

## **English Foundation Course**

### **Course Outcome-**

- The learner will be able to grow intellectually and understand the usage of grammar and vocabulary in speech and writing.
- The learner will be able to inculcate the writing skills of their own which will help them to write academic papers essays and summaries and business letters and applications.
- The learner will be able to speak and write well and they'll be able to narrate their experiences and daily routine.
- The learner will be able to read and interpret the poems, prose, essay, short stories etc.

## **Foundation course – Hindi**

### **Program Outcome-**

- The learner will be able to connect with the basic elements of language so as to develop their grammatical and linguistic skills.
- The learner will be able to engage in mother tongue/English language along with other undergraduate level courses.
- 3. The learner will be interested towards all major genres of literature.
- The learner will be able to inculcate moral and human values in the students.
- The learner will be able to develop reading and writing of general Hindi language / English language.
- The learner will be able to become proficient in creative writing.
- The learner will be able to develop an understanding of social attitudes along with up-gradation of cultural values.
- The learner will be able to gain knowledge of language for competitive examinations.
- The learner will be able to develop speaking skills and study the language with proper pronunciation.

## **Hindi Foundation Course**

### **Course Outcome-**

- The learner will be able to explain competency in literary forms and learn literary works on the basis of the foundation laid by the scholars.
- The learner will be to read, write and develop the communication skills in Hindi within themselves.
- The learner will be able to grow in skill of writing official letters in functional Hindi.
- The learner will be able to identify the dialects of Hindi language family.

## **B.Sc. - mathematics**

### **Program Outcome-**

- The learner will be able to recall basic act about Mathematics and display knowledge of conventions such as notation, terminology.
- The learner will be able to get the adequate exposure to global and local concerns to explore them many aspects of Mathematical sciences.
- The learner will be able to acquire the skill of Mathematical modeling, problem solving, creative talent and power of communication necessary for various kinds of employment.

## **B.Sc. I Mathematics**

### **Paper- I (Algebra and Trigonometry)**

#### **Course Outcome-**

- The learner will be able to analyze divisibility of integers and congruence relations.

- The learner will be able to solve operations on polynomial.
- The learner will be able to find greatest common divisor of two polynomials.
- The learner will be able to label matrix algebra and find solution to system of linear equation.
- The learner will be able to apply algebraic structure groups in detail.

## **Paper- II (Calculus)-**

### **Course outcome-**

- The learners will be able to analyze basic properties of real numbers and its subsets, which is backbone of Real Analysis.
- The learners will be able to illustrate functions of fundamental structure in all science and check continuity of a function.
- The learners will be able to solve first order and first and higher degree differential equation.
- The learners will be able to analyze/synthesize interdisciplinary approach.

## **Paper – - III (VECTOR ANALYSIS AND GEOMETRY)**

### **Course outcome-**

- The learner will be able to analyze given data to solve the problem in geometry
- The learner will be able to explain different ideas of conics and their applications.
- The learner will be able to find the equation of tangent normal at a point on conic

- The learner will be able to apply the properties of conics to solve problems in real-life situations find the polar equation of line circle tangent and normal conics
- The learner will be able to introduce the concept of the independent variable on more than two dependent variables and finding partial derivatives
- The learner will be able to find nth derivatives of a function
- To explain the ideas of conics to explain many natural phenomena
- To explain the basics of vector differentiation
- The learner will be able to determine and apply the important quantities associated with a scalar field such as partial derivatives of all is order the gradient vectors and directional derivative
- The learner will be able to determine and apply the important quantity associated with vector field such as divergence curl and scalar potential
- The learner will be able to apply vector algebra techniques to analyze problem involving two and three-dimensional entities line curves planes and surface
- The learner will be able to compute the curl and the divergence of the vector field

## **B.Sc. II Mathematics**

### **Paper- I, Advanced Calculus-**

#### **Course outcome-**

- The learners will be able to explain functions and variables.
- The learners will be able to study the notion of continuity and Differentiability of multivariate function.

- The learners will be able to explain evaluation of double and triple integration and its application to area and volume.
- The learners will be able to solve the power series solution method using ordinary and singular points.
- The students will be able to apply the various theorems on primes and their convergence, which is used in cryptography.

## **PAPER - II Differential Equation**

### **Course outcome –**

- The learner will be able to identify, analyze and subsequently solve a physical situation whose behavior can be described by ordinary differential equations.
- The learner will be able to determine the solution to first order separable differential equation and linear differential equation.
- The learner will be able to explain the order degree and various standard forms of the differential equation.
- The learner will be able to determine the solution to the first-order exact differential equation determines the solution to a second-order linear homogeneous differential equation with constant coefficients.
  - The learner will be able to evaluate and apply the linear differential equation of second order.
- The learner will be able to obtain a power series solution of the differential equation.
- The learner will be able to apply the differential equation to significant applied are the theoretical problem.

- The learner will be able to describe the origin of the partial differential equation and distinguish the integral of the first-order linear partial differential equation into complete general and singular integrals.
- The learner will be able to give the idea of Lagrange methods for solving the first-order linear partial differential equation and become competent in solving linear PDEs using classical solution method.

### **Paper - III Mechanics (Paper Code - 0850)**

#### **Course outcome --**

- The learner will be able to explain about Newton's law.
- The learner will be able to solve the Newton's equation for simple configurations using various methods.
- The learner will be able to become familiar with the main mathematical methods used in physics.
- The learner will be able to discuss about the knowledge of special relativity.
- The learner will be able to write the result of an experiment in the style of a scientific paper.
- The learner will be able to perform statistical analysis of observed data.
- The learner will be able to explain about the understanding of accelerating structure.
- The learner will be able to tell the major applications of accelerators and new concepts.
- The learner will be able to use the exactly solvable model.

- The learner will be able to use the various types of accelerator work and understand the difference between them.
- The learner will be able to discuss the Lagrangian formulation of general relativity.

### **B.Sc. III, Mathematics**

#### **Paper- I Analysis (Code-0898)**

##### **Course outcome- -**

- The learner will be able to explain the basic idea of the real numbers.
- The learner will be able to describe the real line as a complete order field.
- The learner will be able to describe fundamental properties of the number that leads to the formal develop of real analysis.
- The learner will be able to discuss about the term limit and limit point of set and explain closed and open sets.
- The learner will be able to differentiate between countable and uncountable set an example for them.
- The learner will be able to demonstrate and understanding of the theory of sequence and series continuity differentiation and integration.
- The learner will be able to appreciate abstract Idea and methods in mathematical analysis can be applied to important practical problems.

- The learner will be able to use the definition of convergence to problems and various theorems on convergence absolute convergence and non absolute convergence.
- The learner will be able to demonstrate an understanding of limits and how they are used in sequence series.
- The learner will be able to construct mathematical proofs of basic result in real analysis.
- The learner will be able to produce the proof of result that arises in the context of real analysis.

## **Paper- II, Abstract Algebra**

### **Course outcome-**

- The learner will be able to analyze the importance of linear transformation in physics, engineering, social sciences and various branches of mathematics.
- The learner will be able to find the Eigen value and Eigen vectors of matrix, which is used in the study of vibrations, chemical reactions and geometry.
- The learner will be able to analyze the Inner product space and Gram-Schmidt process of orthogonalization.
- The learner will be able to apply mathematical modeling abilities.
- The learner will be able to solve the unique factorization domain, Euclidean domain and able to find its result.
- The learner will be able to illustrate the algebraic structure through various examples and theorems.

## **Paper – III Discrete Mathematics (Paper Code-0901)**

### **Course outcome –**



- The learner will be able to use different skills in expressing mathematical properties.
- The learner will be able to comprehend formal logical arguments.
- The learner will be able to specify and manipulate basic mathematical objects such as sets function and relation and will also be able to verify simple mathematical properties that this object possesses
- The learner will be able to describe computer program in mathematical manner.
- The learner will be able to gain experience in using various technique of mathematical induction to prove simple mathematical properties of a variety of discrete structures.
- The learner will be able to apply basic counting technique to solve combinational problems.

## **B. Sc. Physics Part I**

### **Program Outcome –**

- The learner will be able to understand these branches of physics classical mechanics quantum mechanics electrodynamics and electrostatics physics theory solid state physics atomic and molecular physics nuclear and particle physics mathematical physics thermodynamics physics and thermo statistical physics electronic physics and relation between these all branches.
- The learner will be provided the necessary input so as to set forth the task of bringing about new and innovative ideas concept so that the formulated model curricular in physics became in tune with the changing scenario and incorporate new and rapid advancement and multidisciplinary skills societal relevance global interface self-sustaining and supportive learning.
- The learner will be exposed to the societal interface so that physics will be used in the development of technologies and society.

## **Paper I- Mechanics, Oscillations and Properties of Matter**

### **Course Outcome-**

After going through the course the student will be able to.

- To understand laws of motion and their application to various dynamical situations, motion of inertial, frames and concept of Galilean invariance. He/she will learn the concept of conservation of energy momentum angular momentum and apply them to basic problem.
- To understand the analogy between translational and rotational dynamics and application of both motion simultaneously in analyzing rolling with slipping.
- To understand about write the expression for the moment of inertia about the given axis of symmetry for different uniform mass distribution.
- To understand the phenomena of collision and idea about centre of mass and laboratory frames and their correlation.
- To understand the principle of elasticity through the study of young modulus and modulus of rigidity.
- To understand the simple principle of fluid and fluid equation governing fluid dynamics.
- To apply Kepler's law to describe the motion of planets and satellite in circular orbit through the study of law of gravitation.
- To understand the phenomena of simple harmonic motion and the properties of system executing such motion understand about how friction force arises in non inertial frames.

## **Paper II- Electricity, Magnetism and Electromagnetic Theory**

### **Course Specific- Outcome**

After going through the course the students will be able to-

- To demonstrate Gauss law coulomb's law for the electric field and apply it to system of point charge as well as line sir is and volume distribution of charge.
- To explain and differentiate the vector and scalar formalism of dectrostatics.
- To understand apply gauss's law of electro statistics to solve a variety of problem.

- To articulate knowledge of electric current resistance in terms of electric field and electric potential.
- To demonstrate working understanding of capacitors.
- To describe the magnetic field produced by magnetic dipole and electric currents.
- To explain Faraday language and Maxwell laws to articulate the relationship between electric and magnetic field.
- To discuss the dielectric properties magnetic properties of material and the phenomenon of electromagnetic induction.
- To describe how magnetism is produced and list example where its effect are observed.

### **B.Sc. Part-II**

#### **Program outcome –**

- The learner will be able to provide ample knowledge of basics of physics which are relevant to the understanding of modern trends in higher physics.
- The learner will be able to prepare the background of thermodynamics and statistical physics essential for any advanced study of physics of condensed matter and radiation.
- The learner will be mainly concerned with a course on geometrical and physical optics and the laser physics it deals with an important phenomenon like interference and diffraction and polarization with stress in the basic nature of light.
- The learner will be introduced the basics of laser physics with some of its important application.
- The learner will be provided comprehensive insight of the subject.

### **Paper - I Thermodynamics, Kinetic Theory and Statistical Physics**

#### **Course Outcome-**

After going through the course the students should be able to-

- To explain about the basic concept of thermodynamics the first and the second law of thermodynamics the concept of entropy and the associated syndromes the

thermodynamics potential and their physical interpretations they are also expected to learn Maxwell thermodynamics relation.

- To discuss about the fundamentals of the kinetic theory of gases Maxwell Boltzmann distribution law equipartition of energies mean free path of molecular collision viscosity thermal conductivity diffusion and Brownian motion.
- To describe the real gas equation wonder wall equation of state joule Thomson effect.
- To discuss about the black body radiation Stefan Boltzmann law Rayleigh jeans law and Planck's law and their significance.
- To talk the quantum statistical distribution example the Bose Einstein statistics and the Fermi Dirac statistics.

In the laboratory the student are expected to perform following experiment.

- Measurement of Planck's constant using black body radiation.
- To determine Stephen's constant.
- To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton disc method.
- To study the variation of thermo EMF across two junction of thermocouple with temperature.
- To determine the pressure of air by constant volume method. To determine the coefficient of linear expansion by travelling microscope.
- To determine the coefficient of thermal conductivity of a bad conductor by Searle's method.

## **Paper II - Waves, Acoustics and Optics**

### **Course – Outcome-**

This course will enable the student -

- To recognize and drive this equation for certain system.
- To apply basic knowledge of principal and theory is about the behavior of light and the physical environment to conduct experiment.

- To explain the principle of super position of waves describe the formation of standing waves.
- To explain several phenomena we can observe in everyday life that can be explained as wave phenomena.
- To use the principle of wave motion and superposition to explain the physics of polarization interference and diffraction.
- To demonstrate the working of selected optical instrument like bi prism interferometer diffraction grating and hologram.
- In the laboratory course students will gain hands-on experience of using various optical instruments and making final measurement of wavelength of light using Newton's rings experiment Fresnel baptism etc. Resolution power of optical equipment can be learn firsthand.
- The motion of coupled oscillators, Lissajoule figure and behavior of the transverse and longitudinal wave we can learn in this laboratory course.

### **B.Sc. Part-III**

#### Program Outcome-

- The learner will be provided ample knowledge of basics of physics which are relevant to the understanding of modern trends in higher physics.
- The learner will be able to understand the background of modern physics which includes the relativistic and Quantum ideas mainly concerned with atoms molecules and nuclear physics which constitutes an essential prerequisite for both understanding of any branch of physics.
- The learner will be able to understand the solid-state physics solid-state device and electronics.
- The learner will be able to know the importance of the application aspect of modern electronic device.
- The learner will be able to understand the advanced electronics including communication technology.
- The learner will be provided the comprehensive insight of the subject

## **Paper - I Relativity, Quantum Mechanics, Atomic Molecular and Nuclear Physics.**

### **Course Specific- Outcome**

After going through the course the student will be able to-

- Appreciate the special theory of relativity, Lorentz transformation, length of contraction, time dilation, velocity addition theorem, variation of mass with velocity, mass energy equivalence particle with zero rest mass Compton Effect.
- Understand the exposition of inadequacies a classical mechanics in explaining microscopic phenomenon, Quantum theory, formulation and introduced through Schrödinger equation.
- Learn the interpretation of wave function a Quantum particles probability nature of its location and subtler point of quantum phenomena are exposed to the student.
- Understand the behavior of quantum particle encountering (i) barrier (ii) potential the student get exposed to solving Nan relative stick hydrogen atom for its spectrum and Eigen function.
- Understand spectra of hydrogen deuteron and alkali atoms spectral terms double fine structure screened constant for alkali spectra for and state selection rule describe set of electronic energy of molecules quantization of vibration and rotational energy determination of intern clear distance pure rotational and rotation vibrator spectra Raman effect stock and anti stoke line complementary character of Raman and infrared spectra experimental arrangement for Raman spectroscopy.
- Know the Interaction of charged particle and neutrons with matter working of nuclear detectors GM counter proportional counter and Scintillation counter cloud chamber Spark chamber emulsions structure of nuclei

## **Paper II SOLID STATE PHYSICS, SOLID STATE DEVICES AND ELECTRONICS**

### **Course Outcome-**

At the end of the course the student will be able to learn and assimilate the following-

- A brief idea about crystalline and amorphous substance about lattice constant Miller indices reciprocal lattice concept of Brillouin zone and diffraction of X-Ray by crystalline materials.
- Knowledge of lattice vibration phonons and in depth of knowledge of Einstein and Debye theory of specific heat of solids.
- Add knowledge of different types of magnetism from diamagnetism to ferromagnetism and hysteresis loops and energy loss.
- Secured and understanding about the dielectric and ferroelectric properties of materials.
- Understanding above the band theory of solid and must be able to differentiate insulator conductors and semiconductors.
- Introduction with basic concept of diode and its various types.
- Metal oxide semiconductors JEET, MOSFET, charge coupled device and tunnel diode.
- Power supply and role of capacitance and inductor filters.
- Active and passive filter and various types of filter.
- Basic idea of communication including different modulation techniques.

## **B.Sc. Botany**

### **Program outcome-**

- The learner will be able to understand the importance of Botany in the area of economic productivity.
- The learner will be able to understand about the group and ideal growing technique that helps Farmers increase crop yield.
- The learner will know that the study of plants is also important in environment protection and in health care, plants contribute to the development of new medicines and treatment for Major disease
- The learner will know the systematic organization of plants useful in industries like agriculture horticulture genetic engineering and healthcare botany job profile on which they can work ecologist plant Biochemist Park Ranger botanist nursery or greenhouse manager farming consultant geneticist.

## **Paper I- Bryophytes pteridophytes gymnosperms and pale botany**

### **Course Outcome –**

- The learner will be able to know and talk about the entire microorganism which is related to our daily life.
- The learner will be able to understand the reason behind any disease for both human and plants.
- The learner will be able to become aware of all this microorganism and they can differentiate between harmful and beneficial microorganisms.

**Opportunity** - Student can serve as a virologist bacteriologist pathologist researcher's biofuel developers, etc.

## **Paper II - Bacteria virus Fungi Lichen and Algae**

### **Course Outcome –**

- The learner will be able to know about the classical botany and some primer tube plants in some Fossil plants.
- The learner will be able to understand the fossilization process and geological time table.
- The learner will be able to differentiate the Bryophyta Pteridophyta and gymnosperm

**Opportunity-** After studying this paper student work as a taxonomist assistant paleobotanist geological data manager park Ranger and many more field

## **B.Sc. second-year**

### **Paper I - diversity of seed plant and their systematic**

#### **Course Outcome –**

- The learner will gain a vast knowledge about the plant which bearing seeds in their plant's body.
- The learner will be able to understand naked seed and covered seed plants.



- The learner will be able to gather the knowledge about the taxonomy of angiosperm and diversity of flowering plant.

**Opportunity** - After studying this paper we can work as a taxonomist under any governmental or private organization supervisor of private or government botanical parks national parks and sanctuaries.

## **Paper II - structure development and reproduction in flowering plant**

### **Course Outcome –**

- The learner will know all the important feature and system of a flowering plant.
- The learner will be able to differentiate the plant body in root system shoot system leaf and flower which are reproductive organ of plants

**Opportunity-** Work as assistant botanist assistant superintendent of any botanical garden many plants have some medicinal properties so after studying of this paper we can suggest some ayurvedic medicine for common diseases and also worked as a medical representative as a medical researchers.

## **B.Sc. 3rd-year**

### **Paper I - plant physiology biochemistry and biotechnology**

#### **Course Outcome-**

- The learner will know about the plant water relationship mineral nutrition mechanism of transport of organic substance basic enzymology development factor.
- The learner will gain knowledge of plant physiology like photosynthesis and respiration as well as a modern aspect about genetic engineering and biotechnology

**Opportunity** - This paper have vast benefit in job sector a student can work as a laboratory technician lab assistant lab superintendent researcher's assistant biotechnologist physiologists park supervisor, supervisor of the botanical garden.

## **Paper - II ecology and utilization of plant**

### **Course Outcome –**

- The learner will know about the interrelation between plants and environment.
- The learner also know the various aspects of ecology and various utilization of plants as a medicine food fiber spices beverage, etc .

**Opportunities** - Student can work as assistant ecologist medical representative assistant medicine developer work in pharmaceutical companies for processing component, etc.

## **B.Sc. Chemistry**

### **Program Outcome -**

After completion of degree, students gained the theoretical as well as practical knowledge of handling chemicals. Also they expand the knowledge available opportunities related to chemistry in the government services through public service commission particularly in the field of food safety, health inspector, pharmacist etc. Afford a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective. Achieve the skills required to succeed in graduate school, professional school and the chemical industry like cement industries, agro product, Paint industries, Rubber industries, Petrochemical industries, Food processing industries, Fertilizer industries etc. Got exposures of a breadth of experimental techniques using modern instrumentation. Understand the importance of the elements in the periodic table including their physical and chemical nature and role in the daily life. Understand the concept of chemistry to inter relate and interact to the other subject like mathematics, physics, biological science etc. Learn the laboratory skills and safely to transfer and interpret knowledge entirely in the working environment.

### **Course Outcome – The learner will be able-**

- To study about the different field of science.
- To develop skill in different laboratories.

- To understand various technologies.
- To develop various knowledge.
- To familiarize the student with the important role played by chemistry in their daily life.
- To have sound knowledge about the fundamentals and application of scientific theories
- To develop scientific attitude to make student open-minded and curious to develop skill in practical works experiment equipment and laborat.

## **B.Sc. Part**

### **Paper I - Inorganic Chemistry**

**Course Outcome – The learner will be able to-**

- To describe the Atomic theory and its evolution.
- To explain about the scientific theory of atoms, concept of wave functions.
- To discuss about the elements in periodic table; physical and chemical characteristics, periodicity.
- To predict the atomic structure, chemical bonding, and molecular geometry based on accepted models
- To describe about the atomic theory of matter, composition of atom
- To identity of given element, relative size, charges of proton, neutron and electrons, and their assembly to form different atoms.
- To define isotopes, isobar and isotones
- To explain about Physical and chemical characteristics of elements in various groups and periods according to ionic size, charge, etc. and position in periodic table.
- To summarize Characterize bonding between atoms, molecules, interaction and energetic (ii) hybridization and shapes of atomic, molecular orbital's, bond parameters, bond- distances and energies.

### **Paper II - ORGANIC CHEMISTRY**

**Course Outcome – The learner will be able to -**

- To talk about the basic of organic molecules, structure, bonding, reactivity and reaction mechanisms.
- To explain about Stereochemistry of organic molecules – conformation and configuration, asymmetric molecules and nomenclature.
- To define the Aromatic compounds and aromaticity, mechanism of aromatic reactions.
- To describe about the hybridization and geometry of atoms, 3-D structure of organic molecules, identifying chiral centers.
- To define the Reactivity, stability of organic molecules, structure, stereochemistry.
- To summarize about the Electrophile, nucleophiles, free radicals, electronegativity, resonance, and intermediates along the reaction pathways.
- To discuss about Mechanism of organic reactions (effect of nucleophile/leaving group, solvent), substitution vs. elimination

### **Paper III -PHYSICAL CHEMISTRY**

#### **Course Outcome – The learner will be able -**

- To talk about and become familiar with various states of matter.
- To discuss about the Physical properties of each state of matter and to describe the laws related the states.
- To calculate the lattice parameters.
- To explain Electrolytes and electrolytic dissociation, salt hydrolysis and acid-base equilibria.
- To define the Kinetic model of gas and its properties.
- To talk about the Maxwell distribution, mean-free path, kinetic energies.
- To explain about the behavior of real gases, its deviation from ideal behavior, equation of state, isotherm, and law of corresponding states.
- To describe about the Solids, lattice parameters – its calculation, application of symmetry, solid characteristics of simple salts.
- To summarize about Ionic equilibria – electrolyte, ionization, dissociation.

- To explain about Salt hydrolysis (acid-base hydrolysis) and its application in chemistry.

## **B.Sc. Part II**

### **Paper I - INORGANIC CHEMISTRY**

#### **PHYSICAL CHEMISTRY (Paper Code - 0845)**

##### **Course Outcome- The learner will be able -**

- To describe about the Oxidation-Reductions and their use in metallurgy.
- To differentiate s and p-block elements.
- To talk about noble gases.
- To explain about Inorganic polymers and their use.
- To discuss about redox reactions in hydrometallurgy processes.
- To explain the structure, bonding of s and p block materials and their oxides/compounds.
- To talk about the boron compounds and their structures.
- To discuss about the noble gases and their compounds; application of VSEPR theory in explaining structure and bonding.
- To describe about the inorganic polymers, their structures and uses.

### **B.Sc. Part – 2, PAPER – II, ORGANIC CHEMISTRY (Paper Code - 0846)**

##### **Course Outcome- The learner will be able-**

- To become Familiar about classes of organic compounds and their methods of preparation.
- To discuss about the Basic uses of reaction mechanisms.
- To tell the Name of reactions, uses of various reagents and the mechanism of their action.

- To discuss about the Preparation and uses of various classes of organic compounds.
- To explain about the Organ metallic compounds and their uses.
- To discuss about the Organic chemistry reactions and reaction mechanisms.
- To use the reagents in various organic transformation reactions.

### **Paper III - PHYSICAL CHEMISTRY (Paper Code - 0847)**

#### **Course Outcome- The learner will be able -**

- To describe about the Laws of thermodynamics and concepts.
- To talk about Partial molar quantities and its attributes.
- To explain about the dilute solution and its properties.
- To explain the concept of system, variables, heat, work, and laws of thermodynamics.
- To explain about the concept of heat of reactions and use of equations in calculations of bond energy, enthalpy, etc.
- To discuss about the concept of entropy; reversible, irreversible processes. Calculation of entropy using 3rd law of thermodynamics.
- To talk about the application of thermodynamics: Joule Thompson effects, partial molar quantities. 8. Understanding theories/thermodynamics of dilute solutions.

## **B.Sc. Part III**

### **PAPER - I INORGANIC CHEMISTRY (Paper Code-0895)**

#### **Course Outcome- The learner will be able -**

- To discuss about the Coordination compounds – its nomenclature, theories, d-orbital splitting in complexes, chelate.
- To talk about the Transition metals, its stability, color, oxidation states and complexes.
- To explain about the Lanthanides, Actinides – separation, color, spectra and magnetic behavior
- To tell about Bioinorganic chemistry – metal ions in biological system, its toxicity; hemoglobin.

- To compare the nomenclature of coordination compounds/complexes, Molecular orbital theory, d-orbital splitting in tetrahedral, octahedral, square planar complexes, chelate effects.
- To describe the transition metals stability in reactions, origin of colour and magnetic properties.
- To explain the separation of Lanthanides and Actinoids, its color, spectra and magnetic behavior.
- To talk about the bioinorganic chemistry of metals in biological systems.
- To explain about the Hemoglobin and its importance in biological systems.

## **Paper - II ORGANIC CHEMISTRY (Paper Code-0896)**

### **Course Outcome- The learner will be able -**

- To talk about the Nitrogen containing functional groups and their reactions.
- To discuss and become Familiar with polynuclear hydrocarbons and their reactions.
- To explain about Heterocyclic compounds and their reactions.
- To tell about Alkaloids and Terpenes
- To explain about the bimolecular structure and function.
- To describe the structure and their mechanism of reactions of selected polynuclear hydrocarbons.
- To summarize the various Spectroscopic techniques.

## **B.Sc. Zoology**

### **Program outcome-**

The learner will be able -

- To explain about the behavior, structure, and evolution of animals. The scope of Zoology as a subject is very broad.
- To discover new skills needed by industry may include the species-specific monitoring for key species, handling of dangerous/ poisonous/ wild animals, and the use of

Geographic Information Systems (GIS) for data collection, also involve advanced or modern biology and help develop a range of generic skills that are relevant to wage employment, self-employment and entrepreneurship.

- To explain the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and cell-organelles.
- To explain about how these cellular components are used to generate and utilize energy in cells.
- To tell about the structure and function of chromosomes, the process of mitosis and meiosis
- To tell the basic idea of cells and organs of the immune system and cancer
- To share depth knowledge of the diversity in form, and tell about the structure Classification, and habits of invertebrates, like Protozoa, Porifera, and Coelenterata, Platyhelminthes, Nematelminthes, Annelida, Arthropoda, Mollusca, and Echinodermata
- To explain the basics of systematics and understand the hierarchy of different categories.
- To tell about diagnostic characteristics of different phyla through brief studies of examples.
- To obtain an overview of economically important invertebrates
- To obtain an overview of economically important invertebrates

## **B.Sc. Part I**

### **Paper 1 (Cell Biology and Non- chordata)**

**Course Outcome** – The learner will be able -

- To describe the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and cell-organelles.
- To explain how these cellular components are used to generate and utilize energy in cells.
- To tell the structure and function of chromosomes, the process of mitosis and meiosis



- To describe the basic idea of cells and organs of the immune system and cancer
- To talk about depth knowledge of the diversity in form, structure Classification, and habits of invertebrates, like Protozoa, Porifera, and Coelenterata, Platyhelminthes, Nematelminthes, Annelida, Arthropoda, Mollusca, and Echinodermata
- To explain the basics of systematic and understand the hierarchy of different categories.
- To talk about the diagnostic characteristics of different phyla through brief studies of examples.
- To obtain an overview of economically important invertebrates

## **Paper II - (Chordata and Embryology)**

### **Course Outcome- The learner will be able -**

- To describe unique characters, structure Classification of Hemichordata Chordata, urochordates, cephalochordates, and fishes.
- To recognize the life functions of urochordates to fishes.
- To explain about the ecological role of different groups of chordates.
- To tell the diversity of chordates.
- To tell about Poisonous & Non-poisonous Snakes
- To study the human reproductive system, modern trends in reproduction, gametogenesis, and cleavage, and fertilization, development of a human fetus, frog and chick embryology, placenta.
- To become familiar with the events that leads up to fertilization.
- To describe the stages and cellular mechanisms for gastrulation and the first four rounds of cell division in different groups.

## **B.Sc. Part – II**

### **Paper – I (Anatomy and Physiology)**

#### **Course Outcome- The learner will be able-**

- To talk about the anatomy, physiology, and functions of various Tissues and cells, organization of the cellular system.
- To classify different types of tissue and explain anatomy and physiology of skeletal system and joints.
- To explain the anatomy and physiology of the cardiovascular and respiratory system and its disorders.
- To explain the anatomy and physiology of the digestive, nervous, urinary, and reproductive system and its disorders.
- To explain Physiology of muscle contraction nerve impulse, Synaptic transmission endocrine system, and sense organs and its disorders.
- To explain Physiology Digestion and absorption of dietary components

## **Paper II -Vertebrate Endocrinology, Reproductive Biology Behavior, Evolution and Applied Zoology**

### **Course Outcome – The learner will be able-**

- To describe the Structure and Function of Endocrine glands, neurohormones, neurosecretions. And the mechanism of hormone action.
- To tell about the different endocrine glands and their disorders.
- To explain and contrast the processes of gametogenesis and understanding of the hormonal control of reproduction in males and how this is regulated
- To explain about the process and theories in evolutionary biology
- To tell about the wide range of theoretical and practical techniques used to study animal behavior
- To discuss about the culture techniques of prawn, pearl and fish.
- To discuss about the silkworms rearing and their products.
- To explain about the Beekeeping equipment and apiary management.
- To summarize about the dairy animals management, the breeds and diseases of Poultry and learn the testing of egg and milk quality.

## **B.Sc. Part III**

### **Paper I - ECOLOGY, ENVIRONMENTAL BIOLOGY: TOXICOLOGY, MICROBIOLOGY AND MEDICAL ZOOLOGY**

**Course Outcome – The learner will be able -**

- To tell about the evolutionary and functional basis of animal ecology. Understand what makes the scientific study of animal ecology a crucial and exciting endeavor.
- To solve the environmental problems involving the interaction of humans and natural systems at the local or global level.
- To explain the Principal and mechanisms of systematic toxicology and Heavy metal Toxicity
- To carry out common procedures for culturing, purifying and diagnostics of micro-organisms understand the disease-causing potential of bacteria and viruses, and the responses of the immune system.
- To describe the mechanisms for transmission, virulence, and pathogenicity in pathogenic micro-organisms.
- To diagnose the causative agents, describe pathogenesis and treatment for important diseases like Entamoeba, Trypanosome, Schistosoma & Plasmodium, etc.

### **Paper II - Genetics, Cell Physiology, Biochemistry, Biotechnology and Biotechniques**

**Course Outcome- The learner will be able -**

- To apply the principles of Non-Mendelian inheritance.
- To explain the cause and effect of alterations in chromosome number and structure.
- To discuss about pH & buffer Membrane transport and Enzymes Action.
- To discuss about the structure and biological significance of carbohydrates, amino acids, proteins, and lipids
- To tell the importance and scope of biotechnology

- To tell the purpose of the technique, its proper use, and possible modifications/improvement. Learn the theoretical basis of technique, its principle of working, and its correct application.

## **Industrial Microbiology**

### **Program Outcome -**

Microbiology is study of the world of organisms that are too small to be seen with the naked eye. Some of these microorganisms are infectious agents to humans, animals, or plants. Many of these microorganisms, however, carry out important functions in their niches that are essential for all life on earth. Microbiologists study the interaction of microorganisms with people and how they affect their lives, as well as the roles these organisms play in the environment. The B.Sc. Industrial Microbiology program aims to cater learners to acquire and demonstrate competency in Microbiology skills, making them knowledgeable and competent to make a prospective career in industry as well as in research in the area of Microbiology. Microbiologists work in hospitals, universities, medical schools, government laboratories, and almost every industry, specializing in a variety of areas, from agriculture to the space industry. In fact, study of microorganisms has become of global importance. The course will enable students to apply the learning of microbiology concepts toward the exploitation of microbial population for industrial and human benefits. The strategies for development of microbial strains, process optimization, large scale production and product recovery will be covered for industrially relevant microbial products and therapeutic proteins. The crux of the course is to ensure that the students at the end of the program are able to acquire higher education further leading to prospective career.

### **Course Outcome- The learner will be able -**

- To discuss about the knowledge and understanding of the microbiology concepts as applicable to diverse areas such as medical, industrial, environment, genetics, agriculture, food and others.
- To demonstrate key practical skills/competencies in working with microbes for study and use in the laboratory as well as outside, including the use of good microbiological practices.

- To compete enough to use microbiology knowledge and skills to analyze problems involving microbes, articulate these with peers/ team members/ other stake holders, and undertake remedial measures/ studies etc.
- To tell about the broader perspective of the discipline of Microbiology to enable him to identify challenging societal problems and plan his professional career to develop innovative solutions for such problems

#### **ENVIRONMENTAL STUDIES & HUMAN RIGHTS-**

**Course Outcome** - Environmental studies Provide students with the scope to develop a knowledge base covering all attributes of the environment and enable them to attain scientific/technological capabilities to find answers to the fundamental questions before the society with regards to human action and environmental effects with due diligence. Enhance the ability to apply this knowledge and proficiency to find solutions relating to environmental concerns of varied dimensions of present times. Improve the employability of the graduates including the enhancement of self-employment potential and entrepreneurial aptitude, and fill the technical resource gap especially in the Indian context,. Help graduates appreciate the requirement of framing environmental policy guidelines. Motivate graduates to appreciate that they are an integral stakeholder in the environmental management of India irrespective of their future jobs or working.

## **Computer Science**

### **B.sc. I -paper first (Computer Science)**

#### **Course outcome –**

- The learner will become aware of computer hardware as well as its software, working principles and technology used in development of advance personal computer.

### **B.Sc. I - Paper Second (Programming in C Language)**

#### **Course Outcomes:**

- After this course, students will be able to understand the programming techniques of C programming language with basic knowledge about computer software and programming language.

### **B.Sc. II – Paper I (Computer Hardware – Part- B)**

#### **Course Outcome-**

- Students will understand the overall organization of the microcomputers, Common peripheral devices used in computers, hardware components, and use of microprocessor and function of various chips used in microcomputer.

### **B.Sc.II-paper II (Computer Science)**

#### **Course outcome -**

- The learner will become aware of computer hardware as well as its software, working principles and technology used in development of advance personal computer.

### **B.sc. III Paper I (Computer Science)**

#### **Course outcome -**

- The learner will become aware of computer hardware as well as its software, working principles and technology used in development of advance personal computer

### **B.Sc. III – Paper Second (Computer Software- Part- C)**

#### **Course Outcomes:**

- Students will understand the Data Base Management System concepts, Relational Database Management System and Relational Database Design, they are able to work with RDBMS software and utility of query language, they understand basic concept of GUI programming and database connectivity using Visual Basic.