us and also looks pleasant. **CO5:** Learners will develop skills that will enable them to plan or assist in the planning of their own living space area and décor, or may provide a foundation for a career in this field.
PAPER-V: SOCIALSURVEY AND	**CO1:** To learn about History of Community Development **CO2:** To understand elements of community development: Role of community development worker

COMMUNITY DEVELOPMENT	**CO3:** To know Community development programmes: Shriniketan rural reconstruction Gurgaon experiment & Etawah pilot project b) Indian village service **CO4:** To understand the term Social Survey & its importance **CO5:** To gain knowledge regarding Social Research. **CO6:** To learn Gender and Development meaning of Sex ratio. **CO7:** To understand Poverty Alleviation Programmes: Efforts taken by Government agencies. **CO8:** To understand eradication of poverty-a) National Rural Health Mission b) Integrated Child Development scheme
PAPPER-VI: ECOLOGY AND ENVIRONMENT-II	**CO1:** To know the development of gardens and nurseries, its importance and entrepreneurship. **CO2:** To study the different ornamental plants used in gardens, nurseries and kitchen gardens **CO3:** To study the different plant propagation techniques and garden implements & accessories **CO4:** To know the method of vermiculture and vermicomposting
Lab Work:	• To get acquainted with methods of gardening and methods of plant propagation • To study the technique of mushroom cultivation and vermicomposting.
PAPER-VII: BASIC CHEMISTRY-II	**CO1:** To know which type of Fuels: Definition, classification, characteristics of good fuel, calorific value, preparation of Gober gas. **CO2:** To know the concept, importance, and process of Crude petroleum and its refining by fractional distillation, cracking of petroleum, composition and application of LPG, Precautions while using LPG **CO3:** To Know Acid and base: Concept of acid, base and salt, (Arrhenius theory and Lowry and Bronsted Theory), Conjugate pair, neutralization reaction. **CO4:** To know pH and pH scale, (Numerical on pH scale) Buffer solution and its applications in everyday life. **CO5: T**o know Organic Compounds: Definition, saturated and unsaturated hydrocarbon, classification of organic compounds based on their structure and functional groups. Definition of alkane, alkene and alkyne with examples. **CO6:** To Understand Homologous series, IUPAC nomenclature of alkane, Laboratory preparation, chemical properties and uses of methane and ethylene. **CO7**: Corrosion: Definition, atmospheric corrosion (Corrosion by oxidation and by other gases). Factors causing atmospheric corrosion, **CO8:** Methods for protection of metals from corrosion (Galvanizing, tinning and electroplating).
Lab Work:	• To estimate the Haemoglobin percentage. • To understand the life cycles of parasites. (*Entamoeba histolytica*, Roundworm, *Plasmodium vivax* and *Plasmodium*

	falciparum, *Wuchereria bancrofti*)
Paper-VIII: Applied Physics and Basic Computer - II	**CO1:** Concept of basic electricity, ohm's law, resistance measurements in different combinations, simple calculations therein. **CO2:** Light and electromagnetic wave. Concept of reflection, refraction and absorption, Physical phenomenon related to natural phenomenon such as reflection, transparency, opaqueness etc. **CO3:** Lens and related optics, use of these principles for human eye assistance. **CO4:** X-rays, their principle, generation and applicability. Harmful radiations such as alpha, beta and gamma rays, their characteristics and properties including their applicability. Computer hardware and peripherals of computer system with details of different types of printers.
Course Outcome for Semester-III	
PAPER-I: COMMUNITY NUTRITION	**CO1:** To understand malnutrition, its types, causes, symptoms, prevalence and nutritional problems due to malnutrition. **CO2:** To understand the basic principles of nutritional assessment as applied to the study of community nutrition. **CO3:** To understand the role of National organizations and international organizations (ICAR, ICMR, NIN, CFTRI) and (FAO, WHO, UNICEF, CARE) in community nutrition and health. **CO4:** To understand the importance, objectives and methods of evaluation of nutrition education. To know the problems and develop solutions in organizing nutrition education programme. **CO5:** To become familiar with the ongoing schemes and programmes for combating nutrition-related problems in the country – National Nutrition Programme. **CO6:** To develop an understanding of the principles underlying Food Preservation, Food Fermentation, Leavening Agents and Food Additives.
PAPER-II: DEVELOPMENT IN LATE CHILDHOOD AND ADOLESCENCE	**CO1:** Students learn the significant Developmental Changes & aspects of development in terms of Physical attainments, Motor Skills, Changing CO1: Emotions with importance of Emotional self-regulation, changes in self-concept & importance of Self Esteem, need for attaining basic growth &building self-confidence through their capacities they master during Childhood. **CO2:** Students also learn the media with its influence on child's development. Relationships within family & outside influencing the child & his potentialities **CO3:** Students learn the pattern of cognitive & language growth within the conditions & factors facilitating development & theoretical implications & perspective supportive to it. Students gain the growth in terms of morality & moral

	reasoning acquired during this phase of life. **CO4:** Students learn the physical changes that occur during the Puberty phase of life & the effect of puberty changes. They learn the term & meaning of Adolescence with the growth spurt during this period of life & concepts like attaining Physical maturity Sexual maturity & Adolescent as a transitional Period. Need of Sex Education. **CO5:** Students learn the pattern of changes in respect to intellectual growth, Cognitive abilities, creative accomplishments & factors for developing creative mind. Adolescent and language accomplishments, also the concept of need of identity, search for identity with parental & factors to determine it. Students get to understand the importance of healthy parent adolescent relationships, Peer relations & it's positive advantages & adjustments.
PAPER-III: TEXTILE DESIGN	**CO1:** Study natural dyes and its importance **CO2:** Study synthetic dyes and their uses **CO3:** Study methods of dyeing **CO4:** Study common dyeing defects their remedies **CO5:** Study dye application **CO6:** Study the concept of dyeing and printing, Study different methods of printing, Study common printing defects and remedy **CO7:** Study preparation of cloth for printing, Study after treatment of printing goods. **CO8:** Study paint textile of India &Study traditional print textile of India **CO9:** Study traditional woven textile of India, Study techniques used in woven textile, Study colour, yarn and motif used in a saree & shawls of India. **CO10:** Study costumes of different states of India. **CO11:** Study draping style of traditional costumes of India.
PAPER-IV: **HOUSING AND INTERIOR DECORATION**	**CO1:** Learners understand regarding housing needs, Principles, Planning of house **CO2:** Experimenting with space, Preparing house plans. **CO3:** Develop graphic skills to express ideas in design, forms, and economic use of space. **CO4:** Implement Decision about applicable design principles in Interior Decoration. **CO5:** Implement decisions about Furniture selection and arrangement in available space.
PAPER-V: EXTENSION COMMUNICATION TECHNIQUE	**CO1:** To understand Extension teaching: Definition of extension teaching, principles of extension teaching. **CO2:** To know Extension teaching process: Teaching plan, Role of teacher in different levels, **CO3:** To study Extension learning process: Definition of extension learning, Learning experience, **CO4:** To gain knowledge on Psychology of learning Types of learning. **CO5:** To know Extension teaching methods

	CO6: To gain Approaches in Extension: Meaning, Strong and weak points of interpersonal. **CO7:** To study Interpersonal approach: Home visit, office call, personal letter and telephone. **CO8:** To understand Art of Presentation: Meaning, five basic steps of presentation and equipment ofcampaign work. **CO9:** Devices useful for effective communication: Over Head projector, opaque projector, DVD, LCD.
PAPER-VI: APPLIED PHYSIOLOGY	**CO1:** Students are able to get knowledge of the cell structure and function, histology, gross anatomy, and physiology of several organ systems. **CO2:** Students are able to understand structure and function of various organs and organ systems like nervous system of human body. **CO3:** It provides basic knowledge of first aid.
Lab Work:	• Students are able to know about bones and joints • Application of triangular bandage and roller bandage. • Artificial respiration
PAPER-VII: APPLIED CHEMISTRY	**CO1:** To know Carbohydrates: Definition, classification, open chain structure of glucose and fructose. **CO2:** To know Manufacture of cane sugar, optical isomerism of asymmetric carbon atom, plane polarised light, dextro and leavo rotatory compounds. **CO3:** To know Fermentation: Definition, ideal conditions for fermentation, application of fermentation. **CO4:** To know Preparation of vinegar and ethanol by fermentation process. **CO5:** To know Oils and Fats: Definition, difference between oils and fats, saponification value, iodine value, rancidity and hydrogenation of oils, refining of edible oil, naturally occurring fatty acids (saturated and unsaturated), essential and non-essential fatty acids. Omega names of MUFA and PUFA. **CO6:** To know Soap and Detergents: Definition, types of soap, Industrial method of preparation of soap, cleansing action of soap. **CO7:** To know Difference between soap and detergents, composition of detergent., Liquid detergents.
Lab Work:	• Preparations of cosmetics: i) Shampoo (Simple and herbal) ii) Perfumes • Preparation of dyes and drug: • Methyl salicylate from salicylic acid. • Orange dye from beta naphthol and aniline or p- toluidine compare the cleansing action of detergents/ shampoo by Stalagmometer • To know How to use of physical balance. • Preparation of standard solution for titration. Identification of Carbohydrates: Glucose, fructose, sucrose and starch • Determination of total fatty acid present in given sample of soap.

	• Determination of total alkali present in given sample of soap
Paper-VIII: APPLIED PHYSICS AND COMPUTER APPLICATIONS-1	**CO1:** To learn about electricity related basic parameters, electrical safety and related devices. **CO2:** Principle of heat, its conduction, Conversion of electricity into heat, heat-based appliances. **CO3:** Computer system and its operating, word processing software (MS WORD) and database creation and management software (MS EXCEL)
Course Outcome for Semester – IV	
PAPER-I: COMMUNITY NUTRITION	**CO1:** To learn principles of meal planning. To plan and calculate balanced diets for family members **CO2:** Concept of RDA, Recommended set- up, Reference persons and RDA **CO3:** Principles and advantages of meal planning Diet planning with reference to special individual requirements **CO4:** Nutrition during adulthood: a) Balanced diet for adult man and women. b) Nutritional requirements c) Dietary guidelines for adults **CO5:** To know Nutrition during pregnancy and lactation a) Physiological changes during pregnancy b) Desirable weight gain c) Nutritional requirements and their importance d) Diet during pregnancy e) Dietary guidelines for pregnancy **CO6:** Nutrition during infancy: a) Growth and development during infancy and Nutritional requirements b) Advantages of breast feeding **CO7:** Importance of Weaning & Supplementary foods **CO8:** Understand Nutrition during: 1. Preschool children 2. School going children, a) Growth and development b) Nutritional requirements c) Dietary guidelines for children **CO9:** Nutrition during Adolescence: a) Growth and Development during adolescence b) Nutritional requirements c) Dietary guidelines for adolescent **CO10:** Geriatric nutrition
PAPER-II: DEVELOPMENT IN ADULTHOOD	**CO1:** Concept of who is an adult? adulthood stage - biological and physiological perspective, diversity in adult lifestyle, cultural variations in roles & expectations **CO2:** Adult life span changes namely physical & cognitive. adult development of self-identity – psycho-social changes within the framework of work, career, parenthood, family marriage. **CO3:** Middle age changes concept of physiology; health. cognitive

	changes in cognitive skills, middle age as time of crisis students understands the importance of age as age of generativity, expertise and experience. concept of aging-approaching retirement, changes and adjustment needed. society and community attachment with an effective social role. **CO4:** Concept of aging, demographic status, sensitizing towards age related issues and adjustments. importance of recreation and wellness in late adulthood. understanding age specific needs: specific problems of elderly concept of retirement homes and dwelling. **CO5:** Governmental policies and welfare schemes for senior citizens
PAPER-III: SURFACE ORNAMENTATION TECHNIQUES	**CO1:** Study natural dyes and their importance, study of synthetic dyes and their uses. **CO2:** Study methods of dyeing **CO3:** Study common dyeing defects their remedies. **CO4:** Study dye application **CO5:** Study the concept of dyeing and printing. **CO6:** Study different styles of printing. study different methods of printing. **CO7:** Study new methods of printing. **CO8:** Study common printing defects and remedy. **CO9:** Study preparation of cloth for printing. **CO10:** Study types of printing used in printing **CO11:** Study after treatment of printing goods. **CO12:** Study painted textile of india. **CO13:** Study traditional printed textile of india. **CO14:** Study traditional woven textile of india. **CO15:** Study techniques used in woven textile. **CO16:** Study colour, yarn and motif used in sarees, shawls of india. **CO17:** Study costumes of different states of india. **CO18:** Study draping style of traditional costumes of india.
PAPER-IV: HOUSING AND HOME FURNISHING	**CO1:** Implement decisions about housing and furnishings. **CO2:** Learner gain knowledge about the role of internal amenities in contributing for satisfying family living. **CO3:** Learn techniques that will help one to construct some furnishing items, relative to their function and decorative purposes. **CO4:** Learn concept of natural and artificial lighting in relation to housing and its plan. **CO5:** Learn concept of waste management and its techniques.
PAPER-V: MEDIA IN EXTENSION	**CO1:** To understand communication techniques **CO2:** To gain knowledge on mass communication andmedia. **CO3:** To know media in extension: meaning of media,electronic media, print media, and folk media. **CO4:** To study electronic media: radio as mass medium, **CO5:** To learn print media - types of print media, impactof print media

	CO6: To gain knowledge on folk media. folk forms as mass media, Indian folk forms. **CO7:** To understand advertisement as mass media. **CO8:** To gain knowledge journalism in extension.
Paper-VI: APPLIED PHYSIOLOGY-II	**CO1**-Students get knowledge about structure and function of heart, valves blood vessels **CO2**-students are able to understand about digestive system, respiratory system and excretory system **CO3**-students also know about endocrine system and reproductive system.
PAPER-VII: APPLIED CHEMISTRY-II	**CO1:** To know Polymers: Definition, addition and condensation polymerization, preparation and uses of polyethylene, PVC, Nylon-6, Nylon-66 and polyester. **CO2:** To know Rubber: Definition, chemical nature and vulcanization, synthetic rubber (Buna-S) and uses. **CO3:** To understand, Textile Chemistry: Definition, Requisite of a true dye, Types of fibres: structure features of fibres (Cotton, wool, silk, cellulose acetate, polyaminde, polyesters), Basic operations in dyeing process (preparation of the fibre, preparation of dye bath, application of dye and finishing), Various methods of dyeing (direct dyeing, vat dyeing, Mordant Dyeing, and disperse dyeing). **CO4:** To know Witts theory of colour and constitution, classification of dyes based on their functional group- i) Nitro ii) Nitroso and iii) Azo, pollution problem due to dye industry **CO5:** To know Cosmetics: Definition, functions and ingredients of shampoo, face powder, cold cream, lipstick, hazards of cosmetics. **CO6:** To Know Drugs: Preparation and uses of following drugs: i) Aspirin ii) Paracetamol and iii) oil of winter green. **CO7:** To know Essential oils: Definition, occurrence and methods of extraction of essential oils. Eucalyptus oil, Rose oil, Lavender essential oil **CO8:** To know Perfumes: Definition, characteristics of perfume, composition of perfumes, formulation of any two perfumes.
Lab Work:	• Titration of strong acid vs strong base (Acid-base double titration) • Determination of pH of different solutions by using pH paper Detection of functional group Acids, Alcohols, Aldehydes and Ketones. • Preparation of acidic and basic buffer solution
Paper-VIII: APPLIED PHYSICS AND COMPUTER APPLICATIONS-II	**CO1:** To learn about electricity, effects of electric current, electromagnetism principle and devices based on it such as transformer and motors, their working. **CO2:** Motor based electrical appliances, chemical effect of electric current, conversion of chemical energy into electric energy, batteries and electrochemical platting. **CO3:** MS power point and internet related knowledge.

Course Out Come for Semester - V	
PAPER-I: DIET THERAPY- I	**CO1:** To provide knowledge about causes And Symptoms Of Various diseases. **CO2:** Understand the role of diet. **CO3:** To plan, calculate and prepare diets for various diseases, to learn principles of diet therapy **CO4:** Diet counselling, role of dietician in health care, dietetic care in hospital patients and its importance, Understanding of therapeutic adaptations of the normal diet: A) Soft Diet B) Clear Liquid Diet C) Liquid Diet D) Bland Diet E) Low Fibre Diet F) High Fibre Diet To understand modes of feeding: A) Enteral B) Parental **CO5:** To know concept of weight management: overweight and obesity causes, symptoms and principles of dietary management of overweight and obesity, concept of underweight **CO6:** Understanding and importance of various gastrointestinal disorders -dietary management of gastro-intestinal disorder, peptic ulcer, diarrhoea, constipation & ulcerative colitis **CO7:** Liver disorders and gall bladder disorders: dietary disorders – viral hepatitis, liver cirrhosis, hepatic coma
PAPER-II: FAMILY DYANAMICS AND DEVELOPMENTAL ASSESSMENT	**CO1:** Students learn the concept of marriage, changing concept of marriage, forms of marriage, eugenics and other considerations in mate selection. Concepts like preparation and readiness for marriage. Pre-marriage Counseling – Need and Importance. **CO2:** Family as a nuclear unit of society. Changing trend, changing concept of family in terms of structure, constitution, roles, demands and responsibilities, students become aware of functions and conceptualize the need of healthy interpersonal relationships, parental techniques, rearing pattern, need of child disciplinary methods. Students are trained to understand the possibilities of crisis situation within a family with a need to crisis resolution. Students learn the expected adjustments within the family stage namely establishing, expanding and contracting stage. **CO3:** Students acquire the knowledge of assessment, need and purpose along with the concept of developmental milestone as benchmarks to development. Acquire the skills to perform certain tests understanding tools techniques of infant testing need of neurological assessment; need for assessing auditory & visual impairment. **CO4:** Students get acquainted with the need of role of early stimulation developmental activities for raising social, cognitive, emotional physical motor skills, language behavior. Home intervention; concept of early intervention in developmental delay. Ngo's and governmental level programmes, policies of early stimulation (birth to six years of age) with its application for normal and children with special

	needs.
PAPER-III: ADVANCE PATTERN MAKING	**CO1:** Develop skilled pattern making **CO2:** Study commercial pattern envelope **CO3:** Study important marking in pattern making. **CO4:** Study different layouts and their uses. **CO5:** Methods of fabric estimation. **CO6:** Study different methods of pattern designing. **CO7:** Study grading, its principles. **CO8:** Study draping and its importance in designing. **CO9:** Study different layouts and their uses. **CO10:** Study flat pattern and its uses. **CO11:** Study darts and its manipulation and methods. **CO12:** Study types of figures and its defects. **CO13:** Study principles of design and its effect. **CO14:** Study of fitting problems and their remedy. **CO15:** Study of different texture on different type of figure. **CO16:** Study different plackets and its application. **CO17:** Study skirts and waist band its application. **CO18:** Study collars, classification and types. **CO19:** Study different fabric construction techniques. **CO20:** Designing garment by using different types of fabric.
PAPER-IV: ADVANCED RESOURCE MANAGEMENT II	**CO1:** Learners gain knowledge about different types, scope, role and Management of resources in relation to Human Life. **CO2:** Learners recognize the importance of wise use of resources in order to reach personal and family goals. **CO3:** Learners understand the importance of motivating factors in management –values, goals and standards. **CO4:** Develop ability to take rational decisions. **CO5:** Develop the ability to evaluate the management efficiency and effectiveness in the family and other organizations.
PAPER-V: PROGRAMME PLANNING & BUILDING IN EXTENSION	**CO1:** To learn Program planning for extension work. **CO2:** To study Program building in extension **CO3:** To understand Community organization: **CO4:** To gain knowledge about innovations in communication, The SMCRE model, Diffusion, Relation between Communication **CO5:** To learn Innovation Decision Process, Innovativeness, and stages involved in adoption process. **CO6:** To gain knowledge on Information from communication media. **CO7:** To understand Group Mobilization, Definition of social groups, occasions of group association, groups in rural communities. **CO8:** To understand the concept of change agent, Meaning & traits of change agents, role of change agents.
PAPER-VI: NUTRITIONAL BIOCHEMISTRY-I	**CO1:** Develop an understanding of the principals of biochemistry (as applicable to human nutrition) **CO2:** Obtain an insight into the chemistry of major nutrients like

	carbohydrates, proteins and lipids and physiologically important compounds. **CO3:** Understand the biological processes and systems as applicable to humannutrition. **CO4:** Understanding the basic Sources, structure, physical properties and uses of macro nutrients **CO5:** To know about the importance of nucleic acids, Structure of a mononucleotide. Bases found in nucleic acids. Difference between RNA and DNA and their functions. Structures of DNAs & RNAs and also understanding the concept of Base pairing rule. **CO6:** Apply the knowledge acquired to human nutrition and dietetics **CO7:** To understand the concept of HighEnergy compounds ATP & ADP **CO8:** To understand the aspects like Inborn errors of metabolism like Sickle cell anemia &Gout.
Lab Work:	• To know the color reactions of carbohydrates and proteins • To understand the procedure of Preparation of Potato Starch andidentify with solubility test and color Reactions • To understand action of Ptyalin (Salivary Amylase) on Starch.
PAPER-VII: HEALTH SCIENCE AND HYGINE	**CO1:** To understand the concepts of Infection, contamination, host, communicable and non-communicable diseases, source of infection, and Incubation period. **CO2:** To know the types of communicable and non-communicable diseases. **CO3:** To understand the modes of transmission of disease- Direct and Indirect. **CO4:** To gain knowledge of measures taken for the prevention and control of diseases. **CO5:** To understand the aims, objectives, principles of Health Education and to know the role of communication in Health Education **CO6:** To understand the concepts of disinfection, sterilization, disinfectant, antiseptic, and deodorant and to know about the types of disinfectants. **CO7:** To gain knowledge about the principles and work of WHO and UNICEF. **CO8:** To understand the implication of drug addiction, Narcotics, Alcoholism, smoking, their control, and prevention. **CO9:** To understand the definition, necessity, advantages, and methods of family planning. **CO10:** To understand the concepts of Birth rate, Death rate, and Census. **CO11:** To understand the various aspects of Geriatrics

Lab Work:	• To know the different commonly used insecticides and disinfectants. • To identify and determine the count of different blood cells.
Course Outcome for Semester - VI	
PAPER-I: DIET THERAPY-II	**CO1:** Dietary management in a) Fever b) Anaemia c) Surgery d) Burns e) Cancer f) Food Allergy **CO2:** Diabetes Mellitus: dietary management of diabetes mellitus a) Role of diet in the management of IDDM and NIDDM b) Complications of diabetes mellitus **CO3:** Food exchange list-use of food exchange list in meal planning of diabetic people, hypertensive people **CO4:** Dietary management of coronary heart diseases **CO5:** Renal Disorders - dietary management in special conditions
PAPER-II: CARE AND WELL BEING IN HUMAN DEVELOPMENT	**CO1:** Students understand the relevance of care & concept of holistic well-being understand the need of care giving for attaining wellness with special attention to vulnerabilities (age specific). How to draw meaning of subjective wellbeing? its implication in understanding quality of life. **CO2:** Students are taught the need to understand Critical Issues in Infancy period, childhood adolescence. concept of wellness with the role & importance of health care, nutritional psychological counseling. **CO3:** Concept of care & well-being in adulthood with understanding the needs of elderly concept of wellness at different stages of work domains in adulthood, health care. **CO4:** Students acquire the need of facilities provisions & amp; policies at community, state and national level for promoting wellbeing. Important need-based health programme for the holistic approach to wellbeing under the broad spectrum of care
PAPER- III: FASHION DESIGING	**CO1:** Study fashion terminology **CO2:** Fashion movement **CO3:** Study theories of fashion adoption, trends in India. **CO4:** Study fashion classification, fashion cycle. **CO5:** Study factors influencing fashion. **CO6:** To learn process of fashion design **CO7:** To know the origin of fashion and clothing theories. **CO8:** To study clothing theories. **CO9:** To study different silhouettes in fashion. **CO10:** To know international fashion centers and fashion categories. **CO11:** To study fashion leaders, followers. **CO12:** To learn role of clothing in social, cultural scenario. **CO13:** To know the clothing and gender differentiation. **CO14:** To study different departments in apparel production and their working **CO15:** To know the marketing and merchandizing of fashion **CO16:** To study fashion forecasting. **CO17:** To learn different style and methods of fashion advertisement.

PAPER-IV: ADVANCED RESORCE MANAGEMENT-II	**CO1:** Learners develop ability to manage various resources. Developing ability to apply management principles in experimental house and in day today life experience and various small events. **CO2:** Learn the concept and application of entrepreneurship skills in Management. **CO3:** Learners develop ability to apply work simplification techniques. **CO4:** Creating awareness regarding intelligent choices of consumer goods.
PAPER-V: COMMUNITY DEVELOPMENT AND MANAGEMENT	**CO1:** To understand leadership in extension, motivation for extension work, to study extension training, to understand the concept of coordination in extension work. **CO2:** To gain knowledge regarding community development, Participatory Approach in community development, To understand Extension Administration **CO3:** To gain knowledge on Extension monitoring evaluation Meaning of monitoring evaluation.
PAPER-VI: NUTRITIONAL BIOCHEMISTRY-II	**CO1:** To understand the concept of Anabolism and Catabolism & its relation tonutrition. **CO2:** To know the concept of Carbohydrate, protein and lipid Metabolism**:** Absorption, transport and assimilation. **CO3:** To introduce definition and significance of intermediary metabolism like Glycolysis, Kreb's cycle (Detail process of energy and energetics), Glycogenesis and Gluconeogenesis **CO4:** To understand the concept of blood sugar regulation: hypoglycemia, hyperglycemia and renal threshold andGlucose Tolerance Test **CO5:** To introduce, definition, process and importance of: Transamination, Oxidative Deamination and Urea Formation. **CO6:** To know the classification of Enzymes according to IUB system. Effect of temperature and pH on the activity of enzymes. **CO7:** To understand the concept of Lipidprofile (Cholesterol, Bile acids, Triglycerides) & Health status. **CO8:** To know the definition of: Lipogenesis and Hyperlipidemia. Formation of Ketone bodies in diabetics. Elementary idea of Beta Oxidation.
Lab Work:	• To know the color reactions ofcarbohydrates and proteins • To understand the procedure of Preparation of Potato Starch and identify with solubility test and colorReactions • To understand action of Ptyalin(Salivary Amylase) on Starch.
PAPER-VII: PUBLIC HEALTH	**CO1:** To understand the basic concept, structure, and classification of bacteria and viruses. **CO2:** To know the concept, importance, and process of Gram Staining. **CO3:** To understand aspects like etiology, diagnosis, treatment, and prevention of non-communicable diseases – Diabetes mellitus and Nephrotic Syndrome

	CO4: To know the aspects like the causative agent, mode of transmission, epidemiology, diagnosis, treatment, prevention, and control of communicable diseases - Hepatitis, Cholera, Typhoid, Dysentery, Tuberculosis, Poliomyelitis, Measles. **CO5:** To understand the aspects like the causative agent, mode of transmission, epidemiology, life cycle, diagnosis, treatment, prevention, and control of parasitic infections (Amoebiasis & Ascariasis) and diseases spread by insects (Malaria & Filaria). **CO6:** To understand the classification and mechanism of immunity. **CO7:** To understand the concept of vaccines and to know the routine immunization schedule. **CO8:** To understand antibiotics and their classification
Lab Work:	• To understand the morphology and structure of different microorganisms- *Staphylococci, Streptococci, Mycobacterium Tuberculosis, E. coli*, Malarial Parasite, Filarial Parasite. • To know about the physical & chemical examination of Urine. • To estimate the Haemoglobin percentage. • To understand the life cycles of parasites. (*Entamoeba histolytica, Roundworm, Plasmodium vivax* and *Plasmodium falciparum, Wuchereria bancrofti*)