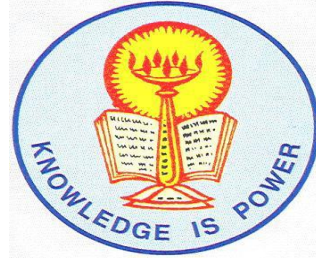


**Sindhi Hindi Vidya Samiti's**  
**Dada Ramchand Bakhru Sindhu**  
**Mahavidyalaya, Nagpur**



**Program Outcomes**  
**Program Specific Outcomes**  
**and**  
**Course Outcomes**

# Program Outcomes

## Program Outcomes (POs) of B.Sc.

The science graduate will be able to –

- PO1:** Develop the knowledge with facts and figures related to various subjects in sciences.
- PO2:** Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.
- PO3:** Develop the skills of observations and drawing logical inferences from the scientific experiments.
- PO4:** Acquire the skills in handling scientific instruments, planning and performing in laboratory experiments.
- PO5:** Develop scientific outlook not only with respect to science subjects but also in all aspects related to life.
- PO6:** Analyze the given scientific data critically and systematically and the ability to draw the objective conclusions.
- PO7:** Develop various communication skills such as reading, listening, speaking, etc., which we will help in expressing ideas and views clearly and effectively.
- PO8:** Imbibe ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.

## Program Outcomes (POs) of B. Com.

The commerce graduate will be able to –

- PO1:** Build a strong foundation of knowledge in different areas of commerce.
- PO2:** Develop the skill of applying concepts and techniques used in commerce
- PO3:** Expose students about entrepreneurship.
- PO4:** Develop an attitude for working effectively and efficiently in business environment.
- PO5:** Create awareness of Law and Legislations related to commerce and business.

- PO6:** Integrate knowledge, skill and attitude that will sustain an environment of learning and creativity among the students
- PO7:** Acquire numerical and practical skills related with banking and other business.
- PO8:** Imbibe ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.

### **Program Outcomes (POs) of B. B. A.**

**The business administration graduate will be able to –**

- PO1:** Develop basic understanding about management education.
- PO2:** Develop functional and general management skills.
- PO3:** Inculcate Entrepreneurial skills.
- PO4:** Develop appropriate skills in the students so as to make them competent and provide themselves self-employment.
- PO5:** Develop skills such as communication, leadership and teamwork effectively.
- PO6:** Imbibe ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.

### **Program Outcomes (POs) of M. Com.**

**Masters of Commerce student will be able to –**

- PO1:** Develop comprehensive knowledge in different areas of commerce such as economics, business and trades.
- PO2:** Understand finance and other core business content.
- PO3:** Ability to start entrepreneurial activities.
- PO4:** Make students ready for employment in functional areas like Accounting, Taxation, Banking, Insurance and Corporate Law.
- PO5:** Inculcate team work, leadership and managerial skills.
- PO6:** Create interest towards pursuing professional courses such as CA/ CS/ CMA/CFA etc.
- PO7:** Provide an environment that facilitates all-round development of the student personality

## Program Specific Outcomes (PSOs)

### Program Specific Outcomes of Physics (Part of B.Sc. Program)

- PSO1:** Understand the knowledge with the facts and figure related to the physics
- PSO2:** Apply the fundamental principles and the scientific theories related to various scientific phenomena and their relevancies in day-to-day life
- PSO3:** Enhance logical thinking
- PSO4:** Understand the Quantum and classical hypothesis
- PSO5:** Develop problem solving technique

### Program Specific Outcomes (PSOs) of Chemistry (Part of B.Sc. Program)

- PSO1:** Develops scientific temper, observe and understand critically while solving complex problems
- PSO2:** Acquire knowledge and able to communicate effectively through oral presentation, writing chemical reactions and graphical methods of learning.
- PSO3:** Develop proficiency during analytical solving of numerical problems, conversions and also in the use of mathematical applications.
- PSO4:** Helping students to create a better understanding and learning of concepts of chemistry, formulae, chemical relations and chemical reactions, principles and their applications .
- PSO5:** Exposed to experimental practical methods, their understanding, skill development in various techniques of experimentations.

### Program Specific Outcomes (PSOs) of Mathematics (Part of B.Sc. Program)

- PSO1:** Enhances Logical thinking
- PSO2:** Develop problem solving technique
- PSO3:** Formulate and develop mathematical arguments in a logical manner
- PSO4:** Understand and evaluate hypothesis
- PSO5:** Apply mathematical methods and knowledge acquired to prove the hypothesis within their proper context.

### **Program Specific Outcomes (PSOs) of Botany (Part of B.Sc. Program)**

- PSO1:** Enhance the knowledge of plant kingdom
- PSO2:** Develop the scientific knowledge of classification of plant
- PSO3:** Understand the structure and function of plants
- PSO4:** Understand and evolution of various phenomenon of physiology, ecology, genetics etc.
- PSO5:** Apply knowledge to solve the various forestry, agricultural and environmental problems
- PSO6:** Using scientific knowledge develop entrepreneur skills about Nursery, gardening, landscaping and agriculture

### **Program Specific Outcomes (PSOs) of Zoology (Part of B.Sc. Program)**

- PSO1:** Understand classification and basic concepts of Non-chordates and Chordates.
- PSO2:** Understand the nature, basic concepts and analyse the relationships among animals, plants and microbes in Ecology.
- PSO3:** Understand the nature, basic concepts of Physiology, Cell biology, Developmental biology, Genetics, Immunology and Molecular biology.
- PSO4:** Perform procedures as per laboratory standards in the areas of Biotechniques, Bioinformatics, Microtechniques, Biotechnology and Biostatistics.
- PSO5:** Understand the applications of biological sciences in Aquaculture and Entomology.

### **Program Specific Outcomes (PSOs) of Microbiology (Part of B.Sc. Program)**

- PSO1:** Microbiology course is aim to give understanding of various microorganisms related with soil, water, air, and medical point of view.
- PSO2:** Develop various skill for laboratory diagnosis of microorganisms.
- PSO3:** Develop various skill for Molecular biology and Biochemistry.
- PSO4:** Attain Eligibility for Post graduate course.
- PSO5:** To attain eligibility for medical laboratory technician.

### **Program Specific Outcomes (PSOs) of Biochemistry (Part of B.Sc. Program)**

- PSO1:** Chemistry of carbohydrates, lipids, fatty acids, proteins, aminoacids, nucleic acids, porphyrins, hormones, cell, blood and it's components, nomenclature, regulation, action, diagnostic enzymes-SGOT, SGPT, LDH, acid and alkaline phosphatase enzymes.
- PSO2:** Bioenergetics, Laws of thermodynamics
- PSO3:** Chromatography, Electrophoresis, Spectroscopic and Radio isotopic techniques, application, chemistry of DNA, RNA molecules functions replication, transcription, translation, genetic code, electron transport chain, oxidative phosphorylation, glycolysis, Creb's cycle, Pentose phosphate pathway, Urea cycle, Beta oxidation of fatty acids. Synthesis and utilization of Ketone bodies, Purines and Pyrimidines. Some culture techniques of Viruses, Types of immunity antigen & antibody reactions.

### **Program Specific Outcomes (PSOs) of Biotechnology (Part of B.Sc. Program)**

- PSO1:** Understanding of various biological systems to the student upto molecular level processes and to develop skill of various microbial, biochemical and advanced genetic techniques for its use in diagnosis, bioestimation and bioanalysis purposes
- PSO2:** Learn to develop skill of various microbial, biochemical and advanced genetic techniques for its use in diagnosis, bioestimation and bioanalysis purposes
- PSO3:** Learn biophysical, biostatistics and standard graph analysis that help them for research in their future studies
- PSO4:** Learn basic skills and knowledge for bioreactor technology, animal and plant tissue cultures and understand use of such techniques for human welfare

### **Program Specific Outcomes (PSOs) of Electronic (Part of B.Sc. Program)**

- PSO1:** The main objective of the Program is to provide enhanced skills to students enabling them to consider Electronics as a career and means of livelihood.
- PSO2:** The Program aims at familiarizing the students with the basic topics in Electronics

- PSO3:** The students will also receive inputs on the foundations of Electronics and Communications Technology and also have an exposure to the advancements in related areas
- PSO4:** To provide teaching-learning process in Electronic science that will make students competitive and innovative to adapt to needs of industry and higher learning
- PSO5:** At the end of the course, students develop problem solving skills and learn various concepts which help in developing logical tools and models used to solve various real life problems

### **Program Specific Outcomes (PSOs) of Computer Science (Part of B.Sc. Program)**

- PSO1:** Apply their knowledge & skills of computer science with an understanding of realistic constraints for the overall benefit of society.
- PSO2:** Design and analyze precise specifications of algorithms, procedures & interaction behavior.
- PSO3:** Select appropriate technique to tackle and solve problems in the discipline of information security management.
- PSO4:** Understand the concept of key area in computer science.
- PSO5:** Analyze and apply latest technologies to solve problems in the area of computer application.
- PSO6:** To developed the solution for the individual problems using the coding &/or logical techniques and skill sets learnt/acquired in three years.

### **Program Specific Outcomes (PSOs) of B. Com.**

- PSO1:** Students acquires knowledge about the various types of business organizations, office management and related
- PSO2:** Learn principles and concepts of Accountancy
- PSO3:** Student are enabled with the Knowledge in the practical applications of accounting
- PSO4:** Enable the students to learn the basic concepts of Partnership Accounting, and allied aspects of accounting. After the successful completion of the course the

student should have a thorough knowledge on the accounting practice prevailing in partnership firms and other allied aspects.

- PSO5:** On successful completion of this course, the student should be well versed in basic provisions regarding legal frame work governing the business world.
- PSO6:** This course aims to develop an understanding of the conceptual framework of Management Accounting. After the successful completion of the course the student acquires the knowledge in the Management Accounting Techniques in business decision making.
- PSO7:** To keep the students conversant with the ever – enlarging frontiers of Cost Accounting knowledge.
- PSO8:** This course aims to provide an in-depth knowledge on the provisions of Income Tax. To familiarize the students with recent amendments in Income-tax.
- PSO9:** On successful completion of this course, the student should be well versed in the fundamental concepts of Auditing.
- PSO10:** On successful completion of this course the students should have the practical knowledge and he tactics in the marketing.
- PSO11:** This course enables the students with the knowledge about the Capital budgeting, Working capital, cash management, and better financial management techniques.
- PSO12:** To inculcate knowledge on various laws relating to business such as law of contract, law of sale of goods, law of agency, Negotiable Instruments Act etc.

### **Program Specific Outcomes (PSOs) of B.B.A**

- PSO1:** Manage and coordinate people, business processes, and business resources.
- PSO2:** Develop and implement components of a business plan.
- PSO3:** Communicate in a variety of domains, including writing, speaking, listening and reading, while respecting the impact of technology on effective communication.
- PSO4:** Students will learn to use data to engage in effective decision-making in a business
- PSO5:** Demonstrate knowledge and application of prescribed ethical codes and behaviors in the workplace



### **Program Specific Outcomes (PSOs) of M. Com.**

- PSO1:** To attain Eligibility for Joining Research
- PSO2:** To attain Eligibility for applying examinations like SET, NET etc.
- PSO3:** To attain Eligibility for joining professional courses in Teaching.
- PSO4:** To attain efficiency in accountancy and commercial skills.
- PSO5:** To Manage and maintain research oriented activities.

## **Course Outcomes**

### **Course Outcomes (COs) of Physics**

#### **Properties of Matter and Mechanics**

- CO1:** Use the basic knowledge of mechanics and properties of matter.
- CO2:** Understand an equation of motion.
- CO3:** Apply the Bernoulli's Principle.
- CO4:** Understand the conservation of rotational motion.

#### **Sound waves, applied acoustics, ultrasonic and power supply**

- CO1:** Use the knowledge of sound waves and applications.
- CO2:** Understand the specific principles relevant to the acoustics of spaces.
- CO3:** Understand the different methods for generation of the ultrasonic waves.
- CO4:** Use a knowledge and apply it to various electronically instruments.

#### **Physical optics and Electromagnetic waves**

- CO1:** Understand the basic concepts in optics.
- CO2:** Apply the Rayleigh criteria for resolution.
- CO3:** Understand the principle of Brewster's law.
- CO4:** Use the knowledge of characteristics of EM waves.

#### **Solid state Physics, X-Ray and laser**

- CO1:** Know about the basic knowledge of crystal structure.
- CO2:** understand the basic principle of Bragg's law and its applications.
- CO3:** Understand the different x-ray spectra and the concept of Auger effect.
- CO4:** Know about the fundamentals of laser, their unique properties and applications

### **Solid state electronics and molecular physics**

- CO1:** Apply the principle of electronics in day to day life.
- CO2:** Understand the construction, working and characteristics of JEFT.
- CO3:** Understand the concept of the molecular bending and molecular energies.
- CO4:** Use the knowledge of elementary ideas of NMR and ESR.

### **Atomic physics, free electron theory and Statistical Physics**

- CO1:** Apply the paulis exclusion principle.
- CO2:** Understand the concept of kroning penny model.
- CO3:** Use the basic knowledge of free electron theory.
- CO4:** Understand the various models in statistical physics.

### **Quantum Mechanics, Nanomaterials and Nanotechnology:**

- CO1:** Apply the Schrödinger equation.
- CO2:** Understand and apply the principle of wave mechanics.
- CO3:** Understand the size dependent properties of Nanomaterials.
- CO4:** Acquire fundamental understanding of integrated multidisciplinary nature of nanotechnology.

### **Relativity, Nuclear physics and Bio-physics:**

- CO1:** Use a knowledge and apply it to various physical problems.
- CO2:** Understand the shell model of nucleus.
- CO3:** Understand the various models in Nuclear physics.
- CO4:** Acquire the basic knowledge of the membrane potential and Bio-instrumentation.

### **Electronics, Fiber optics, communication and Digital electronics:**

- CO1:** Understand the classification of amplifiers.
- CO2:** Apply the principle of optical fiber.
- CO3:** Understand the concept of frequency modulation.
- CO4:** Acquire basic knowledge of binary addition and logic gates.

## Course Outcomes (COs) of Chemistry

### Inorganic Chemistry I

- CO1: Understand structure and write electronic configuration of an elements.
- CO2: Interpret variation of periodic properties among groups and periods.
- CO3: Bonding in ionic solid and S-Block elements.
- CO4: Understand properties of p-Block elements and their changes. Draw the structure of various hydrides and oxides.

### Physical Chemistry I

- CO1: Understand the concepts of first law of thermodynamics along with their applications.
- CO2: Solve the numerical on the thermo chemistry.
- CO3: Identify and explain ideal and non ideal gaseous conditions.
- CO4: Differentiate solid, liquid and liquid crystals.
- CO5: Understand some properties of liquid like surface tension, viscosity and refractive index.
- CO6: Know the concepts and applications of adsorption and catalysis.

### Organic Chemistry I

- CO1: Understand the structure and bonding in organic molecule on the basis of hybridization. Knows about effects in organic compounds.
- CO2: Explain about types of organic reactions. Able to interpret concept of optical activity.
- CO3: Write IUPAC names of alkanes. Comes to know alkanes, cycloalkanes, dienes and their reactions.
- CO4: Understand aromatic nature and properties of benzene.

### Physical Chemistry II

- CO1: Understand the concepts of first law of thermodynamics, entropy along with their applications.
- CO2: Solve the numerical on free energy function and systems of variable composition.
- CO3: Apply phase rule to one component and two components system.
- CO4: Understand concepts of ideal and non-ideal liquid mixtures.
- CO5: Understand basic concepts of nuclear chemistry along with their applications.

**CO6:** Identify orders of reaction. Understand concepts of theories of chemical kinetics.

## **Organic Chemistry II**

**CO1:** Understand the concepts of orientation i.e. activating group and deactivating group and differentiate substitution, addition, elimination and rearrangement reaction.

**CO2:** Explain the preparation of monohydric alcohol, dihydric alcohol and trihydric alcohol and the effect of different reagent on alcohols.

**CO3:** Identify the nomenclature and structure of carbonyl compounds and know the different naming reaction in preparation and reaction of carbonyl compounds.

**CO4:** Explain the preparation of aliphatic and aromatic carboxylic acid and identify the nomenclature, structure and properties of carboxylic acid.

**CO5:** Understand the properties and application of carboxylic acid and ester.

## **Inorganic Chemistry II**

**CO1:** Understand the concepts of covalent bonds, lone pairs, orbital overlapping. Classify the bonding and antibonding molecular orbitals and explain the molecular orbital energy level diagram of  $C_2$ ,  $N_2$ ,  $O_2$ ,  $HF$ , and  $CO$ .

**CO2:** Study the preparation of interhalogen compounds and other inorganic compounds. Classify the polyhalides on the basis of halogens.

**CO3:** Characterized the properties like electronic configuration, atomic and ionic radii, ionization potential, variable oxidation state, magnetic properties, colour, complex formation tendency of first transition series.

**CO4:** Identify the magnetic properties, colour, complex formation tendency of first transition elements. Classify the coordination compound on the basis of isomers.

**CO5:** Understand basic concepts of nuclear chemistry along with their applications. Identify orders of reaction. Understand concepts of theories of chemical kinetics.

## **Inorganic Chemistry III**

**CO1:** Understand the nomenclature, structure and classification of coordination compounds.

**CO2:** Able to explain magnetic properties of the coordination compounds. Explain the stability of coordination compounds

**CO3:** Draw the Latimer and frost diagram of redox reactions. Identify the Oxidation and reduction reactions.

**CO4:** Understand the structure and properties of organometallic compounds. Identify the Hard and Soft acids and bases.

**CO5:** Understand the biological role of Na and K pump. Know the structure of Hemoglobin and Chlorophyll.

### **Physical Chemistry III**

**CO1:** Understand second law of thermodynamics and Carnot's cycle.

**CO2:** Know the concepts of free energy functions

**CO3:** Understand galvanic cell and concentration cell. Get idea of nuclear models.

**CO4:** Understand rotational and vibrational spectroscopy. Understand Clarius Mosotti equation.

### **Organic Chemistry III**

**CO1:** Explain preparation, properties of nitroalkane and nitroarenes. Write some named reactions of organic compounds of nitrogen.

**CO2:** Compare aromaticity and basicity of some heterocyclic compounds like furane, pyrrole, thiophene and pyridine.

**CO3:** Analyse quantitatively some elements like carbon, nitrogen, hydrogen, sulphur and halogens.

**CO4:** Get idea about synthesis, chemical reactions of organometallic compound of magneshium and zinc. Know the basic concepts of UV visible spectroscopy and Infrared spectroscopy.

### **Physical Chemistry IV**

**CO1:** Explain preparation, properties of nitroalkane and nitroarenes. Write some named reactions of organic compounds of nitrogen.

**CO2:** Compare aromaticity and basicity of some heterocyclic compounds like furane, pyrrole, thiophene and pyridine.

**CO3:** Analyze quantitatively some elements like carbon, nitrogen, hydrogen, sulphur and halogens.

**CO4:** Get idea about synthesis, chemical reactions of organ metallic compound of magnesium and zinc. Know the basic concepts of UV visible spectroscopy and Infrared spectroscopy.

#### **Inorganic chemistry IV**

**CO1:** Explain and apply concepts of crystal field theory to the transition elements and their complexes.

**CO2:** Apply Jahn-Teller effect and selection rules to 3d –block elements and their complex.

**CO3:** Calculate magnetic moments of transition metal complexes. Understand thermodynamic and kinetic aspects of metal complexes.

**CO4:** Know basic concepts of colorimetry, spectrophotometry and separation techniques like chromatography, ion-exchange and solvent extraction. Understand preparation, properties of some inorganic polymer like silicones and phosphonitirilic halide

#### **Organic chemistry IV**

**CO1:** Discuss the preparation amino acids and peptides. Explain the physical properties of nucleic acids, fats ,oils and detergents.

**CO2:** Learned methods of preparations synthetic dyes. Explain the physical properties of nucleic acids, fats ,oils and detergents.

**CO3:** Explain synthetic dyes, color and constitution.

**CO4:** Classification of carbohydrates. Discussed nuclear magnetic resonance.

### **Course Outcomes (PSOs) of Mathematics**

#### **Algebra and Trigonometry**

**CO1:** Understand rank of matrix, solve system of linear equations by using matrices, find eigen values, eigen vectors and inverse of a matrix

**CO2:** Able to understand about nature of roots of equations, able to solve cubic equations, biquadratic equations and reciprocal equations

**CO3:** Able to understand De-Moivre's theorem, able to define circular, hyperbolic and inverse hyperbolic function and find relation between them

**CO4:** Able to understand concept of group, able to define subgroup, cosets, properties of group, understand Lagrange's theorem, find cycle and transformations of a given permutations

### **Calculus**

**CO1:** Understand  $\epsilon$ - $\delta$  definition of limit and continuity, apply Leibnit'z rule to find  $n^{\text{th}}$  derivative of function

**CO2:** Apply Maclaurin's Theorem and Taylor's Theorem to find series expansion of function, understand L'Hospital's Rule

**CO3:** Understand the concept of partial derivative of a function, apply Euler's Theorem to find partial derivative of homogenous function

**CO4:** Handle various methods of integration. Apply Reduction Formula

### **Geometry, Differential and Difference equation**

**CO1:** Know about and find equations of sphere, cone and cylinder analytically

**CO2:** Understand types of first order differential equations and various methods of solving them

**CO3:** Determine solution of Higher order differential equation

**CO4:** Understand difference equation and find their solution

### **Vector calculus and Improper Integrals**

**CO1:** Understand vector differentiation and apply their knowledge to find gradient, curl and divergence of a function

**CO2:** Understand evaluation of double and triple integral and their applications

**CO3:** Find surface integral, volume integral, understand Green's Theorem, Stoke's Theorem and Divergence Theorem and their applications

**CO4:** Understand the concept of Improper Integral

### **Advance Calculus, Sequence and Series**

**CO1:** Understand and apply principles of mean value of theorems, Taylor's Theorem, Iterated Limits for functions of two variables

**CO2:** Understand the concept and applications of maxima and minima of functions of two variables

**CO3:** Use the knowledge of sequences

**CO4:** Use a knowledge of series, Geometric series and alternating series

### **Differential Equations and Group Homomorphism**

- CO1:** Understand the properties of Bessel's and Legendre's Equations
- CO2:** Know the working principle of Laplace transform
- CO3:** Apply the knowledge of Laplace transform to solve differential equations
- CO4:** Understand the concept of Normal subgroup, Cyclic group, Quotient group and Group homomorphism

### **Partial Differential Equations and Calculus of Variation**

- CO1:** Understand Pfaffian Equation and to find their solution
- CO2:** Solve Lagrange's form of Partial differential equation of first order
- CO3:** Solve Partial differential equations of higher order
- CO4:** Understand the concept of Functional and apply Euler's differential equation to extremise the functional

### **Mechanics**

- CO1:** Understand Coplanar forces, virtual work, catenary and apply the knowledge of equilibrium of coplanar forces
- CO2:** Discuss velocity and acceleration along radial, transverse, tangential and normal directions
- CO3:** Discuss Mechanics of a particle and system of particles
- CO4:** Understand central force and its applications. Discuss equivalent one body problem

### **Analysis**

- CO1:** Understand the concept of Fourier series
- CO2:** Understand the concept of Riemann-Steiltjes integral and its properties
- CO3:** Understand about Analytic function and construct analytic function
- CO4:** Explain about types of elementary transformations

### **Metric Space, Complex Integration and Algebra**

- CO1:** Understand the concept of countability and metric spaces
- CO2:** Acquire the knowledge of compactness, connectedness
- CO3:** Understand the concept of ring
- CO4:** Acquire the knowledge of working of complex integration



### **Abstract Algebra**

- CO1:** Acquire the knowledge of Group Automorphism, conjugacy relation
- CO2:** Understand the concept of vector spaces
- CO3:** Acquire the knowledge of Linear transformation
- CO4:** Understand the principle of associating matrix with linear transformation and linear transformation with matrix. Also the concept of Inner product space

### **Special Theory of Relativity**

- CO1:** Understand basic principle of Newtonian Relativity and Eienstein's theory of relativity
- CO2:** Concept of relativistic velocity and transformation
- CO3:** Acquire knowledge of tensor analysis
- CO4:** Understand the concept of relativistic mass and energy, Maxwell's equations

## **Course Outcomes (PSOs) of Botany**

### **Viruses, Prokaryotes & Algae**

- CO1:** What exactly the study of Botany is also understand the knowledge of Viruses, mycoplasma cell structure
- CO2:** Understand general account , economic importance of Cynobacteria& bacteria
- CO3:** General characteristics & life history of Algae

### **Fungi, Lichen, Plant pathology & Bryophyta**

- CO1:** Classification, General characteristics, life cycles and economic importance of Fungi and Lichen
- CO2:** Understand the knowledge regarding plant diseases and their remedial measures
- CO3:** Classification, General characteristics, life cycles and economic importance of Bryophytes

### **Pteridophytes and Gymnosperms**

- CO1:** Understand Classification, life history, General characteristics of and economic importance of Pteridophytes and Gymnosperms

### **Palaeobotany and Morphology of Angiosperms**

- CO1:** Knowledge of process of fossilization, types of fossils & fossils Gymnosperms
- CO2:** Able to understand the root, stem and leaf morphology

**CO3:** Understand the structure and types of typical flower

**CO4:** Understand the structure and function of accessory and essential floral whorls

### **Angiosperm Taxonomy**

**CO1:** Understand origin of angiosperms and botanical nomenclature

**CO2:** Understand the Classification, and modern trends in taxonomy

**CO3:** Gain the knowledge of some monocot and dicot families

### **Cell biology, Plant breeding & Genetics**

**CO1:** Understand about structure and function of typical plant cell

**CO2:** Gain the knowledge regarding cell organelles, chromosome organization and cell division

**CO3:** Understand the technique of plant breeding

**CO4:** Gain the knowledge of Biostatistics and evolution

### **Anatomy and Morphology of Angiosperm**

**CO1:** Able to gain the knowledge regarding various type of plant tissue

**CO2:** Understand the concept of apical cell theory, Dicot/Monocot, root/stem structure and types of vascular bundle

**CO3:** Understand the concept of secondary growth and anatomy of stem and leaves

**CO4:** Gain the knowledge about pollination, microsporogenesis, megasporogenesis and double fertilization

### **Cell biology, Plant breeding and Genetics**

**CO1:** Understand the concept of Mendalism, interaction of genes and linkage

**CO2:** Gain the knowledge about crossing over, variation in structure and number of chromosomes

**CO3:** Understand the structure and damage-repair of DNA, concept of gene & mutation

**CO4:** Understand the concept of genetic code and gene expression

### **Biochemistry and plant physiology**

**CO1:** Able to understand properties, structure, classification and role of carbohydrate, lipids, amino acids and enzymes

**CO2:** Able to gain knowledge regarding plant, water relation, water conduction and transport

- CO3:** Understand the role and deficiency symptoms of Macro & Micronutrient
- CO4:** Able to understand concepts mechanism of respiration, photosynthesis and Nitrogen metabolism

### **Plant Ecology I**

- CO1:** Understand the concept of ecology, climatic adaphic and physiological factor
- CO2:** Gain the knowledge of biogeochemical cycle, concept of ecosystem in details
- CO3:** Understand the principal of phytogeography, climatic and phytogeographic region of India

### **Plant physiology and Biochemistry**

- CO1:** Concept of growth and growth regulator, circadian rhythms, plants movements
- CO2:** Able to gain knowledge about photoperiodism, seed dormancy, plant defence and **secondary metabolites**
- CO3:** Understand the process and application of plant tissue culture, genetic engineering and DNA library

### **Plant ecology, Technique & Utilization of plants**

- CO1:** Understand the concept and types of plants succession and plant adaptation
- CO2:** able to understand regarding sources and solution of environmental pollution, natural resources & its conservation
- CO3:** Understand principal, types and application of various techniques used in life science studies
- CO4:** Gain knowledge about morphology, utilization and importance of chemical constituents of some food, oil, fibers, spices, beverages, medicinal properties of important plants.
- CO5:** Gain knowledge about branches and importance ethnobotany

## **Course Outcomes (COs) of Zoology**

### **Life and Diversity of Animals – Non chordates (Protozoa to Annelida)**

- CO1:** Identify the general characters of Phylum Protozoa with its classification up to classes.
- CO2:** Describe structure, reproduction of Paramoecium and structure, life cycle of Plasmodium.

- CO3:** Understand mode of infection and control of Parasitic Protozoans of Man – Entamoeba , Trypanosoma, Giardia and Leishmania.
- CO4:** Classify Phylum Porifera with its general characters.
- CO5:** Describe structure, reproduction and development of Sycon and canal system in sponges.
- CO6:** Identifying the general characters of Phylum Coelenterata with its classification up to classes.
- CO7:** Describe structure, life cycle of Obelia and corals, coral reef formation.
- CO8:** Identifying the general characters of Phylum Helminthes with its classification up to classes.
- CO9:** Describing external morphology, reproductive system of Ascaris and life cycle of Ascaris.
- CO10:** Describing structure, life cycle of Taeniasolium and parasitic adaptations in helminthes.
- CO11:** Classifying Phylum Annelida and its general characters.
- CO12:** Describe morphology, digestive, urinogenital system of Leech and Trochophore larva, its significance.
- CO13:** Describe vermiculture and its importance.

### **Environmental Biology**

- CO1:** Describe major zones of Atmosphere, its importance and composition of air.
- CO2:** Write the Global distribution of water and its Physico-chemical characteristics.
- CO3:** Explain types of rocks and formation of soil in detail.
- CO4:** Describe renewable and non- renewable energy sources.
- CO5:** Explain types of Ecosystem and pond ecosystem.
- CO6:** Write the Food chain, food web and ecological pyramids.
- CO7:** Describe energy flow in an ecosystem, Single channel, Y – shape and Universal model.
- CO8:** Describe biodiversity, its conservation and causes of reduction of biodiversity.
- CO9:** Write the wildlife conservation acts (1972 and 1984), introductory study of national parks and sanctuaries – Tadoba, Kanha, Bharatpur and Nagzira.
- CO10:** Describe Hot spots of biodiversity in India.

**CO11:** Write down the sources, effect and control measures of water pollution, noise pollution, air pollution, Acid rain, green house effect, ozone depletion and global warming

**CO12:** Describe the toxic effect of heavy metals (lead, cadmium and mercury) – Bioaccumulation and biomagnifications

### **Life and Diversity of Animals – Nonchordates (Arthropoda to Hemichordata)**

**CO1:** Identify the general characters of Phylum Arthropoda and Echinodermata with its classification up to classes.

**CO2:** Describe mouth parts, digestive system and reproductive system of Cockroach

**CO3:** Identify Mosquito, Housefly, Sandfly, Tse-Tse fly as insect vectors.

**CO4:** Describe crustacean larvae, Nauplius, Zoea, Megalopa and social behavior in honeybees.

**CO5:** Identify the general characters of Phylum Mollusca with its classification up to classes.

**CO6:** Describe morphology, digestive, respiratory and reproductive system of Pila.

**CO7:** Explain the process of pearl formation in Mollusca.

**CO8:** Describe molluscan larvae, Glochidium, Veliger, Echinoderm larvae, Bipinnaria and Auricularia.

**CO9:** Describe external features, digestive, water vascular system and locomotion in Starfish

**CO10:** Describe general characters of phylum Hemichordata, its phylogeny reproduction, Tornaria larva and affinities of Balanoglossus

### **Cell Biology**

**CO1:** Explain ultra-structure of Prokaryotic and Eukaryotic cell.

**CO2:** Explain Structure of Fluid mosaic model of plasma membrane and its functions.

**CO3:** Describe ultra-structure and function of Endoplasmic reticulum and Golgi apparatus.

**CO4:** Explain ultra-structure of mitochondria and oxidative phosphorylation: Glycolysis, Krebs's Cycle, Electron transport chain and terminal oxidation.

**CO5:** Describe Structure, polymorphism and functions of Lysosomes.

**CO6:** Describe Ultra-structure of nuclear membrane.

- CO7:** Explain structure and functions of nucleolus.
- CO8:** Describe the Structure, types of chromosome and structure of nucleosome, Lamp-brush and polytene chromosome.
- CO9:** Explain structure, types of Ribosome and Lake's model.
- CO10:** Write the Cell cycle, Mitosis, Meiosis and synaptonemal complex.
- CO11:** Describe the cellular ageing and cell death, Elementary idea of cancer and its causative agents.

### **Life and Diversity of Animals – Chordates (Protochordata to Amphibia)**

- CO1:** Classify protochordata up to order and write down the general characters.
- CO2:** Write the Structure, digestive system, ascidian tadpole and retrogressive metamorphosis in Herdmania.
- CO3:** Explain Structure, digestive system, circulatory system, sense organs and protonephridia in Amphioxus.
- CO4:** Write the General characters of Petromyzon, Myxine, Salient features of Chondrichthyes, Osteichthyes and Origin of paired fins in fishes.
- CO5:** Describe Migration and Accessory respiratory organs in fishes.
- CO6:** Write the General characters Amphibia and classify up to order.
- CO7:** Describe Parental care and Neoteny in Amphibia.
- CO8:** Describe the Gametogenesis and type of eggs and Fertilization of egg
- CO9:** Explain Post fertilization development, Types of scales and Development of placoid scales in fishes.
- CO10:** Describe cleavage, blastulation and gastrulation in frog.
- CO11:** Describe the Fate map, Morphogenetic movements in gastrula of frog
- CO12:** Describe Development of respiratory organs and Aortic arches in frog

### **Life and Diversity of Animals – Chordates (Reptilia, Aves and Mammals)**

- CO1:** Classify Reptiles based on temporal vacuities
- CO2:** Explain Poison apparatus, biting mechanism, snake venom and its importance
- CO3:** Describe Comparison of Ratitae and Caranitae, Flight adaptations and migration in birds
- CO4:** Write the general characters of Prototheria, Metatheria and Eutheria
- CO5:** Describe Darwinism and Neo-Darwinism

- CO6:** Write the Cursorial, Aquatic, Terrestrial, Fossorial and Volant adaptation.
- CO7:** Write the genetic basis of evolution with special reference to species, deme and variation.
- CO8:** Describe Caucasoid, Negroid, Mongoloid and Australoid races in man.
- CO9:** Describe Comparative account of aortic arches and heart in Reptiles, Birds and Mammals.
- CO10:** Explain Structure of hen's egg and development of chick up to primitive streak stage.
- CO11:** Describe the Development of extra embryonic membranes in chick and functions.
- CO12:** Describe Blastocyst, implantation in Mammals, Types of placenta on the basis of morphological and histological structure and functions of placenta.
- CO13:** Explain Sources, types of stem cells and their use in human welfare.
- CO14:** Write the diurnal and rhythmic behavior in bird, mammals and role of pheromones in reproductive behavior

### **Molecular Biology and Immunology**

- CO1:** Explain structure of DNA, RNA, forms of DNA, types of RNA and properties of DNA, DNA and RNA as a genetic material
- CO2:** Describe Prokaryotic and eukaryotic gene structure.
- CO3:** Describe Bacterial transformation – Griffith's experiment, Conjugation in bacteria, Transduction.
- CO4:** Explain Semiconservative model, Meselson Stahl experiments.
- CO5:** Describe origin of replication, concept of replication, directionality of replication and Characteristics of genetic code, Wobble hypothesis.
- CO6:** Describe Transcription and Translation mechanism of protein synthesis.
- CO7:** Explain gene regulation model: Lac operon and tryptophan operon.
- CO8:** Describe Innate and acquired immunity, organs of the immune system.
- CO9:** Explain Structure, diversity, functions and types of antigen and antibody.
- CO10:** Explain Antigen-antibody interaction and B cell response, T cell response.
- CO11:** Describe Complement system and General account on cytokines, Cytokine related diseases.

**CO12:** Describe Autoimmune diseases and their treatment, AIDS and other immunodeficiency's

### **Applied Zoology-I (Aquaculture and Economic Entomology)**

**CO1:** Describe the site selection and construction, Pre stocking and post stocking management of nursery, rearing and stocking ponds.

**CO2:** Explain breeding of fishes by bund, Chinese hatcheries, Induced breeding by hypophysetion and New generation drugs.

**CO3:** Explain polyculture, cage culture, sewage fed fish culture, integrated fish farming

**CO4:** Explain fish products, byproducts and Fish preservation.

**CO5:** Explain prawn culture and pearl culture.

**CO6:** Describe fabrication and setting up of aquarium, its maintenance and breeding of aquarium fishes.

**CO7:** Describe diseases caused by fungi, bacteria, protozoa and helminthes.

**CO8:** Describe Chemical control mode of action, merits and demerits.

**CO9:** Explain Biological agents – predators and parasites; merits and demerits.

**CO10:** Describe Life cycle, damage and control of Cotton spotted boll worm, Sitophilus oryzae, Muscanebulo and Stomoxyscalcitrans

**CO11:** Explain Types of Silkworm and Life cycle and rearing of mulberry silkworm, Bombyxmori and non mulberry silkworm (Tasar), Antheraeamylitta.

**CO12:** Explain coccon processing for silk fabric - coccon boiling, reeling, rereeling, winding, doubling, twisting and weaving.

**CO13:** Explain Types of honey bees. Life cycle, culture, movable frame hive, bee product and its economic Importance

**CO14:** Explain Lacciferlacca - Life cycle, Lac processing, Lac products and Economic Importance.

### **General Mammalian Physiology –I**

**CO1:** Describe distribution, chemical nature of enzymes and general properties of enzymes

**CO2:** Classify the enzymes and explain factors affecting enzyme activity.

**CO3:** Describe structure and functions of digestive glands such as Salivary, Gastric, Intestinal, Liver and Pancreas



- CO4:** Explain gastrointestinal hormones and digestion, absorption of proteins, carbohydrates and lipids.
- CO5:** Describe fat soluble and water soluble vitamins, identifying sources, deficiency and diseases of vitamins.
- CO6:** Describe types, distribution and properties of respiratory pigments, mechanism of respiration and transport of O<sub>2</sub> and CO<sub>2</sub> .
- CO7:** Describing respiratory disorders and effects of smoking.
- CO8:** Describe composition, functions of blood and intrinsic, extrinsic factors involved in blood clotting.
- CO9:** Describe blood groups and Rh factor.
- CO10:** Explaining cardiac cycle, E.C.G. and Blood pressure.,

**Applied Zoology –II (Biotechniques, Microtechnique, Biotechnology, Bioinformatics and Biostatistics)**

- CO1:** Explain filtration, autoclaving, dry heat sterilization, wet sterilization and radiation
- CO2:** Explain Centrifugation and Chromatography.
- CO3:** Describe Agarose gel electrophoresis, SDS-PAGE.
- CO4:** Explain Principles of colorimeter and spectrophotometers.
- CO5:** Describe fixation, dehydration, clearing, embedding, section cutting and difficulties encountered during section cutting.
- CO6:** Describe double staining with Haematoxylin and Eosin.
- CO7:** Describe histochemical staining techniques for carbohydrate, proteins and lipids
- CO8:** Describe Basic concepts in recombinant DNA technology using shotgun cloning and DNA manipulation enzymes.
- CO9:** Describe Insertion of DNA and ligation using blunt ends, cohesive ends, Cloning vectors.
- CO10:** Explain Application of biotechnology for Insulin and vaccine production.
- CO11:** Explain basic concepts in bioinformatics, importance and role of bioinformatics in life sciences and types of databases used in bioinformatics.
- CO12:** Explain Nucleotide sequence databases, Elementary idea of protein databases.
- CO13:** Describe Tabulation of data, presentation of data, sampling errors, mean, mode,

median, probability, standard error and standard deviation.

## **Course Outcomes (COs) of Microbiology**

### **History and Microbial Morphology**

- CO1:** Historical development of microbiology and various branches of microbiology are explained to students
- CO2:** Typical structure of bacteria and its sub-cellular parts are described
- CO3:** Various external cellular parts are described
- CO4:** Various spores of Eukaryotic and Prokaryotic cells are explained with its significance
- CO5:** Various ways of classical and modern classification of microorganisms is explained with its significance

### **Microbial Diversity**

- CO1:** Types of prokaryotic microbes with special features are explained
- CO2:** Various Eukaryotic microbes are explained with their characters and examples
- CO3:** Acellular Microbes i.e. viruses are explained with reference to similarity in structure and classification
- CO4:** Life cycle of Bacteriophage is explained
- CO5:** Various types of Microbial interactions are explained with definition and suitable examples

### **Microbial Physiology**

- CO1:** Various nutritional types of bacteria, growth media are described
- CO2:** Bacterial growth, methods of Microbial growth and factors affecting microbial growth are explained
- CO3:** The concept of Microbial death is explained with various microcidal agents with special reference to physical agents
- CO4:** Students are made to understand that Microorganisms are controlled by various chemical agents
- CO5:** The mechanism of microbial cell injury and factors influencing anti-biotic activity are explained.

### **Microbial Techniques**

- CO1:** Various types of Microscope - principles are explained
- CO2:** Various types of Microscope - applications are explained
- CO3:** Various types of stains and dyes, various staining techniques are explained
- CO4:** Various methods of pure cultures are explained. Determination of C, N, P for microbes and their measurement of growth is described

### **Chemistry of organic constituents and Enzymology**

- CO1:** Classification, bonding structures and monomers of carbohydrates and lipids is explained
- CO2:** Classification of Amino acids, titration curves and their characteristics is explained at organizational level of protein and their characteristics are explained
- CO3:** Definition, nature of enzyme, classification, nomenclature is described in detail
- CO4:** Structure and various forms of nucleic acids are explained
- CO5:** Various types of vitamins and classification are explained

### **Industrial Microbiology**

- CO1:** Definition, scope and general concept of Industrial Microbiology is explained.
- CO2:** Student will be able to understand design or affecting, types of fermentation
- CO3:** Types of fermentation process are explained
- CO4:** Various processes required before and after fermentation are explained.
- CO5:** Biochemistry, recovery and uses of various microbial products are explained at industrial level

### **Metabolism**

- CO1:** Process of Metabolism with various pathways is explained
- CO2:** Various methods of lipid oxidation are explained.
- CO3:** Replication of DNA and
- CO4:** Method of prokaryotic transcription is explained
- CO5:** Various metabolic reactions with reference to amino acids is described
- CO6:** Students are able to understand concept of Genetic code
- CO7:** Prokaryotic translation is explained
- CO8:** Energy generation at various levels in cellular metabolism is explained

### **Applied Microbiology**

- CO1:** Significance of bacteriological analysis of water and various methods use for water treatment are explained.
- CO2:** Various types of sewage, its composition and characteristics along with sewage treatment is explained.
- CO3:** Techniques used for microbial analysis of air are explained to students
- CO4:** Various microorganisms as bio-pesticides are explained
- CO5:** Different microbes used in bio-fertilizers are explained.
- CO6:** Microbial leaching are explained
- CO7:** Students will be able to understand Food spoilage microorganisms
- CO8:** Various methods of food preservation and food related diseases are explained.

### **Medical Microbiology**

- CO1:** Various definitions, cause of disease and Host-parasite relationship is explained
- CO2:** Mechanism of pathogenicity is explained with various examples
- CO3:** Study of systematic identification of microorganisms is explained with reference to Pathogenic microorganisms
- CO4:** The principle of Drug designing and Drug Delivery system is described with reference to various antibiotics and anti-metabolite drugs.

### **Molecular biology and Bioinstrumentation**

- CO1:** Various terms and definitions are explained and mechanism of operation is explained.
- CO2:** Various definitions and concepts along with methods of genetic recombination are explained.
- CO3:** Principles of application of centrifugation and electrophoresis are explained
- CO4:** Student will be able to learn principle, types and application of spectroscopy
- CO5:** Principle, types and application of chromatography are explained
- CO6:** Student will be able to learn different uses of isotopes
- CO7:** Detection and Measurement of radioactivity will be taught to students

### **Immunology**

- CO1:** Various types of immunity are explained and mechanism of operation is explained.

- CO2:** Various types of Immunity at cellular level will be explained.
- CO3:** Definitions, types and reactions of various antigen-antibody are described.
- CO4:** Various definitions, classification of hypersensitivity reaction are described.

### **Biotechnology**

- CO1:** Various methods of gene manipulation are explained.
- CO2:** Different types of enzymes used in recombinant DNA technology are explained
- CO3:** Use of Genetic Engineering in the application of vaccines will be explained.
- CO4:** Students will be able to understand Use of Genetic Engineering in the application of hormones.
- CO5:** Various aspects of biotechnology like protoplast fusion
- CO6:** Use of Genetic Engineering in the application of bio-pesticides and bio-fertilizer, will be taught to students
- CO7:** Ethics and hazards of Genetic Engineering are explained
- CO8:** Student will be able to understand biosensors
- CO9:** Student will be able to understand genetically modified food
- CO10:** Transgenic plants and animals are explained with examples
- CO11:** Student will be able to understand Oriental food like Soya sauce, Miso and Sifu

## **Course Outcomes (COs) of Biochemistry**

### **Biomolecules and human physiology**

- CO1:** Define & describe carbohydrate & lipids and understand structural features along with its classification
- CO2:** Describe the structure of muscles, neuromuscular junction, and mechanism of membrane transport and calcium pump.

### **Microbiology and virology**

- CO1:** Understand the basics of microbial world and microscopy applications in discovery of microbial world.
- CO2:** Apply the principles of different staining procedures for understanding morphological features of bacteria.

## **Human physiology**

- CO1:** Describe mechanism of excretion and reproduction in detail in human physiology.
- CO2:** In hematology, able to discover composition of blood, blood groups, its function and structure of hemoglobin.
- CO3:** Describes the basic concepts of Neurobiology (structure of neuron, nerve fiber and mechanism of synapses)
- CO4:** In Endocrine, importance of endocrine glands, their hormones functions and secondary hormones.

## **Microbiology and immunology**

- CO1:** In nutrition, learn about growth and nutritional requirement of bacteria and its classification based on various nutritional requirements and conditions
- CO2:** learn various modes of microbial control and its mechanism
- CO3:** Describe antigen, antibodies, monoclonal antibodies and & their applications. Also understand cellular and humoral immunity

## **Macromolecules**

- CO1:** Able to understand basics of amino acids fundamental blocks of a protein and its importance in organization of primary, secondary, tertiary and quaternary structures.
- CO2:** Describe DNA structure and its molecular level interactions. Understands the basic principles of DNA sequencing.
- CO3:** Understand principle, working and applications of UV-Vis spectro-photometry.

## **Biophysical techniques**

- CO1:** Describe the mechanism of buffer action, buffer capacity and titration curve of acids and amino acids.
- CO2:** Understand working of chromatography as bio-separation technique along with principle, setup and applications of various partition, adsorption and column chromatography including well advanced HPLC

## **Enzymology**

- CO1:** Grasp basics of Enzymology and its classification along with the concept of isozymes, allosteric enzymes and metal ion catalysis.

**CO2:** Understand concept and applications of various enzyme kinetic reactions and assays

### **Biophysical and biochemical techniques**

**CO1:** Able to understand principle, working and applications of various electrophoresis techniques. Agarose gel electrophoresis, PAGE, SDS-PAGE, Iso-electric focusing and pulsed field gel electrophoresis. Understand principle and applications of agglutination, precipitation, ELISA in disease diagnosis and importance of vaccination in detail

**CO2:** Brief concept, importance and role of stable and radioactive isotopes in isotopic tracer techniques.

**CO3:** Understand basic concept, principle and application of preparative and analytical centrifuge in detail as bio-separation technique

### **Metabolism1**

**CO1:** Learn bioenergetics specially related to ATP, phosphoenolpyruvate and creatine phosphate

**CO2:** Build background about various bioenergetic pathways such as glycolysis, gluconeogenesis, TCA cycle and their role in cellular metabolism

### **Molecular biology**

**CO1:** Figure out Basics of DNA Replication, Transcription and translation processes in prokaryotes and eukaryotes in detail

**CO2:** Get knowledge of various mutagens and mutations and DNA repair mechanisms in response to it

**CO3:** Understand regulation of transcription and translation in prokaryotes along with Lac and Trp operon models

**CO4:** Learn about lipid metabolism related pathways such as  $\beta$  oxidation pathways, ketogenesis and biosynthesis of fatty acid chains

### **Metabolism -2**

**CO1:** Understand metabolism of nitrogenous compounds by learning urea cycle, transamination and salvage pathway and its mutation related disorders

**CO2:** Acquire knowledge of recombinant DNA technology with role of various restriction enzymes, Ligases, Polymerases, Reverse Transcription and other DNA Modifying enzymes

### **Molecular biology and r-DNA Technology**

**CO1:** Understand role of various plasmid, phagemid, cosmid, YAC, BAC vectors for making genomic, cDNA and expression vectors libraries

**CO2:** Become familiar with basics of PCR and its role as advanced genetic technique

## **Course Outcomes (COs) of Biotechnology**

### **Microscopy and Basics of Micro-organisms**

**CO1:** Understand the basics of microbial world and microscopy applications in discovery of microbial world

**CO2:** Understand principle and applicability of different staining procedures for understanding different morphological features of bacteria and viruses

**CO3:** Understand generalized morphological features of bacteria and viruses in detail along with its various classification criteria

**CO4:** Learn different microbial growth microscopic methods to study bacteria and its different morphological features

### **Basics of Nucleic Acids and Protein**

**CO1:** Understand basics of genetic organization of chromosome, gene and DNA structure and its molecular level interactions

**CO2:** Understand basics of amino acids a fundamental blocks of a protein and its importance in organization of primary, secondary, tertiary and quaternary structures

**CO3:** Learn colorimetric methods for quantitative estimation of proteins, DNA and RNA

### **Microbial Growth and Control**

**CO1:** Understand growth and nutritional requirement of bacteria and its classification based on various nutritional requirements and conditions

**CO2:** Learn various modes of microbial control and its mechanism

**CO3:** Learn microbiological pure culture based methods



**CO4:** Learn effect of oligodynamics and antibiotic sensitivity assay in pure culture

### **Eukaryotic Cell**

**CO1:** Understand morphological details of various subcellular structures of eukaryotic cells

**CO2:** Understand eukaryotic cell division along with specialized feature of neuromuscular junction

### **Basics of Carbohydrates and Lipids**

**CO1:** Understand structural features of carbohydrates and lipids along with its classification in detail

**CO2:** Learn colorimetric methods for quantitative estimation of sugars

**CO3:** Learn to estimate acid value and saponification value of lipids, assay based concentration of alkaline phosphates

**CO4:** Learn qualitative estimation of sugars

### **Basics of Enzymology**

**CO1:** Understand basics of Enzymology and its classification along with the concept of isozymes, allosteric enzymes and metal ion catalysis

**CO2:** Understand various factors affecting enzymatic activity

**CO3:** Understand concept and applications of various enzyme kinetic reactions and assays

### **Bioenergetics and Metabolic Pathways**

**CO1:** Learn bioenergetics specially related to ATP, phosphoenol pyruvate and creatine phosphate

**CO2:** Understand various bioenergetic pathways such as glycolysis, gluconeogenesis, TCA cycle and their role in cellular metabolism

**CO3:** Understand lipid metabolism related pathways such as  $\beta$  oxidation pathways, ketogenesis and biosynthesis of fatty acid chains

**CO4:** Understand metabolism of nitrogenous compounds by learning urea cycle, transmission and salvage pathway and its mutation related disorders

**CO5:** Learn how to use Spectrophotometric analysis for various biomolecules such as NAD and creatinin

## **Spectrophotometry and Chromatography**

- CO1:** Understand principle, working and applications of UV-Vis spectrophotometry, IR spectroscopy, spectrofluometry, mass spectroscopy and flame spectrophotometry along with its importance as bioanalysis technique
- CO2:** Understand chromatography as bioseparation technique along with principle, setup and applications of various partition, adsorption and column chromatography including well advanced HPLC
- CO3:** Learn how to use Spectrophotometric analysis to determine concentration of DNA and protein
- CO4:** Learn use of Paper Chromatography and TLC use in separation of sugars and amino acids

## **Immunology**

- CO1:** Understand human immune system with role of various organs and tissues in immunity along with innate and acquired immunity
- CO2:** Understand hypersensitivity types and immune disorders
- CO3:** Understand principle and applications of agglutination, precipitation, CFT, ELISA in disease diagnosis and importance of vaccination in detail
- CO4:** Learn the use of various antigen-antibody reactions such as blood grouping, Pergnancy test, Widal test, ELISA, Radial and Ouchterloney immunodiffusion

## **Electrophoresis, Radioactivity and Centrifugation as bioseparation and bioanalysis techniques**

- CO1:** Understand principle, working and applications of various electrophoresis techniques such as Cellulose acetate electrophoresis, Agarose gel electrophoresis, PAGE, SDS-PAGE, Isoelectri focusing and pulsed field gel electrophoresis
- CO2:** Understand concept, importance and role of stable and radioactive isotopes in isotopic tracer techniques
- CO3:** Understand basic concept, principle and application of preparative and analytical centrifuge in detail as bioseparation technique
- CO4:** Learn the skill for separation of proteins using isoelectric precipitation, PAGE and SDS-PAGE

## **Biostatistics**

- CO1:** Understand concept and role of various central tendency measurements in biostatistics
- CO2:** Learn various biostatistics calculations such as mean, mode, median and standard deviation

## **Replication, Transcription and Translation**

- CO1:** Understand DNA Replication, Transcription and translation processes in prokaryotes and eukaryotes in detail
- CO2:** Get knowledge of various mutagens and mutations and DNA repair mechanisms in response to it
- CO3:** Understand regulation of transcription and translation in prokaryotes along with Lac and Trp operon models
- CO4:** Learn the skill of isolation of DNA and RNA and determination of its concentration through UV Vis spectrophotometry

## **Recombinant DNA Technology**

- CO1:** Understand basics of recombinant DNA technology with role of various restriction enzymes, Ligases, Polymerases, Reverse Transcription and other DNA Modifying enzymes
- CO2:** Understand role of various plasmid, phagemid, cosmid, YAC, BAC vectors for making genomic, cDNA and expression vectors libraries
- CO3:** Understand basics of PCR and its role as advanced genetic technique
- CO4:** Learn the skill of isolation of Genomic, Plasmid DNA and determination of its concentration through UV Vis spectrophotometry
- CO5:** Learn the skills of restriction digestion and ligation of the DNA

## **Waste Water Treatment and Industrial Biotechnology**

- CO1:** Understand basics, importance and applications of water treatments and waste water treatment processes along with its assessment parameters
- CO2:** Understand problems associated with bioaccumulation and biomagnification of xenobiotic compounds towards ecosystem
- CO3:** Understand basics of industrial and food biotechnology along with cheese and mushroom production and importance and screening of GMOs for it

**CO4:** Understand quality assessment measures adopted in food and pharmaceutical industries

**CO5:** Learn microbial assessment methods such as IMViC, MF, DO for water quality assessment

**CO6:** Learn methods to isolate azotobacter and Rhizobium

**CO7:** Learn assay of amylase as quality measure for industrial screening

### **Tissue Culture Technology: Basics and Application**

**CO1:** Understand basic laboratory setup and establishment of various plant tissue culture and animal tissue culture methods

**CO2:** Understand use of vectors and genetic engineering technology for production of transgenic animals

**CO3:** Understand use of vectors and in vitro fertilization technology in production of transgenic animals

**CO4:** Understand industrial level production of Hepatitis B vaccine and medical important proteins using rDNA technology and Animal Tissue Culture

**CO5:** Understand basics of gene therapy and in vitro fertilization in humans

**CO6:** Learn Laboratory setup of callus, suspension and another culture

**CO7:** Learn skills to develop primary cell culture and maintenance of cell lines

## **Course Outcomes (COs) of Electronic**

### **Electronic Components, Network Theorems**

**CO1:** Understanding of basic components for working and applicability, Identification devices and instruments in LAB.

### **Fundamentals of Digital Electronics**

**CO1:** Concept of Digital electronics, gates their functioning and logical application

### **Semiconductor Devices**

**CO1:** Understanding of Semiconductor devices for working, characteristics and applicability, concept of amplification, control and power

### **Advanced Digital Electronics**

**CO1:** Introduction to sequential logic, Flip-flop, registers and counter, IC based digital systems

### **OP AMP and Power Supply**

**CO1:** Concept of feedback, ideal amplifier characteristics concept of OP-AMP, Design and working of DC regulator power supply

### **Electronic Circuit Design**

**CO1:** Designing of electronics circuits, its conceptualization designing optimization, component selection and prototyping through Simulation

### **Analogue and Digital Techniques**

**CO1:** Concept of Oscillators, Analog to Digital convertors and vice versa

### **Electronic Instrumentation**

**CO1:** Analysis of transducers and standard system for various combination of sensors and processes

### **Electronics Communication**

**CO1:** Technical know-how of communication system, EM wave propagation, Analog and digital communication

### **Fundamentals of Microprocessor**

**CO1:** In depth understanding about Microprocessor

### **Programming in “C”**

**CO1:** Enhancing programming ability and skills through C language

### **Microcontroller 8051**

**CO1:** In depth understanding about Microcontroller and introduction to embedded systems

## **Course Outcomes (COs) of Computer Science**

### **Programming in C**

**CO1:** Analyse a given problem and develop an algorithm to solve the problem.

**CO2:** Develop conditional and iterative statements to write C programs

**CO3:** Use the 'C' language constructs in the right way Design, develop and test programs written in 'C'.

**CO4:** Understand the basic terminology used in computer programming

**CO5:** Write, compile and debug programs in C language.

**CO6:** Use different data types in a computer program.

- CO7:** Design programs involving decision structures, loops and functions.
- CO8:** Explain the difference between call by value and call by reference
- CO9:** Understand the dynamics of memory by the use of pointers and Structures.
- CO10:** Use different data structures and create/update basic data files.

### **Fundamentals of Information Technology**

- CO1:** Ability to understand theory of Digital Design and Computer Organization to provide an insight of how basic computer components are specified.
- CO2:** An ability to understand the functions of various hardware components and their building blocks.
- CO3:** Ability to understand and appreciate Boolean algebraic expressions to digital design.
- CO4:** Understanding of sequential! Combinational circuits.
- CO5:** Understanding of realization of different combinational/sequential circuits.
- CO6:** Understanding of different stages of an instruction execution.
- CO7:** An in depth understanding of how different hardware components are related and work in coordination.
- CO8:** Ability to understand computer buses and input/output peripherals.

### **Object Oriented Programming using ‘C ++’**

- CO1:** Understand the difference between object oriented programming and procedural oriented language and data types in C++.
- CO2:** Program using C++ features such as composition of objects, Operator overloading, inheritance, Polymorphism etc.
- CO3:** Simulate the problem in the subjects like Operating system, Computer networks and real world problems.

### **System Analysis and Design**

- CO1:** Extract and analyze software requirements specifications for different projects.
- CO2:** Develop some basic level of software architecture/design.
- CO3:** Define the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.
- CO4:** Identify and implement of the software metrics.

**CO5:** Apply different testing and debugging techniques and analyzing their effectiveness.

### **Data Structures**

**CO1:** Access how the choices of data structure & algorithm methods impact the performance of program.

**CO2:** Solve problems based upon different data structure & also write programs.

**CO3:** Choose an appropriate data structure for a particular problem.

**CO4:** Implementation of recursive problem solution approach variety of real life application and game programming i.e. ToH, water jug problem etc.

**CO5:** Implementation for linear data structure like array, stack and linked list for different variety of application along with complexity of algorithm.

**CO6:** Implementation for non- linear data structure like tree and graph specific objective to different data model i.e. network hierarchical data base etc.

### **Operating Systems**

**CO1:** Make students able to learn different types of operating systems along with concept of file systems. And used in operating system.

**CO2:** Students are able to choose appropriate CPU scheduling algorithms primitive & non primitive.

**CO3:** Provide student knowledge of memory management and deadlock handling algorithms.

**CO4:** Students are able to choose appropriate Disk scheduling algorithms

**CO5:** At the end of the course, implement various algorithms required for management, scheduling, allocation and communication used in Operating System.

### **Java Programming**

**CO1:** Understanding of the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements;

**CO2:** Ability to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.

**CO3:** Demonstrate the principles of object oriented programming;

**CO4:** Demonstrate the ability to use simple data structures like arrays in a Java program.

**CO5:** Understand the concept of package, interface, multithreading and File handling in java.

### **Linux Operating System**

**CO1:** Know the basic concepts of Linux operating System.

**CO2:** Familiar with Linux commands.

**CO3:** Understand open source and its flexibility of different distribution of operating system.

**CO4:** Create any type of server such as Apache server, Tomcat etc.

### **Visual Basic Programming**

**CO1:** Design, create, build, and debug Visual Basic applications.

**CO2:** Explore Visual Basic's Integrated Development Environment IDE.

**CO3:** Implement syntax rules in Visual Basic programs.

**CO4:** Explain variables and data types used in program development.

**CO5:** Apply arithmetic operations for displaying numeric output.

**CO6:** Write and apply decision structures for determining different operations.

**CO7:** Write and apply loop structures to perform repetitive tasks.

**CO8:** Write and apply procedures, sub-procedures, and functions to create manageable.

### **Database Management System**

**CO1:** Gain a good understanding of the architecture and functioning of database management systems as well as associated tools and techniques, principles of data modelling using entity relationship and develop a good database design and normalization techniques to normalize a database.

**CO2:** Understand the use of structured query language and its syntax, transactions, database recovery and techniques for query optimization.

**CO3:** Acquire a good understanding of database systems concepts and to be in a position to use and design databases for different applications.

### **Compiler Construction**

**CO1:** Enable to understand fundamental aspects of automata theory and its application for compiler constructor.



- CO2:** Enable to recognize & understood different compiler construction tool available in market.
- CO3:** Master using lexical analyzer and parser generator tools.
- CO4:** Master building symbol tables and generating intermediate code.
- CO5:** Understand generating machine dependent & independent phases of compiler i.e front end, intermediate code generator & back end
- CO6:** Understand programming in Java.
- CO7:** Familiar with compiler architecture.
- CO8:** Familiar with register allocation.
- CO9:** Exposed to compiler optimization.

### **SQL AND PL/SQL**

- CO1:** Have a broad understanding of database concepts and database management system software
- CO2:** Have a high-level understanding of major DBMS components and their function
- CO3:** Able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.
- CO4:** Able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
- CO5:** Able to program a data-intensive application using DBMS APIs.

### **Course Outcomes (COs) of Compulsory English (B.Sc.)**

- CO1:** Illustrate the nature of literary forms like prose, poem and short stories.
- CO2:** Learn to draft application letters.
- CO3:** Comprehend and compose the passages.
- CO4:** Develop vocabulary skills through one word substitute.
- CO5:** Learn synonyms and Antonyms and apply them in sentences.
- CO6:** Appropriate use of parts of speech.
- CO7:** Learn to draft curriculum vitae.
- CO8:** Learn to apply different parts of grammar.
- CO9:** Learn to identify common errors in English.

**CO10:** Learn to make sentences from the given words.

### **Course Outcome (COs) of Supplementary English (B.Sc.)**

**CO1:** Illustrate the nature of literary forms like prose, poems, short stories and prose-poetry.

**CO2:** Comprehend the passage and make précis of it.

**CO3:** Improve vocabulary by learning one word for a group of words.

**CO4:** Learn word formation rules.

**CO5:** Improve essay writing skills.

**CO6:** Introduction of foreign words in English and their application.

**CO7:** Learn to prepare news reports.

**CO8:** Learn to prepare Advertisements

### **Course Outcome (COs) of Hindi (B.Sc.)**

**COS1:** fo |kfFkZ;ksa esa fganh Hkk"kk vkSj mlls tqM+h fo/kkvksa tSlS dfork] dgkuh] fuca/k] i=ys[ku] lekpkj ys[ku] fjiksrkZt vkfn ds izfr vfHk#fp mRiUu djrs gq, v/;;u gsrq izsfjr djuka

**COS2:** 'kqn~/k ,oa Li"V mPpkj.k o 'kqn~/k orZuh ds lkFk 'kCnKku esa o`fn~/k djuka

**COS3:** /kkjkizokg dkO; iBu o x| iBu {kerk esa c<+ksRrjh dk fuekZ.k djuka

**COS4:** okn&fookn] Hkk"kk.k vkfn izLrqfr dh ;ksX;rk dk fuekZ.k

**COS5:** lkfgR; ds izfr vfHk:fp mRiUu djuka

**COS6:** fojke fpg~uksa dk mfpr iz;ksx] O;kdjf.kd fu;eksa rFkk fganh ds ekud :i vkfn dh tkudkjh nsrs gq, ewy lkfgR;d ikBksa ds vFkZ vfHkxzg.k {kerk dk fodkl djuka

**COS7:** lewg ppkZ rFkk fo"k; fo'ys"kk.k ds izfr vfHk:fp mRiUu djuka

**COS8:** fo |kfFkZ;ksa esa fganh Hkk"kk ds ek;/e ls uSfrd psruk] lkekftd nkf;Ro cks/k dk fuekZ.k djuka

## Course Outcomes (COs) of B. Com.

### Financial Accounting I & II

- CO1: To understand the meaning, objectives and principles of Accounting.
- CO2: To understand Accounting Standards- AS 1 to AS 10
- CO3: To know how the accounting entries are posted in books.
- CO4: To know the accounting system for sole trading.
- CO5: To understand about distinction between Hire Purchase and Installment System and how to maintain books of recording under hire purchase installment method.
- CO6: To understand the concept, Distinctions between Joint venture and Partnership.
- CO7: Recording entries of joint venture account.

### Business Economics I & II

- CO1: Identify and use of economic terminologies.
- CO2: Students will apply the basic theories of economics in critical thinking and problem solving of business matters.
- CO3: Make decisions wisely using cost-benefit analysis.
- CO4: Students will demonstrate an understanding of their personal interests, abilities, strengths and weaknesses as they pertain to professional career fields.
- CO5: Students will demonstrate basic understanding of career options available to them and will establish career objectives.
- CO6: Students will demonstrate their knowledge of the fundamental and technical concepts of economics.

### Business Management & Organization

- CO1: Develop the knowledge of business and management principles
- CO2: Learn decision thinking and problem skills
- CO3: Study effective Organization and Organization structure
- CO4: Teach a sense of responsibility and a capacity for business management.
- CO5: Enable an awareness of the global environment in which business operate
- CO6: Develop the knowledge of business and management principles
- CO7: Learn critical thinking and problem skills
- CO8: Enable an awareness of the global environment in which business operate

**CO9:** Develop knowledge of Nature and scope of business, Forms of Business Units, Types of Organization- Line and Staff, Modern types of organizations Project, Matrix, Formal and Informal Organization, Recent Trends in Business Organization

### **Business Statistics**

- CO1:** Able to understand Meaning, Scope, Importance, Functions and Limitations of Statistics
- CO2:** Students can make Collection of data, Tabulation and Classification, Frequency distribution. Mean, Median, Mode, Geometric Mean and Harmonic Mean
- CO3:** Learn Meaning and significance of dispersion Mean Deviation, Standard Deviation, Quartile Deviation etc.
- CO4:** Able to understand Skewness-Absolute Measures of Skewness, Relative Measures of Skewness, Karl Pearson's Coefficient of Skewness, Bowley's Coefficient of Skewness.
- CO5:** Develop basic knowledge of Business Mathematics in students.

### **Corporate Law**

- CO1:** Provide the knowledge of company, shares and Kinds of the company
- CO2:** It describes the features of private companies in India and development of Indian company act
- CO3:** This subject also describes the memorandum of association and article of association
- CO4:** It describes the prospectus and contents of prospectus.
- CO5:** This subject describes the relationship between company and debenture holders.

### **Secretarial Practice**

- CO1:** Develop the knowledge about the concept of secretarial practice and its decision making process.
- CO2:** Learn different techniques and problem skills of secretarial practice.
- CO3:** Study effective transfer and transmission of shares.
- CO4:** Teach a sense of responsibility and a capacity for secretarial practice.

**CO5:** Enable an awareness of the global environment in which secretarial practice operate

### **Financial Accounting I & II**

**CO1:** Understand meaning, needs, advantages and formalities in consignment and also the difference between a consignment and a sale.

**CO2:** Know meaning of branch, objectives of branch accounting, maintenance of accounting records, transactions relating to branch. Accounting procedure of branch.

**CO3:** Know the accounting system for Joint Stock Company.

**CO4:** To understand about distinction between Proposed Dividend and Interim Dividend

**CO5:** Understand meaning, distinctions between Joint venture and Partnership.

**CO6:** knowledge of Final Accounts of Banking Companies

**CO7:** Maintain books of recording under General Insurance Companies.

**CO8:** Meaning, Characteristics of Goodwill, Factors influencing the value of goodwill, Need for Valuation of goodwill, Valuation of goodwill etc.

**CO9:** Preparation of Liquidator's Final Statement of Account

### **Business Communication & Skill Development**

**CO1:** Understand techniques of effective communication.

**CO2:** Make aware about barriers to communication with ethical context.

**CO3:** Understand the process of e-mail communication & Public Relations Management

**CO4:** Understand MS-office aided communication.

**CO5:** Develop & Improve various skills like communication, reading, listing, note making, persuasive speaking, body language & gestures

**CO6:** Understand basics of Personality

**CO7:** Understand techniques of Personality developments

**CO8:** Understand skill required for entrepreneur

### **Monetary Economics I & II**

**CO1:** Identify barter system and evolution of money

**CO2:** Understand Inflation and Deflation phases of economics

**CO3:** Students will apply the Quantity Theory of Money

- CO4:** Make decisions wisely using monetary economics
- CO5:** Able to understand in depth concept in application of monetary policy and fiscal policy
- CO6:** Students will demonstrate an understanding Maximum Social Advantages
- CO7:** Types of Tax System- Proportional, Progressive and Regressive Taxation System, Direct & Indirect Taxes strengths, and weaknesses as they pertain to professional career fields
- CO8:** Students will demonstrate knowledge of the fundamental and technical banking

### **Business Law**

- CO1:** Make students aware about various Laws relating to Business.
- CO2:** Describes the Business law : Meaning, evolution and significance
- CO3:** Describes Indian Contract Act-1872, Sale of Goods Act- 1930, Negotiable Instrument Act-1881, Prevention of Money Laundering Act-2002, Consumer Protection Act-1986, and Information Technology Act-2000.
- CO4:** Describes the cyber law, offences and remedies.
- CO5:** Describes the relationship between business world and legal rules.

### **Income Tax**

- CO1:** Make aware about Basic Concepts of Income Tax, Meaning & Definition of Assesses, Assessment Year, Previous Year, Gross Total Income, Types of Assesses, Income Exempt from tax, Capital & Revenue Expenditure. Agricultural Income
- CO2:** Make aware about Residential Status: Residential Status and its effects on Tax incidence: Residential status of Individual, HUF, Firm & Association of Person, Company, Basic Conditions & Additional Conditions
- CO3:** Understand the provisions and procedure to compute total income under five heads of income i.e. salaries, house property, profits & gains from business and profession, capital gains and other sources.
- CO4:** Understand the provision and procedure for clubbing & aggregation of incomes and set-off & carry forward of losses.

**CO5:** Understand the various deductions to be made from gross total income U/s Deduction under section 80C, 80CCC, 80CCD, 80D, 80DDB, 80E, 80G, 80GG, 80U

### **Cost and Management Accounting**

**CO1:** Make aware about cost structure and cost elements

**CO2:** Understand various techniques and methods of cost accounting

**CO3:** Knowledge of Meaning, Importance, Element of Cost, Cost-Absorption, Allocation of Overheads and Methods of costing, Difference between Cost Accounting and Financial Accounting

**CO4:** Preparation of reconciliation Statement

**CO5:** Describes the Methods of costing, advantages and limitations of process costing, difference between job costing and process costing, Normal loss, Abnormal loss

**CO6:** This subject also provides the knowledge of completed contract, incomplete contract

**CO7:** Helps students to give practical knowledge of cost accounts

### **Management Process**

**CO1:** Equip the students with the knowledge of Management Process and inspire them to acquire required quality to face the managerial challenges.

**CO2:** Understand Differences between Management and Administration

**CO3:** Study managerial styles X and Y Theory of Macgregor,.

**CO4:** Teach a sense of responsibility & significance of professional manager in current scenario.

**CO5:** Enable an awareness of Theories of motivation- Maslow's theory of need hierarchy, Herzberg's theory of motivation, relationship between motivation & productivity etc.

### **Indian Economics**

**CO1:** Identify Economic Planning for development.

**CO2:** Understand Natural resources- Land, soil, water, forest, mineral. Infrastructure - Sources of Energy in India. Power, Coal, Oil and Gas, Atomic, Non-conventional Sources, India's Energy Strategy. Transport System in India- Railways, Road, Water and Air Transport.

- CO3:** Understand Causes of Population Explosion, Consequences on Economic Development & its Remedies.
- CO4:** Students will demonstrate and understanding of their personal interests, abilities, strengths and weaknesses as they pertain to professional career fields
- CO5:** Students will demonstrate role of public expenditure in India, sources of public revenue in India, India's fiscal deficit
- CO6:** Students will demonstrate their knowledge of the fundamental and technical concepts of Indian economics.

### **Business Finance**

- CO1:** Develop the knowledge of business finance and financial management decision.
- CO2:** Functions of Financial Executive in an Organization
- CO3:** Study Equity, Preference shares, Sweat equity shares, Shares with differential rights, debentures and Bonds
- CO4:** Teach a sense of responsibility and a capacity for financial management.
- CO5:** Enable an awareness of the global environment in which financial management operate

### **Advance Statistics**

- CO1:** Able to understand Correlation- Types of correlation, Karl Pearson's coefficient of correlation in Bivariate frequency table, probable error, interpretation of 'r', Rank Correlation Method..
- CO2:** Students can make Regression Analysis- Lines of Regression/Regressions Equation, Coefficient of regression for a bivariate frequency table. To learn Meaning and significance of dispersion mean Deviation, Standard Deviation, Quartile Deviation etc.
- CO3:** Able to understand Index Number- Uses of I N, Types of I No. Methods of Index Number. Test of consistency of Index No.- unit test Time Reversed Test, Factor cost of living Index No.
- CO4:** Develop basic knowledge of Time series Analysis-Introduction components of a Time series- a Trend bShort Term Variation irregular variation Measurement of Trend- simple problems graphic methods, methods of seminar, methods of curve by the square methods of moving average



## **Indirect Tax**

- CO1:** Students will learn Basis of chargeability of duties of central excise-goods, manufacture, classification and valuation of excisable goods; Registration and routine procedures in central excise, payment of duties of excise and removal of goods, Cenvat on inputs and on capital goods, excise and small scale industries.
- CO2:** Students will acquaint with Nature of customs duty, types of customs duty, classification for customs and rate of duty, valuation for customs duty, procedures for import and export.
- CO3:** Students will learn Charging of service tax, Services on which tax is payable, registration, records to be maintained by the assessed, returns and payment of tax, Provisions of law and procedures.
- CO4:** Students will learn Basic Concepts, value added tax on sale or purchase of goods, levy or incidence of tax, goods liable to tax, rate of tax and exemptions, dealer and registration method of computing tax liability, credit, set-off and refunds, documents, records and maintenance of accounts, returns and assessments
- CO5:** Discuss Central Sales Tax Act, 1956 Definitions, Concepts of inter-state sales, Sale outside the state, sale in the course of export and import, Liability to tax and rate of tax, Registration of dealers.

## **Computerized Accounting**

- CO1:** Students will learn Basis of Computerized Accounting, Advantages of Computerized Accounting, Manual Vs Computerized Accounting, Need of Computerized Accounting, Accounts Organization, Accounts group, Loans, Liabilities, Assets and Budget. Students will acquaint with Nature of customs duty, types of customs duty, classification for customs and rate of duty, valuation for customs duty, procedures for import and export.
- CO2:** Students will learn Introduction to Tally Software, Features of Tally, Tally Screen, Company Information, Creating new Company, Gateway, Selection of Company, Selection of Options, Buttons at Gateway, Working with multiple Companies, Company Features, Configuration – General, Numeric Symbols, Voucher Entry, Invoice Order Entry, and Printing.

- CO3:** Able to Create new group, creation of Primary group. Normal and Advance Information, Ledger Accounts, Cost Categories, Cost Centers. Creation of Budget, Types of Budget. Voucher – Voucher Entry, Creation of Voucher Screen, Types of Voucher, Selection of Voucher Types, Post Dated Voucher, Printing of Vouchers, Cheque Printing, advance Features of account Voucher.
- CO4:** Get depth knowledge of Inventory Info, Balance Sheet, Audit trail, Ratio Analysis. Display – Accounting Report Display, Inventory report Display, and MIS Report Display. Printing Reports, Export of Data. Maintenance – Bank Reconciliation, House Keeping, Data Maintenance. Security – Users and Password, Security Controls, Types of Security, Creation New Security Levels and Tally Audit

### **Course Outcomes (COs) of Compulsory English (B.Com)**

- CO1:** Illustrate the nature of literary form like prose, poems and short stories
- CO2:** Learn Synonyms and Antonyms and apply them in sentences
- CO3:** Develop vocabulary skills through one word substitute
- CO4:** Draft Business correspondence letter like Job Application Letter, Interview Call letter, Job offer letter, Claim letters, Adjustment letters, Credit letters and Collection letters
- CO5:** Comprehend and compose the passage.
- CO6:** Comprehend the passage and make précis of it.
- CO7:** Learn concepts of grammar like Degree of comparison, change the voice and transformation of sentences.
- CO8:** Learn to distinguish between confusing words.
- CO9:** Improve essay writing skills.
- CO10:** Learn to draft agenda and Minutes of Meeting.
- CO11:** Draft Inter-office Memorandum and Office orders.

### **Course Outcome (COs) of Supplementary English (B.Com.)**

- CO1:** Illustrate the nature of literary forms like prose, poem and short stories
- CO2:** Learn to draft letters of social correspondence

- CO3:** Learn to write classified advertisement
- CO4:** Learn to spot errors in grammar
- CO5:** Learn to apply different parts of grammar
- CO6:** Learn to draft note making of serial or sequential format.
- CO7:** Learn to draft Recommendation and situational reports
- CO8:** Learn to make notes.
- CO9:** Learn to prepare reports of Inquiry and Progress
- CO10:** To improve writing skill through expansion of idea
- CO11:** Learn Business Terminology and try to apply in various sentences
- CO12:** Learn to write dialogue writing

### **Course Outcome (COs) of Hindi (B.Com.)**

**CO1:** fo|kFkZ;ksa dks fgUnh Hkk'kk dk egRo crykuk@fgUnh lkfgR; ds izfr :fp fuekZ.k djukA fo|kFkZ;ksa esas fgUnh v/;;u dh :fp fuekZ.k gksxhA dqN u;k tkuus dh ftKklk mRiUUk gksxhA

**CO2:** fo|kFkhZ x.k ifjJe] vuq'kklu] lkgI vkfn xq.kksa dk egRo le>sxk rFkk vius thou esa fdz;kfUor djus dk iz;Ru djsxA fo|kFkZ;ksa dks lkekftd ewY;] uSfrd ewY;] lkekftd vkn'kZ In~pfj= dk egRo crykukA ftlls muesa ns'kHkfDr] lkekftd tkx:drk] In~Hkkouk] ijksidkj] R;kx dh Hkkouk fuekZ.k gksxh rFkk muesa drZO; fuokZg dk cks/k gksxkA

**CO3:** lkekftd tkx:drk o drZO; ijk;.krk ds Hkko mRiUUk gksxhA fo|kFkZ;ksa ds eu esa izd`fr ,oa lk;kZoj.k ds izfr izse Hkkouk mitsxhA va/kfo'okl] ngstizFkk] Hkz"Vkpj vkfn lkekftd cqjkb;ksa ds fuewyZu ds izfr fo|kFkZ;ksa esa psruk fuekZ.k gksxh rFkk ;ksxnku nsus ds fy, rlrj gksxhA

**CO4:** vk/kqfud ra=Kku o lkbcj rduhd ds nq'ifj.kke ls ifjpr gksdj mlds mik; o ykHk dks crk ikus esa os leFkZ gksxhA

**CO5:** izkphu dfo;ksa dh jpuk ds ek;/e ls fo|kFkZ;ksa esa v/;kfRed o uSfrd ewY;ksa dk fuekZ.k gksxkA muesa ns'k ds izfr xoZ ,oa xkSjo&ewY;ksa dk fuekZ.k gksxkA

**CO6:** vk/kqfud dfo;ksa dh jpuk ds ek;/e ls lkekftd] jktuSfrd leL;k ls ifjpr djuk rFkk fujkdj.k ds fy, izksRIkfrg djukA fo|kFkhZx.k bu leL;kvksa ds fujkdj.k ds fy, iz;Ru'khy gksxsA

**CO7:** O;ogkfjd fgUnh ds ek;/e ls fo|kFkZ;ksa esa fgUnh ys[ku o jpukdeZ ds xq.k fuekZ.k djukA bls fo|kFkhZ ikfjHkkf'kd 'kCnkoyh o O;ogkfjd mi;ksx] vuqokn] dj ikus esa leFkZ gksxsA lekpkj ys[ku] foKkiu ys[ku] i=ys[ku] lk{kkRdkj dyk dkS'ky dk fodkl gksxkA

**CO8:** eqgkojs ,oa yksdksfDr;ksa ds jlkLoknu dh {kerk mlesa fodflr gksxhA dYiuk foLrkj ladYiuk ls ifjpr gksxsA fganH Hkk'kk ds "kCnksa dk Kku djuk] lewg ppkZ o fo'k; fo'ys'k.k ds izfr vfHk:fp fuekZ.k djuk ftlls fo|kFkZ;ksa esa okn&fookn] Hkk'k.k dyk] od`Ro dyk ds xq.k fodflr gksxs rFkk mUgsa izLrqr djus ds fy, l{ke gksxsA

## **Course Outcomes (COs) of B.B.A.**

### **English**

- CO1:** Understand and communicate with English speakers from different parts of the English speaking world.
- CO2:** Discuss and plan holidays in English and tell jokes and stories.
- CO3:** Understand the basic tenets of reading and writing effective English
- CO4:** Discuss elements of popular culture such as TV, radio and music

### **Fundamentals of Business Management**

- CO1:** knowledge in the process and levels of management in the organization.
- CO2:** knowledge in planning and decision making activities in the organization
- CO3:** Students understand types and structure of organization
- CO4:** knowledge on staffing the employees
- CO5:** Understand the do's and don'ts in business

### **Computer Applications for Business**

- CO1:** Learn the usage of word processor and electronic spreadsheet
- CO2:** Understand the importance of DBMS and its applications in query language.
- CO3:** Study the concept of EDI and its applications.

**CO4:** Learn Internet Basics and realize the difference between Distributed computing and Client / Server computing.

**CO5:** Understand IS audit and its applications.

### **Cost Accounting**

**CO1:** Understand the basic cost concepts, element of cost & Preparation of Cost Sheet.

**CO2:** Understand the principles and techniques used in recording, analyzing and reporting costs.

### **Principles of Marketing Management**

**CO1:** Understand about the marketing and its various environmental factors

**CO2:** knowledge on buyer behavior and market segmentation

**CO3:** learn about various stage in Product Life Cycle

**CO4:** knowledge in the marketing channels and sales management

**CO5:** knowledge on advertising and sales promotion

### **Financial and Management Accounting**

**CO1:** knowledge on various source of finance

**CO2:** Stud knowledge on factors affecting the capital and capital structure formation

**CO3:** Students understand the concept of cost of capital

**CO4:** Understand the principles and techniques used in revenues for internal management purposes

**CO5:** Develop applicable cost concepts in making short term decisions and the application of Spreadsheets in management accounting

### **Micro-Economic Fundamentals**

**CO1:** The concept of elasticity of demand.

**CO2:** Apply the supply/demand models for the analysis of economic events.

**CO3:** Analyze the concept of externalities in macro and micro applications.

**CO4:** Understand how to evaluate microeconomic conditions.

### **Principles of Financial Management**

**CO1:** Understand the basic concept of accounting and preparation of ledger

**CO2:** Knowledge in the preparation of the trading and non-trading organization.

**CO3:** Knowledge in the settlement of accounts for the admitted and retired partners

**CO4:** The depreciation calculation on the fixed assets and computation of claim under loss of stock

**CO5:** Calculation of profit for small traders

### **Basic Statistical Techniques**

**CO1:** Knowledge on presentation and tabulation of data, the methods of collecting data and summarizing the data using central tendency.

**CO2:** Knowledge on various measures of dispersion and the method of measuring it.

**CO3:** Knowledge on measuring the trend or variation existing in a Time Series data.

**CO4:** Knowledge of measuring the fluctuation or changes in Price and quantity of goods and products using various index numbers.

**CO5:** Learn to understand the research problem in hand and to apply the appropriate test suitable to the research problem.

### **Evolution of Business & Commercial Geography**

**CO1:** Students learn Evolution of Business & Economy and Industrial revolution.

**CO2:** Students learn Evolution of Business in post WWII Scenario: Cold War and its impact on International Business; OPEC Crises

**CO3:** Students learn Geographical Environment & Commerce - Relationship between geographical environment and Commerce, Economic activities.

**CO4:** Student learn Role of industries in Economic development; Factors of industrial location – Raw material, power, market, transport and communication

### **Environment Management**

**CO1:** Knowledge on business environment and its importance

**CO2:** Learn on political and legal issues in business

**CO3:** Knowledge on social beliefs, customs and cultural heritage.

**CO4:** Knowledge on micro and macroeconomic concepts.

**CO5:** Knowledge on various financial service institutions.

### **Principles of Human Resource Management**

**CO1:** Knowledge on HRM, its environment, methods of selection, and Interview techniques

**CO2:** Knowledge on training and career development

**CO3:** Learn about remuneration and welfare measures

- CO4:** Learn facts about labour relation and Industrial disputes
- CO5:** Learn about human resource audit, nature and approaches

### **Money, Banking & Finance**

- CO1:** Knowledge of Concept and functions of Money, Origin and development of Money, Limitations of Barter System, and Classification of Money.
- CO2:** Knowledge of Commercial Banking- Role and functions of Commercial Banks, Credit creation and its limitations Central Banking-Functions of Central Bank.
- CO3:** Knowledge of Method & Difficulties of Measuring National Income, Concept of GDP, GNP, NNP, PI, and DPI. Inflation and Deflation
- CO4:** Knowledge of Monetary and Fiscal policy, Public Finance- Meaning, Scope and Importance of Public Finance, Public Finance Vs Private Finance.

### **Introduction to Sociology and Psychology**

- CO1:** Knowledge of Sociology as a science empirical, theoretical, cumulative and non-ethical, Development of Modern Industrial Society – Characteristics, industrialism, capitalism, urbanism, liberal democracy,
- CO2:** Knowledge of Structural aspects of social system – Institutions, groups, subgroups, roles, norms and values
- CO3:** Knowledge of Contemporary Perspectives: Biological, Cognitive, Psychoanalytical, Humanistic, Evolutionary and Cross-cultural
- CO4:** knowledge of Perceiving Others: Forming Impressions; Role of Non-verbal Cues, Group stereotypes, Central Traits; Primary and Recency Effects; Models of Information Integration; Attribution of Causality: Biases and Theories Jones and Davis, Kelley

### **Business Legislations**

- CO1:** Knowledge on contract Act
- CO2:** Learn on companies Act and procedures
- CO3:** Knowledge on consumer rights and duties
- CO4:** Knowledge on legal system of India

### **Entrepreneurship Development**

- CO1:** Understand the meaning of entrepreneurship and being an entrepreneur.

- CO2:** Understand the concept of entrepreneurial development
- CO3:** Develop a business plan and model that supports the strategy as envisaged by the entrepreneur
- CO4:** Identify the issues associated with succession planning, and develop plans to address them.

### **Principles of Operations Management**

- CO1:** Understand the concepts related to business and operations management.
- CO2:** Understand how planning and control are carried out vis-à-vis production.
- CO3:** Understand the significance of inventory and quality management.
- CO4:** Understand elements of production management

### **International Business Environment**

- CO1:** Knowledge about internal and international Trade
- CO2:** Acquired wisdom on the theories of the International Trade
- CO3:** Learn about the Balance of Payment and its concepts in detail
- CO4:** Knowledge was gained by the students on IMF and IBRD
- CO5:** Students understood about the World Trade Organization with special reference to India

### **Research Methodology**

- CO1:** Knowledge in the need of Research, sampling, pilot testing
- CO2:** Gain knowledge on various types of research and the sampling techniques
- CO3:** Learn the sources available for the collections of data and to draft the questionnaire
- CO4:** Acquire knowledge on the application of various statistical tools
- CO5:** Gained knowledge on the preparation of reports

## **Course Outcomes (COs) of M. Com.**

### **Advanced Financial Accounting**

- CO1:** Enable and equip the basic functions and tools of financial management.
- CO2:** Prepare students for NET/SET and Banking Exams.
- CO3:** Equip and train to accept the challenges of 21st Century.
- CO4:** Study and analyze the new industrial and commercial culture.



**CO5:** Make aware for acquiring the knowledge of specialized subjects.

### **Indian Financial System**

**CO1:** Know the financial system and economic development

**CO2:** Familiarize with stock exchange functions

**CO3:** Study the merchant banking functions and services

**CO4:** Analyze the factoring services and depository system in India

**CO5:** Know the trend in Global financial market

### **Managerial Economics**

**CO1:** Students will apply the concept of elasticity of demand.

**CO2:** Students will apply the supply/demand models for the analysis of economic events.

**CO3:** Student will analyze the concept of externalities in macro and micro applications.

**CO4:** Understand how to evaluate microeconomic conditions.

### **Marketing Management**

**CO1:** Know the modern marketing concepts and evaluation

**CO2:** Study the consumer behavior

**CO3:** Analyze the product and price

**CO4:** Analyze the promotion mix

**CO5:** Explore the place mix and strategies decisions

### **Research Methodology**

**CO1:** Fulfil the bank requirement of business research

**CO2:** Evaluate various research decisions

**CO3:** Know the methods of data collection

**CO4:** Study the analysis and interpretation of data

**CO5:** Familiarize report writing

### **Indirect Taxes**

**CO1:** Know the basic methods and legal provisions of indirect taxes

**CO2:** Familiarize Central Excise Act 1944

**CO3:** Know the Tamil Nadu General Sales Tax Act 1959 and VAT

**CO4:** Study Service Tax Act 1994

**CO5:** Study Customs Act 1962

### **Entrepreneurship Development**

- CO1:** Understand the institutional support to entrepreneur
- CO2:** Describe the Women Entrepreneur
- CO3:** Classify the challenges of women entrepreneur
- CO4:** Describe the Project management
- CO5:** Identify the evaluation of Project

### **Advanced Cost Accounting**

- CO1:** Study the costing concept and methods
- CO2:** Analyse the unit cost and job costing
- CO3:** Know the process costing with normal and abnormal loss
- CO4:** Update the standard costing methods
- CO5:** Prepare the reconciliations statements.

### **Human Resource Management**

- CO1:** Know the basic of human resources management
- CO2:** Analysis human resources planning
- CO3:** Familiarize recruitment and selection procedures
- CO4:** Study the trains methods and career development plan
- CO5:** Know the methods of wage and salary administration, compensation, plans

### **International Business Environment**

- CO1:** Know the globalization concept
- CO2:** Familiarize political and social environment
- CO3:** Analyze the economic and technological environment
- CO4:** Study institutional environment
- CO5:** Identify legal and ecological factors affecting international business

### **E- Commerce**

- CO1:** Know the E- commerce frame work
- CO2:** Familiarize with E- commerce and World Wide Web
- CO3:** Study the application of Electronic Data Interchange
- CO4:** Know the marketing on the internet→ to study multimedia and digital video

### **Services Marketing**

- CO1:** Know the services vision and mission

**CO2:** Study services positioning and differentiation

**CO3:** Familiarize service marketing mix

**CO4:** Analyze the customer focused services

**CO5:** Study the specific service marketing

**Direct Taxes**

**CO1:** Update the current finance tax planning

**CO2:** Know the provisions of Income tax act

**CO3:** Study various heads of incomes

**CO4:** Analyze the profit and gain from business or profession

**CO5:** Identify the various other serious of income and capital gain