COURSE OUTCOMES

B.Sc.(N.M.) Physics

Semester-I
Paper: Classical Mechanics and Theory of Relativity (PH-101)

CO 1:   This course helps student to understand the basic and fundamental concepts of classical mechanics.

CO 2:   Learn the concept of conservation of Energy, Momentum, Angular Momentum and apply them to understand the basic problems in Physics. Understand generalized co-ordinates, Hamilton's principle, Lagrange's equation and their applications.

CO 3:   Would be able to understand the inertial and Non-inertial frame of references and Describe how fictitious forces arise in a non-inertial frame.Understand the importance of Michelson Morley's experiment in reference to special theory of relativity

CO 4:   Theory of relativity is most interesting part of the entire mechanics. Students learn the famous theory of relativity. They would find out how the mass length and time would vary with speed.

Paper: Electricity, Magnetism and Electromagnetic theory (PH-102)

CO 1:   This course will enable students to understand the operators like gradient, divergence, curl etc. Gauss's law of electrostatics and its applications

CO 2:   Would be able to understand the important properties of magnetic field and theories of dia, para and ferromagnetic materials. They are able to understand hysteresis curve.

CO 3:   Derive Maxwell's equations and introduce the   role of displacement current, propagation of electromagnetic waves. Derive Poynting's theorem from Maxwell's equation

CO 4 :   Students would be able to understand the results theoretically and experimentally when passive elements are connected to source of alternating e.m.f., Q- factor.

Semester-II

Paper: Properties of matter and kinetic theory of gases (PH-201)

CO 1:   Understand the concept of moment of Inertia and theorems of perpendicular and parallel axes and evaluation of moment of inertia of different objects like sphere, spherical shell etc.

CO 2:   The students are able to understand the fundamental concepts related to Hook's law and elastic properties of materials that have many useful applications in daily life. Proper understanding of bending of beam phenomena, cantilever as well as the concept of twisting couple could open up industrial doors to the students.

CO 3:   Learn about Kinetic interpretation of Temperature, the real gas equations, Van der Waal equation of state and Brownian motion.

CO 4:   Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law, equitation of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion.

Paper: **Semiconductor Devices (PH-202)**

CO 1:   Understand the basic concepts of semiconductor devices and different applications of PN junction diode in different type of rectifiers, voltage regulators, solar cell, LED's filter circuits etc.

CO 2:   Describe the working principle and characteristics of Bipolar Junction transistors. They come to know about various related characteristic parameter like current gain, voltage gain and power gain.

CO 3:   Understand and explain the classification of Amplifiers and the various coupling and distortion in amplifier.

CO 4:   Understand the principle of oscillation, classification of oscillators, and

condition for selfsustained oscillation, tuned collector common emitter oscillator, Hartley oscillator and C.R.O.

Semester -III

Paper: Computer Programming and Thermodynamics (PH-301)

CO 1:   This course will help to understand the basic computer organization, problem solution with the help of algorithm and flow charts, fundamentals of Fortran programming including control structures and Function subprogram and sub routine.

CO 2:   Learn to solve various mathematical problems using Fortran Programming language.

CO3:   This course will help to understand the concept of heat and conversion from one form to another. They will be made aware of the laws of thermodynamics that dictate energy behavior .Joule Thomson effect, Joule-Thomson Porous plug experiment, the concept of entropy and

CO 4:   Students will learn to derive the Clausius- Clapeyron latent heat equations and understand their significance. The students will also be able to learn about Maxwell's thermodynamic relation their physical interpretations and their applications.

Paper: Wave & optics –I (PH-302)

CO1:   This course will help to understand the concept of Interference - by Division of Wave front and applications under division of wavefront: Fresnel's Biprism, Lloyd's mirror and phase change.

CO 2:   Interference concept due to division of amplitude, thin film reflection and transmission,Newton's rings, wedge shaped film and Michelson Interferometer.

CO 3:   Understand the basic concept of diffraction, Fresnel's diffraction, zone plate and diffraction at a straight edge and at a circular aperture, diffraction due to a narrow slit and due to a narrow wire.

CO 4:   Understand and explain the Fraunhoffer diffraction, dispersive power
         of grating, Rayleigh' criterion and resolving power of telescope
         and grating.

Semester -IV

Paper: Statistical Physics:(PH-401)

CO 1:   This course helps the students to understand the concept of Probability.
         microstates and macrostates and how the particles are distributed in
         the system in different states.

CO2:   Learn about the concept of phase space and its division into cells,basic
         approach to three kinds of statistics, Maxwell Boltzmann statistics
         applied to derive the energy distribution, speed distribution and
         velocity distribution laws.

CO2:   Distribution of distinguishable and indistinguishable understand the
         methods of statistical mechanics used to develop the statistics for
         Bose-Einstein. Photon gases and Fermi-Dirac statistics and energy
         distribution law for electron gas in metal.

CO 4:   Learn and understand the different law's and theory of specific heat of
         solids and their significance.

Paper: Wave & Optics –II (PH-402)

CO 1:   This course helps students to understand the theories and laws
         of polarization along with understanding of the production and
         detection of (i) plane polarized light (ii) circularly polarized light and
         (iii) elliptically polarized light. Also able to understand optical rotation,
         specific rotation and polarimeters.

CO 2:   This enables students to be familiar with the concept of Fourier series
         which help to find the output of half wave and full wave rectifiers,
         square & triangular wave, etc.

CO 3:   Concept of Fourier Transform, its properties and applications. unit

planes, nodal planes.

CO 4: Understand the concept of aberrations and concept of fiber optics along with its applications.

Semester -V

Paper: Quantum Mechanics and Laser (PH-501)

CO 1: This course helps student to identify and understand the kinds of experimental results which are incompatible with classical mechanics that required a development of the quantum theory of matter and light. It also throws light on the co-existence of particle and wave nature of matter particles and their applications. It also explains the meaning of uncertainty in Physics and how it can be applied to explain various phenomenon of nuclear physics i.e.existence of protons and neutrons and non-existence of electrons in nucleus

CO 2: This course also explains the behaviour of a free and bound particle in terms of Schrodinger equation and explains the role of potential by way of its applications such as potential barrier, particle in a box. It makes student to understand the concept ot tunnelling, reflection and transmission probabilities at different energies of the particle.

CO 3: Familiarize with optical phenomena anddifferent concepts related to laser physics, characteristics of Laser Light, and different types of pumping.

CO 4: Qualitative understanding of basic lasing mechanism, types of Lasers application of laser in medicine, industry and military.

Paper : Nuclear Physics(PH-502)

CO 1: Nuclear Physics is a wonderful course having a great relevance to current scenario in terms of research. This course helps students to have a deep understanding of basic and fundamental concepts of nucleus in terms of its composition , its stability (i.e. binding energy)

and various properties and also be able to understand the basics of experimental techniques/methods to determine the mass and size of nuclei.

CO 2: Learn about the emission of alpha, beta and gamma rays, the mechanisms of the emissions of these rays, outlines of theory of alpha decay and Pauli's theory of beta decay with the neutrino hypothesis.

CO 3: Understand the principles and basic constructions of particle accelerators, interaction of charged particles (such as Alpha and Beta particles) and Gamma radiations with matter, their detection and understand the energy loss mechanism of various particles which is most useful when the students goes for higher studies and opt for research

CO4: Learn the basic aspects of nuclear reactions, the Q-value of such Reaction & its derivation from conservation laws and understand the principle, construction, working and uses of Nuclear fission and fusion reactors

Semester -VI

Paper: Solid state and Nano Physics (PH-601)

CO 1: Students will be able to describe the different type of crystal structures in terms of crystal lattice and basis of constituents' atoms, miller indices, bravais lattices in two and three dimensions and crystal structures of Zinc Sulphide, Sodium Chloride and Diamond.

CO2: Acquire knowledge about X-ray diffraction, Bragg's Law and experimental X-ray diffraction methods and about the reciprocal lattice to a simple cubic lattice, b.c.c. and f.c.c. lattice.

Co3: Understand basic ideas of superconductivity, classification of

superconductors, London and BCS theory of superconductivity and the applications of superconductivity

CO4: understand the concept of nanomaterials, nanotechnology, Nano-Physics and the applications of nanomaterials and nanotechnology

Paper : Atomic and Molecular spectroscopy(PH-602)

CO 1: This course helps students to have a deep understanding of basic and fundamental concepts of of atomic spectroscopy through the study of spectral series in Hydrogen atom, effect of nuclear motion on line spectra,Wilson sommerfeld quantization rule, Sommerfeld'sextension of Bohr's model, Sommerfeld relativistic correction, and finally vector atom model.

CO2: After studying this course students are able to analysis different spectrums of alkali atoms.

CO3: This course enables students to explain the key properties of many electron atoms and the importance of Pauli Exclusion Principle. Understand and explain the vector atom model, various coupling schemes and atomic spectra of one and two electron atoms.

CO4: This course helps students to explain the observed dependence of atomic spectral lines on externally electric & magnetic fields. Have basic idea about the rotational, vibrational and rotational-vibrational spectra of diatomic molecules and basic idea of Raman Effect.

B.SC -1 Lab Practical (PH-203)

CO 1: This course helps students to familiarise with measuring instruments like Vernier callipers, screw gauge and electronic equipments.

CO2: This course helps students to familiarise with Carey foster bridge, pendulums, flywheel,Young's modulus, Modulus of rigidity, Searle's method.

CO3: Verify basic laws of electronics using PN junction, photo cell, Zener diode, sonometer, impedance of A. C circuits. Learn to present

observations, results and analysis in suitable form.

CO4:   This course helps students to nurture in all branches of physics and will prove that they can think critically and work independently

B.SC -2 Lab Practical(PH-403)

CO 1:   Students will be able to find the resolving power, Dispersive Power and demonstrated the phenomenon of Interference by Newton's Ring experiment.

CO 2:   The various experiments in the area of optics will nurture the students in all branches of physics to think critically and work independently

CO3:   Basic concept of Fortran, statements under Fortran and program based on Fortran.

CO 4:   Will enable students to nurture knowledge of all branches of physics and will make them think critically and work independently.

B.SC -3 Lab Practical (PH-603)

CO 1:   At the end of this course, the students will be able to demonstrate their understanding of magnetic field by analyzing the B-H Curve.

CO 2:   This course enables students to understand various physics streams and will make them think critically and work independently.

CO3:   Understand the applications of FORTRAN in various mathematical problems: Simpson's 1/3 rule, least square fitting, sum of finite series and standard deviation.

CO4:   The various experiments in the area of optics will nurture the students in all branches of physics to think critically and work independently

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DEPARTMENT OF PHYSICS

Name Of The Programme : Bachelor Of Science

Duration : Three Years

Programme Outcomes (Pos)

PO1
Knowledge
Students get acquainted with the knowledge of Science, to the solution of complicated Scientific and technical problems besides to enable them to pursue higher courses.

PO2
Communication
Ability to communicate effectively while performing professional activities with the technical community and with public at large, so as to be able write effective documentation, and make effective presentations.

PO3
Science and Society
This programme provides the technical platform for the enhancement of research capabilities of students. Thus , motivate the students to explore the future aspects in physical world.

PO4
Ethics
Students have overall development with respect to moral and social values which benefits them at personal as well as society level leading them to become a better civilized personality.

PO5
Individual and Team Work
Capable to learn and work effectively as an individual, and as a member or leader indiverse teams, in multidisciplinary settings.

PO6
Investigation of Problems
Ability of critical thinking, analytical reasoning and researchbased knowledge including design of experiments, analysis and interpretation of data to provide conclusions.

PO7

Life-Long Learning.

This programme act as a skill booster to enhance the qualities such as observation, precision, analytical and logical thinking, clarity of thought and expression, systematic approach in Student's personality.

PO8

Environment and Sustainability

The Environmental protection is the main concern or the society these days.The students can aware the society about harmful pollutants, their affect on environment in general and effect on human health in particular.

PO9

Project Management

Ability to demonstrate knowledge and understanding of the scientific principles and apply these to manage projects.

Course Outcomes of Chemistry

(B.Sc. Non-Medical and Medical)

Semester – I

Course Name – Inorganic Chemistry – CH-101

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to understand the atomic structure.

CO2. Will be familiar with Periodic Table and Atomic Properties.

CO3. Will understand the concept of bonding and will to able to analyze the bonding in compounds.

CO4. Will be able to Draw structure of ionic solids and understand its properties.

Course Name – Physical Chemistry – CH-102

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to discuss Kinetic Molecular Theory of Gases.

CO2. Will be able to understand real gas equation and its applications.

CO3. Will understand the critical phenomenon and importance of critical constants.

CO4. Will understand the symmetrical elements in crystals and structural determination of crystals.

Course Name – Organic Chemistry – CH-103

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to Understand localized and de-localized Chemical bonds.

CO2. Will understand Electronic Effects, Isomerism, Configuration, E and Z, R and S Nomenclature, Conformations.

CO3. Will be able to draw the mechanism of Organic Reactions.

CO4. Will understand about the attacking reagents reaction Intermediates.

Semester – II

Course Name – Inorganic Chemistry – CH-104

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to elaborate Hydrogen Bonding, Vander Waal's forces, Metallic bond,.

CO2. Will be familiar with the properties of S-block Elements and their compounds.

CO3. Will be familiar with noble gases and bonding in compounds of noble gases.

CO4. Will be familiar with p-block elements and compounds of B, C, N and halogen family.

Course Name – Physical Chemistry – CH-105

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will Understand the rate of reaction, Order of reaction.

CO2. Will be able to derive integrated rate expressions of different ordered reactions.

CO3. Will be able to understand collision theory of reactions.

CO4. Will understand the effect of temperature on activation energy of the reaction.

Course Name – Organic Chemistry – CH-106

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to Understand the preparation and properties of Alkenes, Arenes.

CO2. Will understand Aromaticity, Mechanism of Aromatic Electrophilic substitution.

CO3. Will be able to Discuss the methods of preparation, structure, properties of Dienes, Alkynes, Alkyl and Aryl halides.

CO4. Will understand S_N1 and S_N2 mechanisms.

Course Name –Chemistry Practical – CH-107

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to perform redox titrations, iodometric titrations and complexometric titrations.

CO2. Will be able to determine surface tension, viscosity and specific gravity of liquids.

CO3. Will be able to prepare and purify some organic compounds.

CO4. Will be able to study the sublimation and crystallization of the organic compounds.

Semester – III

Course Name – Inorganic Chemistry – CH-201

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to Discuss the Classification, properties, Comparison of properties of 3d, 4d and 5d elements, Latimer and Frost diagrams.

CO2. Will be familiar with the Structure and properties of Transition element compounds.

CO3. Will understand nomenclature, Isomerism and bonding in Coordination compounds.

CO4. Will be able to understand Types of Solvents, Physical properties with special reference to liq. NH_3 and SO_2.

Course Name – Physical Chemistry – CH-202

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to study the types of system, Thermodynamic process.

CO2. Will be able to understand Heatcapacity.

CO3. Will be able to understand Work, Joule- Thomson Effect.

CO4. Will be able to understand the application of Joule- Thomson Effect.

Course Name – Organic Chemistry – CH-203

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to Elaborate the methods of preparation, properties of Alcohols, phenols, Epoxides.

CO2. Will understand Fries, Claisen Re-arrangement, Riemer Tiemann, Kolbe's, Schotten and Baumann Reactions.

CO3. Will be able to discuss absorption laws and will understand the applications of UV spectroscopy.

CO4. Will understand the preparation and properties of carboxylic acid and its derivatives.

Semester – IV

Course Name – Inorganic Chemistry – CH-204

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to discuss about the Electronic configuration, properties of Lanthanides, actinides, Lanthanide Contraction

CO2. Will understand the separation of Np, Pu, Am from Uranium, Trans-uranic Elements.

CO3. Will be able to Elaborate the basic and acidic radicals, their identification.

CO4. Will be able to understand Interference by acidic radicals, solubility product, common ion effects.

Course Name – Physical Chemistry – CH-205

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to Discuss the Equilibrium, Law of Chemical equilibrium, Claussius-Calpeyron Equation

CO2. Will be able to understand Nernst distribution law, degree of hydrolysis, process of Extraction.

CO3. Will be able to Study the Laws of Thermodynamics, Entropy and Enthalpy Change, Spontaneity of Reaction.

CO4. Gibbs Free Energy, Collision Theory and Transition state Theory, Electrolytic and galvanic cell, S.H.E. and Nernst Equation

Course Name – Organic Chemistry – CH-206

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to Discuss about IR spectroscopy in structure determination, Hook's law, Application of IR.

CO2. Will understand the separation of primary, secondary and tertiary amines, Preparation, reaction with Nitrous acid.

CO3. Will be able to Discuss the diazonnium salts and synthetic applications, synthesis of aldehydes and ketones.

CO4. To understand special reagents, condensation reactions, oxidation and reduction reactions.

Course Name –Chemistry Practical– CH-207

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will understand gravimetric analysis, colorimetry and be able to prepare Cuprous chloride, tetra ammine cupric sulphate, chrome alum, potassium trioxalatochromate (III) and Nickel Hexammine chloride.

CO2. Will understand the Critical Solution Temperature (CST) and be able to determine the solubility of benzoic acid, enthalpy of neurtralisation and dissolution.

CO3. To study the distribution of iodine between CCl_4 and water. 6. Determine rate constant of hydrolysis of ethylacetate.

CO4. Systematic identification (detection of extra elements, functional groups, determination of melting point or boiling point and preparation of at least one pure solid derivative) of the simple mono and bifunctional organic compounds.

Semester – V

Course Name – Inorganic Chemistry – CH-301

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to discuss the Crystal field theory and metal ligand bonding, Splitting octahedral, tetrahedral and square planar complexes.

CO2. Will understand thermodynamic stability of metal complexes, trans effect.

CO3. Will be able to discuss the magnetic materials, magnetic susceptibility, method of determining magnetic susceptibility, spin only formula.

CO4. Will understand orbital contribution to magnetic moments, application of magnetic moment data, Selection rules for d-d transition, orgel energy leveldiagram.

Course Name – Physical Chemistry – CH-302

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will understand Black-body radiation, Plank's radiation law, photoelectric effect.

CO2. Will be able to understand the importance of quantum mechanical operators.

CO3. Will understand about the Optical activity, magnetic susceptibility and types of magnetism.

CO4. Will be able to elaborate the basic features of Spectroscopy, Degrees of freedom. Rotational, Vibrational and Raman Spectrum

Course Name – Organic Chemistry – CH-303

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to discuss the NMR spectroscopy and its application in structure determination of Organic compounds.

CO2. Will be able to study the Structure, properties, Inter conversion of Carbohydrates.

CO3. Will understand the formation and chemical reactions of Oregano magnesium.

CO4. Will understand the formation and chemical reactions Organozinc and Organolithium compounds.

Semester – VI

Course Name – Inorganic Chemistry – CH-304

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to study the concepts of Acids and bases, HSAB principleand its applications.

CO2. Will understand Structure and bonding in organometallic compounds.

CO3. Will be able to discuss the metal ions present in biological system, Cooperative effect, Bohr effect.

CO4. Will understand Nomenclature, classification, preparation and uses of silicones, and phosphagens.

Course Name – Physical Chemistry – CH-305

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will understand the importance of statistical thermodynamics, partition function and its physical significance.

CO2. Will be able to understand the Laws of photochemistry, fluorescence, phosphorescence and quantum yield.

CO3. Will understand about the Ideal and non-ideal solutions, Colligative properties, Applications in calculating molar masses of normal, dissociated and associated solutes in solution.

CO4. Will be able to understand Phase Rule, phase equilibria of one and two component systems.

Course Name – Organic Chemistry – CH-306

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to study the Organic synthesis using Enolates.

CO2. Will be able to study Structure and method of preparation and reactions of Heterocyclic compounds.

CO3. Will be able to study the structure, nomenclature, synthesis of amino acids and proteins.

CO4. Will understand synthetic polymers and their use.

Course Name –Chemistry Practical – CH-307

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to perform semimicro qualitative analysis of mixture containing not more than four radicals (excluding interfering, Combinations and insoluables).

CO2. Will understand the working of conductometer, pH meter and potentiometer.

CO3. Will be able to prepare buffer solutions and be able to determine the molecular weight of the organic compounds by Rast method.

CO4. Will be able to determine the Rf values and identification of organic Compounds by Thin Layer Chromatography.

I.B. (PG) COLLEGE, PANIPAT

Estd:1956

Department of Mathematics

Programme Outcomes, Programme Specific Outcomes, Course Outcomes and Scope

Under Graduate Programme

B.Sc. Non-Medical

Programme Outcomes (POs)

The student graduating with the B.Sc. Non-Medical degree will be able to acquire and demonstrate the following:

PO1. Essential competencies: Students will attain capabilities in the subjects of Mathematics, Chemistry and Physics. Demonstrate comprehensible understanding of the fundamental concepts of Mathematics, Chemistry and Physics including their different sub-fields.

PO2.Technical Knowledge: Acquire technical knowledge that creates different types of professionals in the fields of Mathematics, Chemistry and Physics and related fields such as pharmaceuticals, chemical industry, teaching, research and development, environmental monitoring, product quality, consumer goods industry, food products, cosmetics industry, material sciences and government/public service, in banking, insurance and investment sectors etc.

PO3. Problem Solving: Students will be able to apply their lab skills and technical skills in solving real world problems which are beneficial in higher studies for successful career.

PO4. Communication skill: On completion of this course, students would be trained to carefully listen, read and analyze the experimental data/research papers and express it through technical writing as well as orally in a concise manner.

PO5. Critical thinker: The students are able to develop inquisitive characteristics such as critical thinking, ability to solve numerical problems using key concepts and basic knowledge.

PO6. Disciplinary knowledge: Students will be able to demonstrate inclusive knowledge and understanding of all three subjects of Mathematics, Chemistry and Physics and utilize their lab and technical skills in interdisciplinary applications of these subjects.

PO7. Ethical awareness: A student after graduation in this course would be able to depict ethical awareness and reasoning.

PO8. Skilled project manager: A B.Sc. Non-Medical graduate student will be capable of being a project manager and will be efficient in planning, writing and

studying the ethical standards and rules concerning to scientific project management.

PO9. Sense of inquiry: The course is designed in such a manner to cultivate inquiry skills in learners such as investigation skills.

PO10. Team Work: The course is designed in such a way so as to train the students to work as a team player in a laboratory or industry and also to work independently for writing projects and carrying out research.

PO11. Self learning : Ability to think, acquire knowledge and skills through logical reasoning and to inculcate the habit of self-learning

PO12. Lifelong learner: The syllabus is planned to install a practice of continuous learning among the students through various tools for academic growth and future jobs.

Programme Specific Outcomes (PSOs)

A Graduate with a B.Sc. in Non-Medical will have the ability to :

PSO1. Develop scientific temper and undertake scientific projects.

PSO2. To familiarize the emerging areas of Chemistry and their applications in various spheres of chemical sciences and to apprise the students of its relevance in future studies.

PSO3. Understand the theoretical basis of quantum mechanics, relativistic physics, nuclear physics, optics, spectroscopy, solid state physics, statistical physics and thermodynamics

PSO4. Equip with mathematical modeling ability, creative talent and power of communication necessary for various kinds of employment.

PSO5. To develop skills in the proper handling of instruments and chemicals.

B.Sc. (Computer Science)

Programme Outcomes (POs)

The student graduating with the B.Sc. Computer Science degree would be able to acquire and demonstrate the following:

PO1. Scientific knowledge: Apply the knowledge of Mathematics, Science, and computing to the solution of complex scientific problems.

PO2. Problem analysis: Identify, formulate, research literature, and analyze complex scientific problems reaching vindicate conclusions using principles of mathematics, natural sciences, and applied sciences.

PO3. Ethics: Able to Implement ethical principles and commit to professional moral code, responsibilities and norms.

PO4. Utilization of Modern tools: Apply modern techniques and to solve complex scientific problems using modern tools.

PO5. Methodical ability: Students will be able to thrive focusing ability in all scenarios and to pay attention while indulging in any task. They will be able to design a hypothesis, collect data and analyze it critically to decipher if the data supports the hypothesis.

PO6. Disciplinary knowledge: Students will be able to apply and utilize their technical and lab skills in interdisciplinary applications of subjects and demonstrate inclusive knowledge of all three subjects of Computer, Physics and Mathematics.

PO7. Effective Communication: Speak, read, write, listen and able to communicate effectively with the scientific coterie on complex activities. This three year degree programme make students able to write effective reports and to design documentation, attractive presentations, give and receive clear instructions.

PO8. Team player: The course is designed in such a way so as to train the students to work as a team player in a laboratory or industry and also to work independently for writing projects and carrying out research.

PO9. Digital skills: This course equip the students will the skills of data analysis using various apps and software, able to use library search engines and simulation software to carry out computational work.

PO10. Project management: Implement knowledge and understanding of the scientific and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO11. Self learning : Ability to think, acquire knowledge and skills through logical reasoning and to inculcate the habit of self-learning

PO12. Life-long learning: Ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)

A Graduate with a B.Sc. in Computer Science will have the ability to:

PSO1. Apply problem-solving skills and the knowledge of Computer Science to solve real world problems.

PSO2. Develop technical project reports and present them orally among the users.

PSO3. Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue instantly.

PSO4. Recall basic facts about Mathematics and Physics and should be able to display knowledge of conventions such as notations and terminology.

PSO5. Apply and verify theoretical concepts through laboratory experiments.

Course Outcomes (CO) for Under Graduate Programme

Course: BM-111 ALGEBRA

Course Objectives: This course aims to enhance the student's understanding to study the concepts of Algebra like Matrix, Determinant, System of Equations and Characteristic Polynomials.

Course Outcomes: **After the completion of this course the students will be able to:**

- Understand different types of matrices like Symmetric, Skew Symmetric, Hermitian, Skew Hermitian, Unitary, Orthogonal and their basic concepts. To find inverse, rank, eigen values and eigen vectors of a matrix. To find the characteristic equation of matrix.

- Find solution of homogeneous and non-homogeneous system of linear equations using matrices.

- Determine relation between roots and coefficients of an equation. To find nature of the roots of an equation. To apply Descarte's rule of signs.

- Solve cubic and biquadratic equations. To solve practical problems of cubic equations by Cardon's method and biquadratic equations by Ferrari's method. To use the characteristic polynomial to compute the eigen values and eigen vectors of a square matrix. To differentiate between diagonalizable and non- diagonalizable matrices.

Course: BM-112 CALCULUS

Course Objectives: The aim of the course is to acquaint students with the fundamental concepts of calculus like limit, continuity, tracing of curves and different coordinate systems.

Course Outcomes: At the end of this course, the students will be able to:

- Understand basic properties of Limit, Continuity and Derivability of different types of functions.
- Understand successive differentiation and expansion of functions. Understand the consequences of various mean value theorems for differentiable functions.
- Understand concepts of tangents, normals, asymptotes, curvature, evolutes and involutes of a curve, the geometrical meanings of these terms and to solve the related problems.
- Determine singular points of a curve and their types. To understand rectification of curves and to apply the reduction formulae.
- Determine area bounded by curves. To find volume and surface area of solids formed by revolution of curves.
- Trace curves in Cartesian and polar coordinate systems.
- Apply derivative tests in optimization problems appearing in social sciences, physical sciences, life sciences and in other disciplines.

Course: BM-113 SOLID GEOMETRY

Course Objective: The aim of this course is to equip the students with the knowledge of different geometrical shapes and to understand the concepts related to two & three dimensional geometry. Studying solid geometry imparts Logical thinking skills, understanding of analytical reasoning, and problem-solving techniques.

Course Outcomes: At the end of this course, students will be able to:

- Understand the meaning of general equation of second degree and to trace the curves.
- Find pole of line and director circle of conic, polar equation of conic, tangent and normal to conic.
- Determine plane section of sphere, sphere through a given circle, intersection of two spheres, radical plane of a sphere, coaxial system of spheres.
- Learn about Right circular cone, enveloping cone and reciprocal cone.
- Find equation of Right circular cylinder, enveloping cylinder.
- Know about conicoid, tangent and normal to conicoid, polar plane, enveloping cone and enveloping cylinder to conicoid.
- Know about Paraboloid and plane section of conicoid.
- Understand concepts of generating lines and confocal conicoid
- Demonstrate their knowledge of geometry to the real world problems. Geometry has many practical applications in architecture, construction of buildings and computer graphics.

Course: BM-121 NUMBER THEORY AND TRIGONOMETRY

Course Objectives: The aim of this course is to increase the knowledge of students in Number Theory and Trigonometry using various theorems and results.

Course Outcomes: At the end of this course, the students will be able to:

- Learn some important results ey574r7fyyb cxzx of numbers including prime numbers, Chinese Remainder Theorem, Wilson`s theorem and its consequences.
- Understand the basic concept of number theory and their application in problem solving.
- Familiarize with Complete residue system and reduces residue system modulo m.
- Able to understand about Euler function, Legendre symbols and quadratic residues.
- They will learn about Greatest Integer function and Mobius function.
- Know about De Moiver`s theorem and its applications, Expansion of trigonometric functions.
- It enables students to understand the concept of direct and inverse circular and hyperbolic functions.
- Able to find logarithm of complex quantity, Gregory`s Series which is a pi formula.
- Enhance and reinforce the student's understanding of concepts through the use of technology when appropriate.
- Analyze the structure of real-world problems and plan solution strategies.
- Use concepts of number theory in problem-solving and to represent problems graphically using trigonometry.

Course: BM-122: ORDINARY DIFFERENTIAL EQUATIONS

Course Objectives: The aim of this course is to enhance the knowledge of students in Ordinary Differential Equations and get them familiar with its geometrical interpretation.

Course Outcomes: At the end of this course, the students will be able to:

- Learn about the definition of differential equations, order and degree of differential equations, Understand the geometrical meaning of differential equations.
- Understand the basic concepts of ordinary differential equations, exact differential equations and learn various techniques of finding the solutions of first order differential equations.
- Develop the skills of solving homogenous linear ordinary differential equations with constant co-efficients.
- Understand the concept of linear differential equations of second order and their solutions using different methods. Develop skills of solving ODEs.
- Learn about ordinary simultaneous ordinary differential equations, total differential equations and their solutions.

Course: BM-123 VECTOR CALCULUS

Course Objectives: The aim of this course is to study the concepts of vector calculus. Students will attain the necessary knowledge and skills in vector calculus.

Course Outcomes: At the end of this course, the student will be able to:

- Understand and solve problems related to scalar and vector product of vectors.
- Learn vector differentiation and directional derivatives and their problem solving techniques.
- Learn gradient, divergence, curl and their physical interpretations. Apply these tools in problem solving.
- Know about geometrical interpretation of gradient, orthogonality conditions of three mutually perpendicular vectors, orthogonal curvilinear coordinates, cylindrical-coordinates, spherical coordinates.
- Understand vector identities, Laplacian operator. Learn vector integration and line integral. Solve problems using these concepts.
- Learn surface and volume integral formulations and their evaluation. Prove Gauss Divergence, Green's and Stoke's theorems. Realize application of Green, Gauss and Stokes' theorems.

Course: BM-231 ADVANCED CALCULUS

Course Objectives: The aim of this course is to study the concepts of Advanced Calculus. This course deals with the concepts of Continuity, Differentiability and its applications.

Course Outcomes: This course will enable the students to: Get the knowledge of Continuity, Uniform continuity and chain rule of differentiation.

- Understand Darboux Intermediate Value Theorem for derivatives, Rolle's Theorem, Mean Value Theorems and their geometrical interpretations. To determine indeterminate forms.
- Learn conceptual variations while advancing from one variable to several variables in limit, continuity, partial differentiation of functions. To understand composite functions, implicit functions and homogeneous functions and to solve related problems.
- To determine maxima, minima and saddle points of two variables and to apply multivariable calculus in optimization problems.

- Grasp the knowledge of total differentiation, Lagrange`s method of multiplier. Learn how to apply Schwarz and Young`s theorem and Implicit function theorem.

- Evaluate double and triple integrals. Learn about Dirichlet integrals, Beta and Gamma functions and problem solving techniques.

- At last they get to know about different curves, their tangents, normal and learn how to find locus of the centre of curvature

- Able to use Serret-Frenet formula, spherical curvature, involutes, evolutes, Bertrand curves and envelopes.

Course: BM-232 PARTIAL DIFFERENTIAL EQUATIONS

Course Objectives: The aim of this course is to study the concepts of partial differential Equations.

Course Outcomes: After the successful competition of this course students will be able to:

- Understand the basic concepts of partial differential equations. Learn methods and techniques for solving linear and non linear PDEs of first order. Understand compatible systems and charpit's method, Jacobi's methods for solving PDEs.
- Learn techniques of solving second and higher order PDEs.
- Learn classification and canonical forms of second order linear PDEs and methods of solving those. Apply Monge's method to solve the problems for second order PDEs. Attain skills to reduce PDEs into canonical form.
- Find characteristics of second order PDEs and Cauchy's problem. Learn methods of separation of variables: solutions of Laplace's, Wave and Heat equations in Cartesian coordinate system.

Course: BM-233 Statics

Course Objective: The aim of this course is to increase the knowledge of learners in Statics.To analyze forces and moments in two and three dimensions.

Course Outcomes: At the end of this course, students will be able to learn:

- Understand about the different concepts of statics. They learn how to find magnitude and direction of resultant of two or any number of forces acting at a point.
- Grasp the knowledge of parallel forces, resultant of two like or unlike parallel forces.
- Learn about moments and couples, analytical condition of equilibrium of coplanar forces.
- They will be able to acquired information about friction, different types of friction.
- It enables them to determine centre of gravity of different bodies like plane lamina, tetrahedron, rectangular lamina and triangular lamina.

- To find position at which body is stable or at which mass is concentrated and can use in daily life examples.
- Understand the concepts of virtual work.
- Understand the concepts of central axis, wrenches, null lines and null planes which helps in solving many real life problems.
- Students acquire the knowledge of stable and unstable equilibrium and solve related problems.

Course: BM-241 Sequence and Series

Course Objective: The objective of this course is to study concepts of sequence and series.

Course Outcomes: This course will enable the students to:

- Study basic concepts of boundedness of set of real numbers, neighbourhood of a point, interior points, limit points, closure points, open sets, closed sets, compact sets and results related to these concepts.
- Study concept of real sequences, their limits, boundedness, monotone, convergenceand divergence behavior, subsequences, Cauchy sequences and theorem related to these concepts.
- Obtain the convergence and divergence of geometric series and hyper-harmonic series or p-series.
- Apply various tests to check convergence like D-Alembert`s ratio test, Logarithmic test, De Morgan and Bertrand test, Cauchy integral test and condensation test.
- Study the convergence, absolute, conditional and divergence behavior of alternating series, arbitrary series. Understand the re-arrangement of terms in series and related theorems.
- Apply and deduce the convergence using Leibnitz`s test, Abel`s test, Dirichlet test and Riemann`s rearrangement theorem.
- Analyze the sequence and series, apply their knowledge in higher mathematics which includes the prominent contribution of Heine-Borel theorem and Bolzano-Weiestrass theorem.

Course: BM -242 Special Functions and Integral Transforms

Course Objective: To analyze properties of special functions by their integral representations. This course deals with some special functions and integral transform like Beta, Gamma, Laplace and Fourier transform.

Course Outcomes: At the end of this course, students will be able to learn:

- Understand definition of Beta and Gamma function, identify Bessel equation and its solutions, functions and their properties- recurrence relations and orthogonality.

- Determine Legendre and Hermite differential equations, its solutions and properties.
- Know about Laplace transforms and its properties, convolution theorem, Laplace of derivatives and integrals.
- Familiarize with Fourier transforms of functions and its properties, relation between Laplace and Fourier transforms.
- Solve ordinary differential equations using Laplace transforms and Fourier transform.
- Explain Parseval's identity, applications of Fourier transforms to boundary value problems.
- Learn Fourier series, Shifting, Modulation, term by term differentiation and integration of Fourier series.
- Apply the concepts of the course to real life problems.

Course: BM-243 Programming in C and Numerical methods (Theory)

Course objective: The objective of this course is to develop skills to solve real time practical problems by using Programming in C and solve equations using different Numerical methods.

Course Outcomes: This course will enable the students to:

- Aquire the knowledge of Programmer`s model of a computer, learn about algorithms and flowcharts.
- Investigate about the different data types, operator used in calculations and expressions and various Input/Output functions.
- Acquire the sufficient information of decision control structure, switch statements, array and pointers to allocate space dynamically.
- Represent the outputs of programs visually in terms of well formatted text and plots.
- Gain confidence to build programmes and software, learn to solve critical problems using flowcharts and algorithms.
- Analyze various methods to solve algebraic and transcendental equations like Bisection method, Regula-Falsi method, Newton Raphson`s method, Secant method and other iterative methods.
- Demonstrate methods to solve simultaneous linear equations- Gauss-elimination method, Gauss Jordan method, LU decomposition, Crout`s method, Cholesky, Iterative, Jacobi`s, Gauss Seidal`s and relaxation.

BM-243: Programming in C and Numerical methods (Practical)

Course objective: The objective of this course is to provide skill to students to develop programs in C language to solve real life practical problems.
Course Outcomes: This course will enable the students to:
- Develop understanding of syntax and structure of simple programs in C.
- Attain skills of writing codes in the C programming language.
- Learn to write programs in the programming language C.
- Learn to run and debug programs in C for different mathematical and other practical problems of daily or scientific use.

Course: BM-351 Real Analysis

Course Objective: The aim of this course is to familiarize students with the basic results and key concepts of real analysis, integrability, continuity and differentiability and terms of metric space.

Course Outcomes: This course will enable the students to:

- Understand the concept of Riemann integration theory, conditions of integrability. Learn Fundamental theorem and Mean Value theorems of integral calculus.
- Study convergence and divergence behavior of Improper integrals using basic definitions and various tests.
- Learn the concepts of metric spaces, subspaces, limit points, interior points, open and closed sets, sequences and theorems related to these concepts.
- Study the concepts of continuity, uniform continuity, compactness and connectedness in metric space.
- Demonstrate an understanding of limits and how they are used in sequences, series.

Course: BM-352 GROUPS AND RINGS

Course Objective: The aim of this course is to study concepts of Groups and Rings. This course deals with the different algebraic structures, groups, their properties, concept of rings, ideals and fields.

Course Outcomes: The course will enable the students to:

- Acquire the basic knowledge about the Groups, Subgroups and Cyclic Groups.
- Analyze and demonstrate examples of subgroups, normal subgroups and quotient groups.
- Use Lagrange's Theorem to analyze the cyclic subgroups of a group.
- Develop an idea about Isomorphism, homomorphism and automorphism. Understand homomorphism, inner automorphism and their properties.
- Explain Cayley's theorem and its applications.
- Describe the characteristics of a ring, quotient rings and ideals. Understand Quotient Rings, Ideals and their existence with examples.
- Differentiate between Ring Ideals and Quotient Rings and also their properties.
- Familiarize with Rings, Integral Domains, Fields and Divisors of Zero.
- Determine the concepts of Ideals and factor rings and homomorphisms and factor rings.
- Use various canonical types of groups (including cyclic groups and groups of permutations) and canonical types of rings (including polynomial rings and modular rings).
- Produce rigorous proofs of propositions, theorems arising in the course of abstract algebra.

Course: BM-353 Numerical Analysis (Theory)

Course Objective: The objective of this course is to provide the skills to students to solve the real life practical problems using numerical methods.

Course Outcomes: This course will enable the students to:

- Apply appropriate numerical methods to solve the problem with accuracy.
- Learn the effects of errors in a tabular values, finite difference operators, numerical methods to study practical problems related to concepts of interpolation and extrapolation.
- Study different Central difference interpolation methods to find values of functions and their derivatives and their use in solving practical problems.
- Use the appropriate numerical method for the solution of ODE and system of linear equation.
- Demonstrate different methods of integration like Newton Quadrature formula, Trapezoidal rule, Simpson`s one-third rule, Simpson`s three-eight rule etc.

Course: BM-353 Numerical Analysis (Practical)

Course Objective: The objective of this course is to demonstrate numerical methods using C language.

Course Outcomes: This course will enable the students to:

- Learn to write codes in C language efficiently and skillfully to demonstrate numerical Methods.

- Apply numerical methods to obtain solution to mathematical problems.
- Solve scientific problems by applying numerical techniques in C programming language.

Course: BM- 361 REAL AND COMPLEX ANALYSIS

Course Objective: The aim of this course is to study the concepts of real and complex analysis.

Course Outcomes: At the end of this course, the students will be able to:

- Familiarize with the concepts of Jacobians, Beta and Gamma functions, double and triple integrals, Dirichlet's integral, change the order of integration and solve related problems.
- Learn the concepts of fourier series, properties of fourier coefficients, parseval's identity.
- Know about stereographic projection of complex numbers, continuity and differentiability of complex functions, analytic functions, Cauchy-Riemann equations and harmonic functions.
- Understand the concepts of elementary functions, mobius transformations and critical mappings.

Course: BM-362 LINEAR ALGEBRA

Course Objective: The aim of this course is to study the concepts of Linear Algebra .

Course Outcomes: At the end of this course, the student will be able to:

- Understand the concepts of vector spaces, subspaces, linear span and dimension of a vector space, bases and their properties, quotient space, use of these concepts in problem solving.
- Learn the concepts of linear transformations on vector spaces to find out rank and Nullity, dual-spaces and to use these concepts for problems solving.
- Know about the matrix representation of a linear transformation and change of basis; Determine eigen values, eigen vectors, characteristic polynomial and minimal polynomial of a linear transformation and their further use in solutions of problems.
- Understand the concepts of inner product spaces, related theorems and orthogonalization process.

Course: BM-363 Dynamics

Course Objective: This course deals with the concept of objects in motion.

Course Outcomes: At the end of this course, students will be able to learn:

- Velocity and acceleration along radial, transverse, tangential and normal directions. Relative velocity and acceleration.
- Understand the concepts of Mass, Momentum and Force. Newton's laws of motion. Work, Power and Energy.
- Motion on smooth and rough plane curves. Projectile motion of a particle in a plane. Vector angular velocity.
- General motion of a rigid body. Central Orbits, Kepler's laws of motion.

Scope of Under Graduate Programme

Science has been described as an ocean of opportunities with numerous options for higher studies and for employment. After graduating in science students have following options for higher education and have further career options:

- M.Sc. (Master of Science)
  - Research Scientist
  - Professor
  - Chemical Analyst
  - Food and Drug Inspector
  - Biochemist
  - Cashier & Accountant
  - Lab Technician
  - Data Analyst
- MCA (Master of Computer Application)
  - Systems Management
  - Systems Development

- Systems Engineering
- Computer System Analyst
- Technical Consultant
- Database Administrator
- Hardware Engineer
- Web Designer or Web Developer
- Project Manager
- Software Developer
- Software Engineer
- Software Architect and Software Consultant

- MBA (Master of Business Administration)
  - Human Resources Manager
  - Operations Manager
  - Product Manager
  - Finance Manager
  - Marketing Manager
  - Project Managers

- B.Ed. (Bachelor of Education)
  - Teaching
- Technical Short-Term Courses
  - Post Graduate Diploma in Management (PGDM)
  - Business Accounting and Taxation (BAT)
  - Certifies Financial Planner (CFP)
  - Data Visualization
  - Diploma in Digital Marketing
  - Certificate Program in Data Science

Also after graduation a student can appear for Government Exams:

- UPSC
- IAF
- IFS
- RBI
- AIIMS- Nursing officer
- IARI- Laboratory Assistant
- LIC-AAO and SBI PO
- SSC Exam etc.
- Other centre and state government exams.

Post Graduate Programme M.Sc. Mathematics

Programme Outcomes (POs)

The student Post-graduating with the M.Sc. Mathematics degree would be able to acquire and demonstrate the following:

PO 1: Critical Thinking: Inculcate critical thinking to carry out scientific investigation objectively. Critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.

PO 2: **Analytical Reasoning:** Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesise data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.

PO 3: Exposure: get adequate exposure to global and local concerns that explore them many aspects of Mathematical sciences

PO 4: Scientific Communication Skills: Imbibe effective scientific and / or technical communication in both oral and writing.

PO 5: Knowledge: Student will get knowledge about both pure as well as applied mathematics branches.

PO 6: **Problem Solving:** Capability to use appropriate software to solve various problems and to apply programming concepts of C++ and Mathematica/ Matlab to various scientific investigations, problem solving and interpretation.

PO 7: Positive Attitude: Develop a positive attitude towards mathematics as an interesting and valuable subject of study.

PO 8: Research Skills: Prepare students for pursuing research or careers in industry in concerned branch of Mathematics. To inculcate the curiosity for mathematics in students and to prepare them for future research.

PO 9: Lifelong Learning: Ability to think, acquire knowledge and skills through logical reasoning and to inculcate the habit of self-learning throughout life, through self- paced and self- directed learning aimed at personal development.

PO 10: Leadership Qualities: Capability for mapping out the tasks of a team or an organization, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination in a smooth and efficient way.

PO 11: Ethics: Continue to acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in the subject concerned.

PO 12: Utilization of Modern tools: Apply modern techniques and to solve complex scientific problems using modern tools.

Programme Specific Outcomes (PSOs)

A Post Graduate with a M.Sc. Mathematics will have the ability to:

PSO1: Have strong foundation in core areas of Mathematics, and able to communicate Mathematics effectively. Understand the nature of abstract mathematics and explore the concepts in further details.

PSO2: Pursue research in challenging areas of pure/applied mathematics. Recognise the need to engage in lifelong learning through continuous education, and research leading to higher degrees like PhD, DSc etc.

PSO3: Provide a systematic understanding of the concepts and theories of mathematics and their application in the real world- to an advanced level, and enhance career prospects in a huge array of fields, viz. in industry, commerce, education, finance and research.

PSO4: Assist students in preparing (personal guidance, books) for competitive exams eg. NET, GATE, etc.

PSO5: Effectively communicate and explore ideas of mathematics for propagation of knowledge and popularization of mathematics in society.

PSO6: Effectively communicate and explore ideas of mathematics for propagation of knowledge and popularization of mathematics in society

PSO7: Employ confidently the knowledge of mathematical software and tools for treating the complex mathematical problems and scientific investigations.

PSO8: Nurture problem solving skills, thinking, creativity through assignments, project work.

PSO9: Strong foundation on Topology, Real & Complex Analysis, Advanced Abstract Algebra, Number Theory, Functional Analysis, Measure theory, Differential equations which have strong links and application in theoretical physics, Seismology, Analytical mechanics and calculus of variation etc.

PSO10: Understanding of the fundamental axioms in mathematics and capability of developing ideas based on them.

Course Outcomes (COs)

Course: MM-401 Advanced Abstract Algebra-I

Course Objective: This aim of the course is to enhance the students knowledge about Conjugates and Centralizers in Sn, p-groups, Applications of Sylow theorems, splitting field, Normal extensions, separable elements, perfect fields, klein's 4- group, Dihedral group, Galois group, Solvent group, Derived series, cyclotomic polynomial, radical extensions and construction with ruler and compass only.

Course Outcomes: After the completion of this course the students will be able to:

- Explore the properties of groups, subgroups, symmetric groups, permutation group, cyclic group, normal subgroup and quotient group.

- Understand the advance algebra using various theorems like Jordan Holder theorem, Scheier`s refinement theorem, Zassenhaus`s Lemma and Dedekind Lemma.
- Learn properties Solvable groups, P-Groups, Galois group, and field theory.
- Apply Sylow's theorems to demonstrate the structure of some finite groups and able to design different algebraic structures with their applications.
- Develop abstract mathematical thinking about groups, rings and fields and able to apply abstract thinking in real life problems.
- Able to identify challenging problems in higher mathematics and their optimum solutions.
- Illustrate the concept of homomorphism, isomorphism and automorphism between groups and rings for solving different types of problems.
- Describe and create examples of composition series, normal series and derived series.

Course: MM-402 Real Analysis-I

Course Objective: This Course deals with the basic properties of real numbers, Riemann Stieltjes integral, Convergence, uniform convergence, continuity and differentiability, power series and integration of differential forms.

Course Outcomes: After the completion of this course the students will be able to:

- Learn about Riemann Stieltjes Integral and its properties in solving different problems arising in Science and Engineering.
- Implement Weirstrass M-test, Abel``s test and Dirichlet`s test for uniform convergence and Cauchy criterion.
- Familiarize with the functions of several variables, chain rule, partial derivative, extremum problem.
- Analyse Lagrange`s multiplier method and derivatives of higher order.
- Illustrate power series using Abel`s and Tauber`s theorem, Taylor`s theorem, Exponential & Logarithmic function, Trigonometric function, Fourier series and Gamma series.
- The student will gain confidence in proving theorems and solving problems.
- Understand the concept of Integration of differential forms, Partition of unity, differential forms and able to use Stokes theorem.
- Extend their knowledge of real variable theory for further exploration of the subject for going into research.
- Understand the abstract nature of higher mathematics and to study the further concepts of Real Analysis.

Course: MM-403 Topology

Course Objective: The main objective of this course is to introduce basic concepts of point set topology, basis and sub basis for a topology. Further, to study continuity, homeomorphisms, open and closed maps, product and quotient topologies and introduce notions of filters and compactness of spaces.

Course Outcomes: After the completion of this course the students will be able to:

- Students will understand the concepts of metric spaces and topological spaces, and their role in mathematics.
- Know about topological spaces, understand neighbourhood system of a point and its properties, interior, closure, boundary, limit points of subsets, and base and subbase of topological spaces; apply the knowledge to solve relevant exercises.
- Learn about first and second countable spaces, separable and Lindelof spaces, continuous functions, separation axioms and their properties.
- Know about quotient topology; demonstrate understanding of the statements and proofs of Embedding theorem and Urysohn's Lemma.
- Know about filters and compactness in topological spaces and apply the knowledge to prove specified theorems.
- Students will be able to apply the theory in the course to solve a variety of problems at an appropriate level of difficulty.
- Students will be able to write cohesive and comprehensive solutions to exercises and be able to defend their arguments.

Course: MM-404 Complex Analysis-I

Course Objective: This course is aimed to provide an introduction to the theories for functions of a complex variable. Some of the objectives of the course is to study and understand the topics like Power Series, Cauchy Inequality, Singularity, Poles, Residue and Bilinear transformation and conformal mapping.

Course Outcomes: After the completion of this course the students will be able to:

- Identify different types of singularities, Zeroes of analytic function. Able to evaluate improper integrals and apply Rouche`s theorem to solve the problem.
- Able to determine the nature of singularity and calculating residue.
- Understand Mobius transformation and mapping of regions under some special transformations.
- Undertsand the concept of residue, evaluate contour integral and solve polynomial equations.
- Compute the radius of convergence for complex power series, differentiability of sum function of power series.
- Demonstrate the idea of complex differentiation and integration for solving related problems.
- Able to understand properties of exponential and logarithm function and their branch with analyticity
- Apply various theorems like Cauchy –Goursat theorem, Gauss mean value theorem, Morera`s theorem, Liouville`s theorem, Taylor`s theorem and Cassorati weierstrass theorem.

Course: MM-405 Differential Equations-I

Course Objective: This course enables the students to understand the concept of differential equations, various methods to find its solutions, fundamental theorems for existence and uniqueness.

Course Outcomes: After the completion of this course the students will be able to:

- Understand concepts of an initial value problem and its exact and approximate solutions, existence of solutions, uniqueness of solutions and continuation of solutions of an initial value problem of order one.
- Learn about system of linear differential equations of first order and its preliminary concepts, homogeneous and non-homogeneous linear systems, existence and uniqueness theory, fundamental matrix, theory of adjoint systems, linear systems with constant coefficients and with periodic coefficients. Attain the skill to obtain fundamental matrix of such a given linear system to demonstrate problem solving.
- Have deep understanding of theory of linear differential equations of higher order by getting knowledge of basic theory, Wronskian theory and fundamental sets, adjoint equations and standard theorems related to these topics.
- Apply methods of reduction of order and variation of parameters to solve linear and non-linear differential equations respectively and to solve higher order linear differential equations with constant coefficients.
- Understand system of differential equations and its existence theory, dependence of solution of an IVP on initial parameters, extremal solutions so as to be able to develop research aptitude in this area.
- Solve the problem of differential equations arising in various fields. Apply the knowledge to prove specified theorems and to solve relevant exercises.
- Students will have the knowledge of theorem of Wintner, Kamke`s, Nagumo`s and Osgood theorem.

Course: MM-407 Advanced Abstract Algebra-II

Course Objective: This course aims to enhance the student's understanding regarding Commutators, Nilpotent groups, Modules, Noetherian and Artinian modules & rings.

Course Outcomes: After the completion of this course the students will be able to:

- Understand commutators and commutators identities.
- Understand about nilpotent groups, their centre, subgroups & factors groups.
- Form upper and lower central series of a group and know their properties.
- Understand linear transformation- similarity, nilpotency index and reduction to triangular form.
- Construct the Jordan Canonical Form and find Companion Matrix for a given polynomial.
- Understand about modules, submodules and quotient modules.
- Find rank of a finitely generated free module and their submodules.
- Learn about the ascending and descending chain conditions.
- Understand about Noetherian modules and rings as well as Artinian modules and rings and differentiate Nil and Nilpotent ideals.

Course: MM-408 Real Analysis- II

Course Objective: This course aims to enhance the students understanding of Lebesgue measure, Measurable sets & functions, Lebesgue Integral, Differentiation of monotone functions and Integrals.

Course Outcomes: After the completion of this course the students will be able to:

- Define Lebesgue outer measure, measurable sets and understand their properties.
- Characterise measurable sets in terms of open, closed, F and G sets and show the existence of a non-measurable set.
- Understand the various properties of Lebesgue measurable functions.
- Define almost uniform convergence and convergence in measure.
- Learn about the shortcomings of Riemann integral , understand Lebesgue integral and its properties.
- Find integral of a non negative function and differentiation of a monotone function.
- Familiarise with the functions of bounded variation and represent them as difference of monotone functions.
- Understand about the L^p spaces & their completeness and bounded linear functionals on the L^p spaces.

Course: MM-409 Computer Programming (Theory)

Course Objective: This course aims to enhance the student's understanding of the Programming languages - FORTRAN 90 and FORTRAN 95 and apply them in mathematical problems.

Course Outcomes: After the completion of this course the students will be able to:

- Form arithmetic expressions by defining numerical constants and variables in FORTRAN.
- Understand conditional flow and looping in a program.
- Construct logical expressions to control the flow in a particular program in FORTRAN.
- Define and differentiate functions, subroutine and arrays and use them accordingly.
- Understand format specifications, strings, array arguments and derived data types.
- Learn about processing files, pointers and modules.
- Familiarise with FORTRAN 90 and FORTRAN 95 features.

- Use the understanding of the programming languages in solving mathematical problems.

Course: MM-410 Complex Analysis-II

Course Objective: This course aims to enhance the student's understanding of the Spaces of analytic functions and their completeness and various other theorems in Complex.

Course Outcomes: After the completion of this course the students will be able to:

- Understand Hurwitz's theorem, Montel's theorem and Riemann mapping theorem.
- Extend the understanding of Weierstrass factorization theorem to the factorization of sine function.
- Learn about Gamma function and its properties, functional equation for gamma function, Integral version of gamma function.
- Define Reimann-zeta function, Riemann's functional equation and Analytic continuation, uniqueness of direct analytic continuation
- Understand Monodromy theorem and its consequences, Hadamard's three circle theorem.
- Understand Dirichlet problem for a unit disk and for a region.
- Learn about Order of an entire function and Exponent of convergence.
- Familiarise with various theorems in Complex- Borel theorem, Hadamard's factorization theorem, Bloch's theorem, Little-Picard theorem, Schottky's theorem, Montel-Carathedory theorem, Great Picard theorem.

Course: MM-411 Differential Equations- II

Course Objective: This course aims to enhance the student's understanding of linear second order differential equations, Autonomous system, critical points and paths of linear as well as non-linear systems , boundary value problems and their applications.

Course Outcomes: After the completion of this course the students will be able to:

- Learn about Linear second order equations: Preliminaries and self adjoint equation of second order.
- Understand about Oscillatory and non-oscillatory equations and common zeros of solutions and their linear dependence.
- Analyse Sturm theory using Sturm separation theorem, Sturm fundamental comparison theorem and its corollaries.

- Define Autonomous systems: the phase plane, paths and critical points and Types of critical points.

- Understand Critical points and paths of non-linear systems: basic theorems and their applications.

- Know about Limit cycles and periodic solutions: Limit cycle, existence and non-existence of limit cycles.

- Understand Second order boundary value problems (BVP) and define eigen value and eigen functions.

- Use Implicit function theorem and Fixed point theorems for periodic solutions of linear and non-linear equations.

Course: MM-501 Functional Analysis

Course Objective: This course aims to enhance the students understanding of Normed linear space, Banach spaces, Hahn-Banach theorem for real linear spaces, Inner product spaces, Hilbert spaces, Bessel's Inequality

Course Outcomes: After the completion of this course the students will be able to:

- Define Normed linear spaces, Banach spaces and examples, Subspace of Banach spaces.

- Quotient space of a normed linear space and its completeness and product of normed spaces.

- Understand Bounded and continuous linear operators, differentiation operator, integral operator.

- Learnt about Hahn-Banach theorem for real linear space, complex linear spaces and normed linear spaces.

- Application to bounded linear functionals on C[a,b], Riesz- representation theorem for bounded linear functionals on C[a,b].

- Determine Strong and weak convergence, weak convergence in lp, uniform operator convergence, open mapping theorem.

- Inner product spaces, Hilbert spaces and their examples, Pythagorean theorem, Apolloniu's identity, projection theorem.

- Understand Orthogonal sets and sequences, Bessel's inequality, Hilbert adjoint operator, its existences and uniqueness, properties of Hilbert adjoint operators.

Course: MM-502 Analytical Mechanics and Calculus of Variations

Course Objective: This course aims to enhance the students understanding of Shortest distance, Brachistochrone problem, Isoperimetric problem, Euler's equation, Constraints, Canonical transformations, Lagrange brackets and Poisson brackets.

Course Outcomes: After the completion of this course the students will be able to:

- Find Shortest distance, Minimum surface of revolution, Brachistochrone problem, Isoperimetric problem, Geodesic.

- Euler's Equation for one dependent function of one and several independent variables.

- Understand Free and constrained systems, Constraints and their classification, Holonomic and Non-Holonomic systems, Scleronomic and Rheonomic systems.

- Lagrange's equation of first kind, Principal of virtual displacements D'Alembert's Principle, Lagrange's equation of second kind.

- Understand Hamilton's variables, Donkin's theorem, Hamilton canonical equation, Routh's equations.

- Cyclic coordinates Poisson's Bracket, Poisson's Identity, Hamilton's principle, Poincare-Carton integral invariant, Whittaker's equation.

- Canonical transformations, Hamilton-Jacobi equation, Jacobi theorem.

- Testing the Canonical characters of a transformation, Lagrange's brackets, Condition of canonical character of a transformation in terms of Lagrange's brackets and Poisson's brackets

Course: MM-503 Number Theory

Course Objective: This course aims to enhance the students understanding of simultaneous linear equation, Pythagorean triangles, Elliptic curves, Farey sequences, Hurwitz theorem, Euclidean algorithm and Partitions.

Course Outcomes: After the completion of this course the students will be able to:

- Understand the equation ax+by=c, simultaneous linear equations, Pythagorean triangles, ternary quadratic forms.

- Define Elliptic curves, Farey sequences, rational approximation, Hurwitz theorem.

- Geometry of numbers, Blichfeldt's principle, Minkowski's convex body theorem Lagrange's four square theorem.

- Understand Euclidean algorithm, infinite continued fractions, irrational numbers.

- Approximation to irrational numbers, Best possible approximations.

- Learn about Periodic continued fractions and Pell's equation.

- Define Partitions, Ferrers Graphs, formal power series, generating functions and Euler's identity.

- Understand Euler's formula, bounds of P(n), Jacobi's formula, a divisibility property.

Course: MM-504 Algebraic Coding Theory

Course Objective: This course aims to enhance the students understanding of Block codes, Group codes, Dual codes, finite fields, automorphism group, linear codes, Hadamard transform, Hadamard matrices.

Course Outcomes: After the completion of this course the students will be able to:

- Define Block codes, decoding principle of maximum likelihood, group codes, matrix codes.

- Understand Dual codes, polynomial codes, binary representation of a number, hamming codes.

- Define finite fields and its construction, primitive element of a finite field, irreducible polynomial and primitive polynomial over finite fields.

- Define Automorphism group of $GF(q^n)$ and its normal basis, generator polynomial of a Bose- Chaudhuri- Hocqhenghem codes and its construction.

- Learn about Linear codes, Equivalent codes and permutation matrices, Dual code of a linear code, Self dual codes, Hadamard transform.

- Maximum distance separable codes and its examples, dual code of a MDS code, trivial MDS codes.

- Hadamard matrices, Existence of a Hadamard matrix of order n, Cyclic codes, generator polynomial of a cyclic code, check polynomial of a cyclic code.

- Understand Equivalent code and dual code of a cyclic code, Idempotent generator of a cyclic code, Hamming and BCH codes as cyclic codes, Perfect codes, Self dual binary cyclic codes.

Course: MM-505 Integral Equations

Course Objective: This course aims to enhance the students understanding of Integral equations, Eigen values and eigen functions, Fredholm theorem, Fredholm and Volterra integral equation, Kernels, Abel integral equation.

Course Outcomes: After the completion of this course the students will be able to:

- Define Integral equations and their classifications, eigen values and eigen functions.
- Find inner or scalar product of two functions, Fredholm Alternative, Fredholm theorem.
- Understand the method of successive approximations, Iterative scheme for Fredholm and Volterra integral equation of second kind.
- Conditions of uniform convergence and uniqueness of series solution.
- Learn Classical Fredholm theory, Fredholm first theorem, Fredholm second theorem, Fredholm third theorem.
- Determine Symmetric kernels, Complex Hilbert space, Riesz- Fisher theorem, Fundamentals properties of eigen values and eigen functions for symmetric kernels.
- Definite kernels and mercer's theorem, Rayleigh- Ritz method for finding the first eigen value.
- Understand Abel's integral equation, Riemann- Hilbert problem, Hilbert- kernel, solution of the Hilbert- type singular integral equation.

Course: MM-507 General Measure & Integration Theory

Course Objective: This course deals with the Measurable set, measurable functions, theorems and results based on it and integration theory.

Course Outcomes: After the completion of this course the students will be able to:

- Gain Knowledge of measurable sets, extension of measurable sets and measurable functions.
- Understand the theorems based on measurable functions. Acquire mastery on Lebesgue Integral.
- Study differentiation and integration concepts. Understand the concept of almost everywhere, fundamental almost everywhere, convergence in measure and almost uniform everywhere.
- Approximate bounded measurable function by the sequence of simple function.
- Familiarize with integrable simple function, monotone convergence theorem, product measure, signed measure and contraction of finite signed measure.
- Apply the concept of Egoroff`s theorem, Riesz-Weyl theorem, Fubini`s theorem, Lebesgue Decomposition theorem, Radon-Nikodym theorem, Jordan Decomposition and Riesz- Markoff`s theorem.
- Demonstrate integration over locally compact spaces, Baire sets, Baire functions, Borel sets, regularity of borel set and baire set.

Course: MM-508 Partial Differential Equations

Course Objective: This course deal with partial differential equations, its types, formations, solution and to transform them in canonical form.

Course Outcomes: After the completion of this course the students will be able to:

- Understand partial differential equations and its applications.
- Distinguish between linear and non-linear partial differential equations.
- Use Green`s function to solve partial differential equations.
- Determine complete integral of Non-linear first order partial differential equations.
- Understand formation and solution of some PDEs. Solve Boundary Value problems of Laplace, Heat and Wave equation by various methods.
- Apply the knowledge of PDEs and their solutions in order to understand physical phenomena.
- Transform partial differential equations in its canonical form.
- Apply specific methodologies, technique to conduct research and produce innovative results in the area of specialization.

Course: MM-509 Algebraic Number Theory

Course Objective: This course deals with the algebraic number fields and its related theorems. It is the study of zeros of polynomial with rational or integral coefficients. The very motivation for learning this subject was solving certain Diophantine equations.

Course Outcomes: After the completion of this course the students will be able to:

- Learn and perform the arithmetic of algebraic number fields, such as addition and multiplication, finding inverse etc.
- Prove theorems for integral bases and unique factorization intro ideals.
- Factorize an algebraic integer into irreducible.
- Obtain the ideals of an algebraic number ring.
- Understand ramified and un-ramified extensions and their related results.
- Solve certain Diophantine equations by applying methods developed in this course.
- Compute class numbers and class groups of some simple number fields.
- Synthesize the main idea of algebraic number theory.
- Understand Thue theorem, Roth`s theorem, theorem of primitive elements and Liouville`s theorem for complex algebraic number etc, Chinese Remainder theorem.
- Construct cyclotomic polynomial, norm and trace of algebraic numbers and algebraic integers, Diophantine equations Minkowski`s bound.

Course: MM-510 Boundary Value Problem

Course Objective: This course deals with the ordinary and partial difference equations and to solve boundary value problems . It also enhance the learning of students about integral transform methods and perturbation methods.

Course Outcomes: After the completion of this course the students will be able to:

- Use applications of Ordinary and Partial differential equations. Able to solve Initial and Boundary value problem.
- Understand Dirac Delta function, Green`s function to reduce boundary value problem of a self-adjoint-differential equation with homogeneous boundary conditions to integral equation forms.
- Demonstrate solution of Laplace and Poisson equations in integral form, The Newtonian, Single-layer and double-layer potential, Interior and exterior Dirchlet`s problem, Neumann problem.
- Define Green`s function for Laplace`s equation in a free space as well as in a space bounded by a ground vessel.
- Construct Green`s function for the space bounded by grounded two parallel plates or an infinite cylinder.
- Understand integral transform methods- Laplace, fourier and Hilbert transform and applications to mixed Boundary value problems.
- Demonstrate perturbation methods- applications to electrostatics, Low-Reynolds-number Hydrodynamics, Steady stokes flow, rotary flow, oseen flow, crack problem in elasticity and theory of diffusion.

Course: MM-511 Mathematical Aspects of Seismology

Course Objective: This course enhance the knowledge of students about earthquakes, different types of waves and mathematical aspects of seismology.

Course Outcomes: After the completion of this course the students will be able to:

- Understand Harmonic waves, Plane waves, principle of superposition and equation of telegraphy.
- Able to progressive and stationary type solutions of wave equation.
- Apply D` Alembert`s formula and exponential form of harmonic waves.
- Reduce equation of wave to wave equation , P and S wave and their characteristics and their polarization, Snell`s law of reflection, Liquid-liquid interface, solid-liquid interface, solid –solid interface.
- Define Rayleigh waves, Love waves and stonely waves
- Solve 2-D and 3-D lamb`s problem in an isotropic elastic medium and Haskell matrix method for love waves in multilayered medium.
- Demonstrate Spherical wave, Sommerfield`s integral, Kirchoff`s solution, Poisson formula, Helmholtz formula.
- Expand spherical waves into plane waves.
- Identify location of earthquakes, aftershocks and foreshocks, seismic moment, earthquake magnitude and observation of earthquake.

Scope of Post Graduate Programme

Just like a number line, which starts with a zero and leads to infinity, career options for an individual with M.Sc. in Mathematics, is never ending.
Here is a list which one can explore after M.Sc. in Mathematics:

- **Higher study-Ph.D.**
- **Research Scientist**
- **Assistant Professor/ Professor**
- **School Lecturer/ School Teacher**
- **Data Analyst**
- **Bank PO/SSC**
- **Information Scientist**
- **Subject Matter Expert**
- **Startups/Entrepreneur**
- **Software Developer**
- **Data Scientist**
- **ML Scientist**
- **Computer Scientist**
- **Cryptographer**
- **Operations Research Analyst**
- **Engineering Sciences**
- **Financial Analysts**
- **Financial Planners**
- **Statisticians**
- **Actuarial Sciences**
- **Quantitative Risk Analyst**
- **Quantitative Developer**
- **Interest Rate Trending Strategist**
- **Investment Analyst**
- **Accountants**
- **Share Marketing**

I.B.(PG) COLLEGE, PANIPAT

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS

PROGRAM OUTCOMES (PO), PROGRAM SPECIFIC OUTCOMES (PSO), COURSE OUTCOMES (CO)

PROGRAM: BACHELOR OF COMPUTER APPLICATIONS (B.C.A)

PO No	Program Outcome (PO) After completing the three-year degree program, student will be able to:
PO1	Attain employability skills to serve Software, IT industry and government sector.
PO2	Attain entrepreneurship skills to open their own venture in the area of hardware, software and networking.
PO3	Obtain analytical and problem-solving skills to understand, analyze and develop real life applications for the benefit of society.
PO4	Develop effective communication skills.
PO5	Attain ability to apply knowledge of computer science, applications and mathematics in practice.
PO6	Attain strong base to pursue higher education in the field of Computer Applications, Computer Science, IT and Management.
PO7	Become civilized citizen bundled with human values, professional ethics, Environment consciousness and sensitive to societal issues.
PO8	Attain skill to use modern computing tools and techniques for learning and developing software solutions.
	Program Specific Outcome (PSO) After Completing Bachelor of Computer Applications, the student will be equipped to :
PSO1	Attain skills to work in latest technologies and programming languages.
PSO2	Attain technical skills for software development, testing, problem analysis,hardware troubleshooting, web designing, web development project Management, database management, network management and office support.
PSO3	Attain communication and personality development skills.
PSO4	Attain knowledge of open-source technology.

Course Outcomes	
Semester-I Course: BCA-111 Computer and Programming Fundamentals **At the end of the course student should be able to :**	
CO-1	Understand the basic fundamentals of Computer System
CO-2	Classify different types of computer memories
CO-3	Establish relationship between hardware and software
CO-4	Classify different types of software
CO-5	Explain operating system, its functions, types and working
CO-6	Solve various problems using problem solving techniques like Flowcharting, algorithms, pseudo code, decision table, Structured programming concepts.
CO-7	Differentiate top-down and bottom-up programming methodologies.
CO-8	Understand various types of Computer virus.
CO-9	Explain various types of computer languages.
CO-10	Differentiate and implement linear and binary search
CO-11	Differentiate various sorting techniques
CO-12	Implement Bubble, Selection, and Insertion Sorting
CO-13	Explain Merging
Semester-I Course: BCA-112 Windows and PC Software **At the end of the course student should be able to :**	
CO-1	Explain Windows and its Features, Using CD, DVD, Pen Drive, Burning CD. Windows Accessories. Entertainment- Media Players, Sound Recorder, Volume Control.
CO-2	Explain Hardware Requirements of Windows. Windows Concepts, Windows Structure
CO-3	Work efficiently with Desktop, Taskbar, Start Menu, My Pictures, My Music, My Documents, Recycle Bin.
CO-4	Manage Files, Folders and Disk
CO-5	Explain working of windows explorer
CO-6	Access and store data on CD, DVD, Pen Drive
CO-7	Ability to burn CD
CO-8	Ability to work on Media Players, Sound Recorder, Volume Control.
CO-9	Installation of Hardware & Software
CO-10	Work on Scanner, Web Camera, Printers
CO-11	Use System Tools - Backup, Character Map, Clipboard Viewer, Disk Defragmenter, Drive Space, Scandisk, System Information, System Monitor, Disk Cleanup.
CO-12	Update Windows

CO-13	Browse the Web with Internet Explorer,
CO-14	Explain Multiple User Features of Windows,
CO-15	Create and Delete User, Apply security features
CO-16	Share Folders and Drives,
CO-17	Browse the Entire Network, Use Shared Printers.
CO-18	Use Control Panel & its components
CO-19	Explain Toolbars, Menus and Keyboard Shortcuts, concepts of Workbook & Worksheets.
CO-20	Explain various data types in Excel
CO-21	Use Wizards
CO-22	Use different features with Data, Cell and Texts
CO-23	Inserting, Removing & Resizing of Columns & Rows
CO-24	Work with Data & Ranges
CO-25	Explain Different Views of Worksheets,
CO-26	Implement Column Freezing, Labels, Hiding, Splitting ..
CO-27	Use different features with Data and Text, Cell Formatting including Borders &Shading
CO-28	Multiple Worksheets: Concept, Creating and Using Multiple Worksheets;
CO-29	Use of Formulas, Calculations & Functions,
CO-30	Various types of Functions, Cell Referencing, Absolute and Relative Addressing,
CO-31	Use of various types of Charts
CO-32	Print Workbook & Worksheets with various options,
CO-33	Database: Creation, Sorting, Query and Filtering a Database;
CO-34	Creating and Using Macros; Pivot table & Pivot chart
Semester-I **Course: BCA-113 Mathematical Foundations – I** **At the end of course student should be able to:**	
CO-1	Apply Set, subsets and operations on sets,
CO-2	Apply Venn diagram of sets. Power set of a set.
CO-3	Apply Equivalence relation on a set and partition of a set,
CO-4	Apply Permutation and combinations,
CO-5	Apply Partially ordered sets, Lattices (definition and examples).
CO-6	Boolean algebra (definition and examples)
CO-7	Apply Epsilon and delta definition of the continuity of a function of a single variable,
CO-8	Explain Basic properties of limits,
CO-9	Explain Continuous functions and classifications of discontinuities

CO-10	Use Derivative of a function, Derivatives of Logarithmic, exponential, trigonometric, inverse trigonometrical and hyperbolic functions. Higher order derivatives.
CO-11	Explain Formation of differential equations order and degree of the differential equation,
CO-12	Explain Geometrical approach to the existence of the solution of the differential equation dy/dx=f (x,y).
CO-13	Apply Ordinary differential equations of first degree and the first order, exact differential equations.
CO-14	Apply Linear differential equations of higher order with constant coefficients,
CO-15	Apply Homogeneous linear differential equations and linear differential equations reducible to homogenous differential equations,
CO-16	Applications of differential equations to geometry.
Semester-I Course: BCA-114 Logical Organization of Computers-I At the end of course student should be able to:	
CO-1	Identify, understand and apply Number Systems, Binary Arithmetic, Fixed-pointand Floating point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC.
CO-2	Apply Binary Logic: Boolean Algebra, Boolean Theorems, Boolean Functions andTruth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions – Venn Diagram, Karnaugh Maps.
CO-3	Design Digital Logic: Basic Gates – AND, OR, NOT, Universal Gates – NAND, NOR,Other Gates – XOR, XNOR etc. implementations of digital circuits, Combinational Logic – Characteristics, Design Procedures, analysis procedures
CO-4	Design Combinational Circuits: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters.
Semester-I Course: BCA-115 Communicative English At the end of course student should be able to:	
CO-1	Compose Faxes, e-mails, and text messages
CO-2	Develop vocabulary and improve the accuracy in grammar
CO-3	Produce words with right pronunciation
CO-4	Improve LSRW- listening, speaking, reading and writing skills and the related sub-skills.
CO-5	Accuracy and fluency in producing and understanding spoken and written English.
CO-6	Writing Official letters / applications

CO-7	Accuracy in using English in situations (for example: greetings, in the post office,catching a train, at a bank, making a telephone call, buying vegetables, at the hospital, on the bus etc.
CO-8	Explain Right to Information Act, 2005 : Definition, Meaning, Nature and Scope of Right to Information,
CO-9	Explain Obligations and functioning of PIO's (Public Information Officers), Information, which cannot be disclosed,
CO-10	Explain Functioning of Appellate Authorities(State Information Commission(s) and Central Information Commission), Terms and conditions of appointment of members in State Information Commission(s) and Central Information Commission.

Semester-I
Course: BCA-116 Programming in C
At the end of course student should be able to:

CO-1	Explain Structure of a C Program.
CO-2	Explain tokens in C
CO-3	Explain Data types, Constants and Variables,
CO-4	Design algorithms for simple problems
CO-5	Design Simple Programs using formatted and unformatted input output functions
CO-6	Write C program for simple applications
CO-7	Differentiate various types of operators
CO-8	Design Programs using arithmetic, logical and bitwise operators
CO-9	Design applications using control statements
CO-10	Design programs using functions, functions with & without parameters
CO-11	Apply recursion to solve problems
CO-12	Explain use and working of storage classes in c
CO-13	Design applications using single dimensional and two-dimensional arrays
CO-14	Design programs using strings.

Semester-II Course: BCA – 121 Advanced Programming in C
At the end of course student should be able to:

CO-1	Design applications using string functions.
CO-2	Design simulation of string functions
CO-3	Design Applications using arrays of strings
CO-4	Design applications using structures and unions
CO-5	Differentiate Structure and union
CO-6	Explain enumeration
CO-7	Understand memory management using pointers.

CO-8	Design programs using the concept of dynamic memory allocation using pointer and pointer to pointer.
CO-9	Create files and perform file operations using C
CO-10	Apply Random-access I/O in files
CO-11	Explain preprocessors
CO-12	Design applications using command line arguments.

Semester-II
Course: BCA-122 Logical Organization of Computers – II
At the end of course student should be able to:

CO-1	Understand and Apply Flip-Flops, Clocked RS, D type, JK, T type and Master Slave flip-flops. State table, state diagram. Flip-flop excitation tables
CO-2	Understand and design Sequential Circuits, registers, counters
CO-3	Understand and explain Memory & I/O Devices: Semiconductor RAM, ROM,Magnetic and Optical Storage devices, Flash memory, I/O Devices and their controllers.
CO-4	Understand and apply Machine instruction, Instruction set selection, Instruction cycle, Instruction Format and Addressing Modes
CO-5	Explain I/O Interface, Interrupt structure, Program-controlled, Interrupt-controlled & DMA transfer, I/O Channels, IOP.

Semester- II
Course: BCA – 123 Mathematical Foundations - II

CO-1	Understand and apply Propositions and logical operators, Truth tables and propositions generated by a set.
CO-2	Understand Equivalence and implications, Laws of logic, Mathematical system, Proposition over a universe, Mathematical induction, Quantifiers
CO-3	Understand and apply Binary operations on a non empty set, Groups, Subgroups, Normal Subgroups, Cosets, Factor groups, Rings, Sub rings, Ideals, Factor rings, Prime ideals, Minimal ideal, Fields, direct product of groups, Isomorphism of groups and rings
CO-4	Perform Addition and multiplication of matrices, Laws of matrix algebra, Singularand non-singular matrices, Inverse of a matrix, Rank of a matrix, Rank of the product of two matrices, Systems of linear equations i.e. AX=0 and AX=B
CO-5	Understand and apply Characteristic equations of a square matrix, Cayley- Hamilton Theorem, Eigen values and eigen vectors, Eigen values and eigen vectors of symmetric skew symmetric, Hermitian and skew –Hermitan matrices, Diagonalization of a square matrix

Semester –II Course: BCA 124 Office Automation Tools
At the end of course student should be able to:

CO-1	Differentiate different DTP packages

CO-2	Design publication in Page maker
CO-3	Editing publication in Page maker
CO-4	Design, Edit & format Document in MS Word
CO-5	Proofing Document
CO-6	Creating Bookmarks
CO-7	Write letters using mail merge
CO-8	Design tables
CO-9	Perform File Management
CO-10	Printing Document
CO-11	Using Styles, linking and embedding object.
CO-12	Designing effective and automated presentations using MS Power point
CO-13	Making use of Animations, Sounds and animated pictures in presentations.

Semester-II
Course: BCA – 125 Structured System Analysis and Design

CO-1	Identify Characteristics, Elements of system, Physical and abstract system, open and closed system, man-made information systems.
CO-2	Explain System Development Life Cycle: Various phases of system development, Considerations for system planning and control for system success.
CO-3	Demonstrate knowledge on the different phases of Systems Development Life Cycle (SDLC)
CO-4	Explain Role of system analyst.
CO-5	Demonstrate the use of systems design techniques, methodologies, and tools.
CO-6	Understand System Planning: Bases for planning in system analysis: Dimensions of Planning.
CO-7	Understand and Explain Initial Investigation: Determining user's requirements and analysis, fact finding process and techniques.
CO-8	Demonstrate use of Tools of structured Analysis: Data Flow diagram, data dictionary, IPO and HIPO charts, Gantt charts, pseudo codes, Flow charts, decision tree, decision tables.
CO-9	Apply Feasibility study: Technical, Operational & Economic Feasibilities in designing the system
CO-10	Explain Cost/Benefit Analysis: Data analysis cost and benefit analysis of a system
CO-11	Explain Input/ Output and Form Design,
CO-12	Perform File Organization and database design in designing systems
CO-13	Perform System testing and demonstrate test planning, testing techniques.
CO-14	Explain Quality assurance: Goal of quality assurance, levels of quality assurance System implementation
CO-15	Explain software maintenance

	Semester-II **Course: BCA- 126 Personality Development** **At the end of course student should be able to:**
CO-1	Develop and exhibit and accurate sense of self
CO-2	Develop an understanding of and practice personal and professional responsibility.
CO-3	Develop Personal hygiene, Social, Business and Dining Etiquettes,
CO-4	Develop and understand sense of Body language use and misuse, Art of good Conversation, Art of Intelligent Listening.
CO-5	Develop Interpersonal Skills: Dealing with seniors, colleagues, juniors, customers, suppliers, contract workers, owners etc. at work place
CO-6	Develop and demonstrate presentation and seminar skills
CO-7	Develop interview skills
CO-8	Develop skill to write winning resume
CO-9	Develop skill to understand company profiles
CO-10	Develop skill to keep update on current affairs
CO-11	Develop time management skill
	Semester-III **BCA – 231 OBJECT ORIENTED PROGRAMMING USING 'C++'** **At the end of course student should be able to:**
CO-1	Articulate the principles of object-oriented problem solving and programming.
CO-2	Outline the essential features and elements of the C++ programming language.
CO-3	Develop simple applications using class, objects, constructors
CO-4	Develop applications using console I/O
CO-5	Understanding and implementing concepts of dynamic memory allocation using pointers
CO-6	Design application using friend functions and friend class.
CO-7	Understand and use manipulators
CO-8	Developing applications using Arrays, Array of Objects, Passing and Returning Objects to Functions,
CO-9	Developing applications using String Handling in C++,
CO-10	Developing applications using Concepts of Polymorphism, Function Overloading, Inline Functions.
CO-11	Use C++ language to solve problems
	Semester-III **BCA – 232 DATA STRUCTURES** **At the end of course student should be able to:**
CO-1	Identify applications and categories of Data Structure

CO-2	Understand and explain Algorithms complexity and time-space tradeoff, Big-O notation
CO-3	Applying String operations, Pattern matching algorithms
CO-4	Identify the appropriate data structures and algorithms for solving real world problems
CO-5	Applying various kinds of searching and sorting techniques
CO-6	Understanding and implementing algorithms using various data structures like Arrays, stacks, queues, Deques, Priority Queues, linked list, trees, graphs.
CO-7	Understanding and implementing applications of all data structures studies in due course.

Semester-III
Course: BCA – 233 COMPUTER ARCHITECTURE
At the end of course student should be able to:

CO-1	Understand and explain the basic architecture and design of computer
CO-2	Understand and apply Register Transfer Language (RTL), register transfer, Bus and Memory Transfers
CO-3	Understand and apply Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit
CO-4	Understand and explain Microprogrammed Control
CO-5	Understand and explain Central Processing Unit
CO-6	Understand and explain Memory Organization.

Semester-III
Course: BCA – 234 SOFTWARE ENGINEERING
At the end of course student should be able to:

CO-1	Understand and explain Programming paradigms
CO-2	Differentiate Program and Software
CO-3	Explain Phases in Software Development Process
CO-4	Explain and apply various models: Waterfall, Prototype, Evolutionary and Spiral models
CO-5	Understand and apply feasibility Study
CO-6	Design SRS
CO-7	Understand and apply Structured Analysis and Tools: Data Flow Diagram, Data Dictionary, Decision table, Decision tress, Structured English, Entity-Relationship diagrams, Cohesion and Coupling. Gantt chart, PERT Chart
CO-8	Understand and explain Software Maintenance: Type of maintenance,Management of Maintenance, Maintenance Process, maintenance characteristics. .
CO-9	Explain Software Project Planning

Semester-III Course: BCA – 235 FUNDAMENTALS OF DATABASE SYSTEM
At the end of course student should be able to:

CO-1	Explain traditional file system
CO-2	Differentiate Traditional file system and Database approach.
CO-3	Explain DBMS Functions and Components
CO-4	Understand and explain various roles in Database Environment
CO-5	Understand and explain Database System Architecture
CO-6	Understand and Explain Data Independence – Logical and Physical Data Independence,
CO-7	Classify Database Management System, Centralized and Client Server architecture to DBMS.
CO-8	Understand and explain various Data Models

Semester-III
Course: BCA- 236 COMPUTER-ORIENTED NUMERICAL METHODS
At the end of course student should be able to:

CO-1	Understand and perform Computer Arithmetic: Floating-point representation of numbers, arithmetic operations with normalized floating-point numbers and theirconsequences, significant figures. Error in number representation-inherent error, truncation, absolute, relative, percentage and round-off error
CO-2	Understand and apply Iterative Methods
CO-3	Understand and explain Solution of simultaneous linear equations and ordinary differential equations
CO-4	Understand and apply Interpolation and Approximation
CO-5	Understand and explain Numerical Differentiation and integration

Semester-IV
Course: BCA – 241 ADVANCED DATA STRUCTURE
At the end of course student should be able to:

CO-1	Understand and apply operations on Binary search Tree, General trees
CO-2	Perform Huffman's algorithm
CO-3	Understand and apply operations on Graph
CO-3	Implement Warshall's algorithm for shortest path, Dijkstra algorithm for shortest path
CO-4	Perform Sorting and Searching using various techniques.
CO-5	Differentiate different Sorting and Searching techniques
CO-6	Implement all types of File organization
CO-7	Implementing Hashing
CO-8	Understand and explain Collision Resolution

	Semester-IV Course: BCA – 242 Advanced PROGRAMMING USING C++ At the end of course student should be able to:
CO-1	Apply Dynamic Polymorphism with Function Overriding, Virtual Function & Abstract Class,
CO-2	Apply Data type Conversions
CO-3	Develop applications using inheritance
CO-4	Apply Function templates
CO-5	Develop generic classes using class templates
CO-6	Perform Exception Handling
CO-6	Implement operations on Text and Binary files
	Semester-IV Course: BCA-243 E-Commerce At the end of course student should be able to:
CO-1	Demonstrate understanding of Business operations
CO-2	Understand and describe Features of E-Commerce,
CO-3	Differentiate Types of Ecommerce Systems,
CO-4	Demonstrate Management Issues relating to e-commerce.
CO-5	Differentiate E-commerce practices vs. traditional business practices
CO-5	Differentiate concepts of b2b, b2c, c2c, b2g, g2h, g2c
CO-6	Demonstrate understanding of Elements and principles of E-Commerce
CO-7	Apply Operations of E-commerce: Credit card transaction; Secure HypertextTransfer Protocol (SHTP); Electronic payment systems; Secure electronic transaction (SET); SET`s encryption; Process; Cybercash; Smart cards; Indian payment models.
CO-8	Demonstrate understanding of Applications of E-Governance
CO-9	Demonstrate understand of Applications of E-commerce in B2C
CO-10	Describe Impact on disinter mediation and re-intermediation
CO-11	Analyze Products in b2c model;
CO-12	Describe success factors of e-brokers; Broker-based services on-line; Online travel tourism services;
CO-13	Explain Benefits and impact of e-commerce ontravel industry; Deal estate market; online stock trading and it benefits; Online banking and its benefits; Online financial services and their future;
CO-14	Describe E-auctions – benefits, implementation and impact.
CO-15	Describe Applications in B2B

CO-16	Describe Emerging Business models:
CO-17	Describe Internet & E-Commerce scenario in India
CO-18	Describe Internet security Issues
CO-19	Describe Legal aspects of E-commerce

Semester-IV Course: BCA – 244 RELATIONAL DATABASE MANAGEMENT SYSTEM **At the end of course student should be able to:**	
CO-1	Describe Relational Model Concepts & Codd's Rules for Relational Model
CO-2	Describe and apply Relational Algebra
CO-3	Understand and apply Relational Calculus
CO-4	Understand and describe Functional Dependencies and Normalization
CO-5	Understand and perform SQL commands and operations
CO-5	Differentiate Basic DDL, DML and DCL commands in SQL
CO-6	Apply Simple Queries, Nested Queries,
CO-7	Understand and describe PL/SQL architecture
CO-8	Describe and use Tables, Views, Indexes, Aggregate Functions, Clauses
CO-9	Understand and describe The Generic PL/SQL Block: PL/SQL Execution Environment,
CO-10	Understand and describe PL/SQL Character set and Data Types,
CO-11	Demonstrate working of Control Structure in PL/SQL
CO-12	Demonstrate working of Cursors in PL/SQL,
CO-13	Design Triggers in PL/SQL
CO-14	Develop Basic programs using PL/SQL

Semester –IV Course: BCA – 245 COMPUTER-ORIENTED STATISTICAL METHODS **At the end of course student should be able to:**	
CO-1	Understand and perform Basic Statistics: Preparing Frequency Distribution Table and Cumulative frequency,
CO-2	Demonstrate Measure of Central Tendency, Types: Arithmetic mean, Geometric Mean, Harmonic Mean, Median, Mode.
CO-3	Demonstrate Measure of Dispersion: Range, Quartile Deviation, mean deviation, Coefficient of mean Deviation, Standard Deviation
CO-4	Demonstrate Moments: Moments About mean, Moments about any point, Moment about origin, Moment about mean in terms of moment about any point, Moment about any point in terms of Moment about mean.
CO-5	Demonstrate Probability Distribution
CO-5	Demonstrate Mathematical Expectation Types: Binomial, Poisson, Normal Distribution, Mean and Variance of Binomial, Poisson, and Normal Distribution

CO-6	Demonstrate. Correlation: Introduction, Types, Properties, Methods of Correlation: Karl Pearson's Coefficient of Correlation, Rank Correlation and Concurrent Deviation method, Probable error.
CO-7	Demonstrate Regression
CO-8	Compare regression with Correlation
CO-9	Demonstrate Curve Fitting: Straight Line, Parabolic curve, Geometric Curve and Exponential Curve Bayes' Theorem in Decision Making, Forecasting Techniques
CO-10	Demonstrate Sampling: Meaning, methods of Sampling,
CO-11	Demonstrate Statistical Inference
CO-12	Demonstrate Types of test of Significance
Semester-IV **Course: BCA – 246 MANAGEMENT INFORMATION SYSTEM** **At the end of course student should be able to:**	
CO-1	Describe system and Basic System Concepts,
CO-2	Understand and describe Types of Systems,
CO-3	Understand and describe Information System.
CO-4	Understand and describe Role of Information in Decision Making,
CO-5	Describe Sub-Systems of an Information system: EDP and MIS management levels, EDP/MIS/DSS.
CO-5	Describe overview of Management Information System
CO-6	Describe Simon's Model of decision-Making, Structured Vs Un-structured decisions, Formal vs. Informal systems.
CO-7	Develop Information Systems
CO-8	Describe Analysis & Design of Information Systems: Implementation & Evaluation, Pitfalls in MIS Development.
CO-9	Demonstrate Functional MIS
Semester-V **Course- BCA-352: Operating System-I** **At the end of course student should be able to:**	
CO-1	Describe and explain the fundamental components of a computer operating system
CO-2	Describe and explain the fundamental components of a computer operating system
CO-3	Define, restate, discuss, and explain the policies for scheduling, deadlocks
CO-4	Describe and extrapolate the interactions among the various components of computing systems.

CO-5	Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems.
CO-6	Define, restate, discuss, and explain the policies for memory management
CO-7	Define, restate, discuss, and explain the policies for synchronization, system calls, and file systems
CO-8	Know about different page replacement techniques
CO-9	Understand various memories

Semester-V

Course- BCA-353: Artificial Intelligence

At the end of course student should be able to:

CO-1	Understand different types of AI agents
CO-2	Know various AI search algorithms
CO-3	Understand the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving
CO-4	Know how to build simple knowledge-based system.
CO-5	Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information
CO-6	Ability to apply knowledge representation, reasoning, and machine learning techniques to real-world problems.
CO-7	Ability to carry out independent (or in a small group) research and communicate it effectively in a seminar setting.
CO-8	Know about the different searching process techniques
CO-9	Know about the NLP
CO-10	Know about the Robotics

Semester-V

Course- BCA-354: Computer Networks

At the end of course student should be able to:

CO-1	Describe the general principles of data communication.
CO-2	Describe how computer networks are organized with the concept of layered approach.
CO-3	Describe how signals are used to transfer data between nodes.
CO-4	Implement a simple LAN with hubs, bridges and switches.
CO-5	Describe how packets in the Internet are delivered.
CO-6	Analyze the contents in a given data link layer packet, based on the layer concept.
CO-7	Design logical sub-address blocks with a given address block.
CO-8	Decide routing entries given a simple example of network topology
CO-9	Explain various transmission media.

CO-10	Describe how routing protocols work.
CO-11	Explain routing algorithm.
CO-12	Know about the various network security issues

	Semester-V **Course- BCA-355: Programming Using Visual Basic** **At the end of course student should be able to:**
CO-1	Students list the visual programming concepts.
CO-2	Explain basic concepts and definitions.
CO-3	Express constants and arithmetic operations.
CO-4	Distinguish variable and data types.
CO-5	Students code visual programs by using Visual Basic work environment.
CO-6	Distinguish and compose events and methods.
CO-7	Recognize and arrange control structures.
CO-8	Design a complete program using visual programming concepts.
CO-9	Students prepare various projects by helping visual programming.
CO-10	Manage and analyse prepared project with programs.
CO-11	Interpret and report obtaining results.
CO-12	Explain basic concepts and definitions.
CO-13	Express constants and arithmetic operations.
CO-14	Distinguish variable and data types.
CO-15	Students code visual programs by using Visual Basic work environment.
CO-16	Distinguish and compose events and methods.

Semester-V **Course- BCA-356: Multimedia Tools** **At the end of course student should be able to:**	
CO-1	Describe the types of media and define multimedia system.
CO-2	Describe the process of digitizing (quantization) of different analog signals (text, graphics, sound and video).
CO-3	Use and apply tools for image processing, video, sound and animation.
CO-4	Apply methodology to develop a multimedia system.
CO-5	Apply acquired knowledge in the field of multimedia in practice and independently continue to expand knowledge in this field.
CO-6	Describe the types of media and define multimedia system.
CO-7	Explain different audio and video compression techniques.
CO-8	Explain quantization and transmission of audio.

	Semester-VI **Course- BCA-361: Web Designing Using Advanced Tools** **At the end of course student should be able to:**
CO-1	Understand the major areas and challenges of web programming.
CO-2	Distinguish web-related technologies.
CO-3	Use advanced topics in HTML5, CSS3, JavaScript ,DHTML
CO-4	Use a server-side scripting language, PHP
CO-5	Use a relational DBMS, MySQL
CO-6	Use PHP to access a MySQL database
CO-7	Design and implement o typical static web pages and interactive web applications. o dynamic web applications.
CO-8	Working with Macromedia flash player and other interactivity tools
CO-9	Explain how to make website on frontpage.
CO-10	Explain XML
	Course Outcomes
	Semester-VI **Course- BCA-362: Operating System II** **At the end of course student should be able to:**
CO-1	To study the process management and scheduling.
CO-2	To understand various issues in Inter Process Communication (IPC) and the role of OS in IPC.
CO-3	To understand the concepts and implementation Memory management policies and virtual memory.
CO-4	To understand the working of an OS as a resource manager, file system manager,process manager, memory manager and I/O manager and methods used to implement the different parts of OS
CO-5	To study the need for special purpose operating system with the advent of new emerging technologies
CO-6	Study different disk scheduling algorithms
CO-7	Study network and distributed operating systems.
CO-8	Identify and use UNIX/Linux utilities to create and manage simple file processingoperations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks..
CO-9	Effectively use the UNIX/Linux system to accomplish typical personal, office, technical, and software development tasks.
CO-10	Monitor system performance and network activities.

CO-11	Effectively use software development tools including libraries, preprocessors,compilers, linkers, and make files. Collaborate in teams on system tasks
CO-12	Comprehend technical documentation, prepare simple readable user documentation and adhere to style guidelines.

<table>
<tr><td colspan="2" align="center">Semester-VI
Course- BCA-363: Computer Graphics
At the end of course student should be able to:</td></tr>
<tr><td>CO-1</td><td>To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.</td></tr>
<tr><td>CO-2</td><td>To learn the basic principles of 3- dimensional computer graphics.</td></tr>
<tr><td>CO-3</td><td>Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.</td></tr>
<tr><td>CO-4</td><td>Provide an understanding of mapping from a world coordinate to device coordinates, clipping, and projections.</td></tr>
<tr><td>CO-5</td><td>To be able to discuss the application of computer graphics concepts in thedevelopment of computer games, information visualization, and business applications.</td></tr>
<tr><td>CO-6</td><td>To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles</td></tr>
<tr><td colspan="2" align="center">Semester-VI
Course- BCA-364: Internet Technologies
At the end of course student should be able to:</td></tr>
<tr><td>CO-1</td><td>Predict and explain how different networking technologies at the same or different layers interact and affect each other in a large-scale system</td></tr>
<tr><td>CO-2</td><td>Critically evaluate network technologies with respect to system requirements, based on information from current research and technical documentation</td></tr>
<tr><td>CO-3</td><td>Apply basic system models and analysis methods to analyze distributed systems and networks</td></tr>
<tr><td>CO-4</td><td>Study about Application Layer</td></tr>
<tr><td>CO-5</td><td>Study about Routing in internet</td></tr>
<tr><td>CO-6</td><td>Study about TCP/IP protocol.</td></tr>
<tr><td colspan="2" align="center">Semester-VI
Course- BCA-365: Advanced Programming with Visual BasicAt
the end of course student should be able to:</td></tr>
</table>

CO-1	To develop an understanding of Visual Basic
CO-2	To develop the skills necessary to create software solutions using Visual Basic
CO-3	To learn how to analyze certain types of problems with a software solution in mind
CO-4	To learn how to design software solutions to some types of problems
CO-5	To learn how to implement, test, and debug Visual Basic applications
CO-6	Working with Menus, Advanced Controls
CO-7	Explain File Handling & File Controls
CO-8	Working with Accessing Databases (Data Controls, Data-Bound Controls, DAO, RDO, ADO)
	Semester-VI **Course- BCA-366: Programming in Core Java** **At the end of course student should be able to:**
CO-1	Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.
CO-2	Read and make elementary modifications to Java programs that solve real-world problems.
CO-3	Validate input in a Java program.
CO-4	Identify and fix defects and common security issues in code.
CO-5	Document a Java program using Javadoc.
CO-6	Use a version control system to track source code in a project.
CO-7	Identify classes, objects, members of a class and relationships among them needed for a specific problem
CO-8	Write Java application programs using OOP principles and proper program structuring
CO-9	Demonstrate the concepts of polymorphism and inheritance Demonstrate
CO-10	Write Java programs to implement error handling techniques using exception handling

Programme Name: Bachelor of Science
(B.Sc. Computer Science)

Program Outcomes (POs) Computer Science

POs	After completing this programme students will be able to:
PO 1	Develop problem solving abilities using a computer
PO 2	Prepare necessary knowledge base for research and development in Computer Science.
PO 3	Build the necessary skill set and analytical abilities for developing computer-based solutions for real life problems.
PO 4	Developed their critical reasoning, logic judgment and communication skills.
PO 5	Augment the recent developments in the field of IT and relevant fields of
PO 6	Get overall professional skills related to Software Industry

Semester I		
Course Code	**Course Name**	**COs: After successfully completing this course, students will be able to**
Paper-I	Computer & Programming Fundamentals	o Understand the concept of input and output devices ofcomputer o Explain functional units and classify types of computers, how they process information. o Understand an operating system and its working and solve common problems related to operating system o Possess the knowledge of basic hardware peripherals. o Develops basic understanding of computers, the concept of algorithm and algorithmic thinking.

Paper-II	PC Software	- Understand basics of Windows, its history and basic components of windows, - Do documentation using word, creating, formatting & editing documents. - Use advance features of MS-Word such as mail merge, macros, tables, file management, printing, styles, linking and embedding object. - Understand electronic spread sheet using Excel and apply formulas and mathematical functions. - Create, manipulate presentations using power point tools such as organizational charts, excel charts, word art, layering art objects, and animations.

Semester II

Course Code	Course Name	COs: After successfully completing this course, students will be able to
Paper-I	Programming in 'C'	- Explain about the basic concepts of programdevelopment statements and its syntax. - Understand algorithms and flowchart for solvingproblems using computers. - Understand and can choose the loops and decision-making statements to solve the problem. - Explain the various types of arrays and its structure. - Discuss about the various types of Functions andString handling mechanisms. - Explain the Concepts of structures and Unions. - Illustrates the various operations performed on different types of files.
Paper-II	Logical Organization ofComputers	- Understand the working of different Sequential logiccircuits. - Understand working operations of different types of Flip flops as a basic building block. - Know the operations of shift registers and Binary Counters. - Understand the basic Computer System and general organization of different blocks. - Understand the organization of memory in the Computer system and know different types of Memories.

Semester III

Course Code	Course Name	COs: After successfully completing this course, students will be able to
Paper-I	Data Structures	- Understand different methods of organizing largeamount of data using data structure. - Implement abstract data types using arrays andlinked list. - Apply the different linear data structures like stackand queue to various computing problems. - Implement different types of trees and apply themto problem solutions.

		o Discuss graph structure and understand various operations on graphs and their applicability. o Analyze the various sorting and searching algorithms.
Paper-II	Software Engineering	o Explain to design a system, component, or processto meet desired needs within realistic constraints such as economic, environmental, social, political, manufacturability, sustainability, ethical, health and safety. o Describe the techniques, skills, and modernengineering tools necessary for engineering practice. o Explain the early careers will be capable of team and organizational leadership in computing project settings, and have a broad understanding ofethical application of computing-based solutions to societal and organizational problems. o Discuss about analyse, design and manage the development of a computing based system,component or process to meet desired needs within realistic constraints in one or more application domains.

Semester IV		
Course Code	**Course Name**	**COs: After successfully completing this course, students will be able to**
Paper-I	Object Oriented Programming with C++	o Understand OOPs Concept, C++ languagefeatures. Able to Understanding and Applying various Datatypes, Operators, Conversions in program design. o Understand and apply the concepts of Classes & Objects, friend function, constructors &destructors in program design. o Design & implement various forms of inheritance,String class, calling base class constructors. o Apply & Analyze operator overloading, runtime polymorphism, Generic Programming. o Analyze and explore various Stream classes, I/O operations and exception handling.
Paper-II	Operating System	o Describe the basic components of an operating system and their role in implementations for general purpose, real-time and embedded applications. o Define the concepts of processes, threads, asynchronous signals and competitive system resource allocation. o Explain what multi-tasking is and outline standard scheduling algorithms for multi-tasking.
		o Discuss mutual exclusion principles and their use in concurrent programming including semaphore construction and resource allocation. o Expose the details of major operating system concepts, of memory management, page allocation algorithms, disk management and the implementation of file systems.

Semester V		
Course Code	**Course Name**	**COs: After successfully completing this course, students will be able to**
Paper-I	Fundamental of Database Management System	o Understand the fundamental concepts of database. o Understand user requirements and frame it in data model. o Understand creations, manipulation and querying of data in databases. o Solve real world problems using appropriate set, function, and relational models. o Design E-R Model for given requirements and convert the same into database tables. o Use SQL commands.
Paper-II	Web Designing	o Understand the fundamentals of Internet, and the principles of web design. o Understand the principles of creating an effective web page o Explain the fundamental tags used in HTML. o Develop the web page in various applications. o Develop the web page using various ordered and unordered listing commands and tables. o Develop the web page using frame concepts with multi-media handling.

Semester VI		
Course Code	**Course Name**	**COs: After successfully completing this course, students will be able to**
Paper-I	Relational Database Management System	o Design E-R Model for given requirements and convert the same into database tables. o To apply knowledge of Programming in SQL & PL/SQL including stored function and trigger. o Students will get to know how to apply DML/DDL commands on database. o Explain transaction Management in relational database System. o Use advanced database Programming concepts.
Paper-II	Computer Networks	o Explain the local, metropolitan and wide area networks using the Standard OSI Reference Model. o Discussion of various networking technologies.
		o Explain the concepts of protocols, network interfaces and design of performance issues in local area networks and wide area networks. o Describe about wireless networking concepts, contemporary issues in networking technologies, network tools and network programming. o Explain the analysis of different types of protocol and the comparison of number of data link, network and transport layer protocols.

I.B. (PG) College, Panipat

Department of Biosciences: Program and Course Outcomes

1. NAME OF THE PROGRAM: B. Sc. (MEDICAL)

OUTLINE of Courses for the Program

BOTANY	ZOOLOGY	CHEMISTRY
1st Year		
Semester 01 2 Theory Courses 01 Practical Course	**Semester 01** 2 Theory Courses 01 Practical Course	**Semester 01** 3 Theory Courses 01 Practical Course
Semester 02 2 Theory Courses 01 Practical Course*	**Semester 02** 2 Theory Courses 01 Practical Course*	**Semester 02** 3 Theory Courses 01 Practical Course*
2nd Year		
Semester 03 2 Theory Courses 01 Practical Course	**Semester 03** 2 Theory Courses 01 Practical Course	**Semester 03** 3 Theory Courses 01 Practical Course
Semester 04 2 Theory Courses 01 Practical Course*	**Semester 04** 2 Theory Courses 01 Practical Course*	**Semester 04** 3 Theory Courses 01 Practical Course*
3rd Year		
Semester 05 2 Theory Courses 01 Practical Course	**Semester 05** 2 Theory Courses 01 Practical Course	**Semester 05** 3 Theory Courses 01 Practical Course
Semester 06 2 Theory Courses 01 Practical Course*	**Semester 06** 2 Theory Courses 01 Practical Course*	**Semester 06** 3 Theory Courses 01 Practical Course*

*Continuation of Previous Semester, as Applicable

Program Outcomes for B.Sc. (Medical)

This 3- year degree Program (TDC) is intended to make the students capable of:

(a) **PO1**: Deciphering different components of Plant Sciences starting from Basic Botany to Applied Botany.

(b) **PO2**: Acquiring enough understanding of Anatomy, Taxonomy, Embryology and Physiology of Plants.

(c) **PO3**: Getting information about environment, its components, functioning of ecosystems and communities.

(d) **PO4**: Knowing the evolution of Animal Life and its diversity on earth, along with learning some economic zoology.

(e) **PO5**: Knowing the living systems with a considerable knowledge of intricacies of cells and cellular systems.

(f) **PO6**: Understanding the threats to life on earth including global warming, pollution and conservation issues.

(g) **PO7**: Understanding the theoretical and practical aspects of Physical, Organic and Inorganic Chemistry.

(h) **PO8**: Getting knowledge of Thermodynamics, Biochemistry, Metallurgical aspects, analytical chemistry, atomic and molecular structures etc.

All these outcomes are so designed as to provide exposure to students about advanced fields of study, in a way that the students become capable of choosing their further field of interest.

Courses in Botany

Semester – 01

Course –I   (BOT 101) Diversity of Microbes
Course –II   (BOT 102) Cell Biology
Course–III   (BOT 103) Practicals (Based on BOT 101&BOT 102)

Semester – 02

Course –IV   (BOT 201) Diversity of Archegoniates
Course –V   (BOT 202) Genetics
Course–VI   Practicals (Based on BOT 101, BOT 102, BOT 201 & BOT 202)

Semester – 03

Course –VII   (BOT 301) Biology and Diversity of Seed Plants-I
Course –VIII   (BOT 302) Plant Anatomy
Course–IX   Practicals (Based on BOT 301 & BOT 302)

Semester – 04

Course –I   (BOT 401) Biology and Diversity of Seed Plants-II
Course –II   (BOT 402) Plant Embryology
Course–III   Practicals (Based on BOT 301, BOT 302, BOT 401 & BOT 402)

Semester – 05

Course –I   (BOT 501) Plant Physiology
Course –II   (BOT 502) Ecology
Course–III   Practicals (Based on BOT 501 & BOT 502)

Semester – 06

Course –I   (BOT 601) Biochemistry & Plant Biotechnology
Course –II   (BOT 602) Economic Botany
Course–III   Practicals (Based on BOT 501, BOT 502, BOT 601 & BOT 602)

Course Outcome BOT 101

CO 1: The students will gain in-depth knowledge about bacteria, cyanobacteria, their ecological and economic importance. **CO 2:** They will know about the lower plants, algae, their features, diversity, and life-cycle through some type examples **CO 3:** The students will learn basic fundamentals of life of viruses. **CO 4:** The students will also learn about another diverse group of plants, i.e. Fungi as well as Lichens, through some examples.

Course Outcome BOT 102

CO 1: The students will gain in-depth knowledge about the cell, plasma membrane and other organelles of eukaryotic cell. **CO 2:** After this course, the students will get knowledge about cell division, the most significant life activity. **CO 3:** The students will learn basic structure and functions of chromosomes. **CO 4:** They will also learn about chromosomal variations leading to metabolic or other disorders.

Course Outcome BOT 201

CO 1: The students will come to know about characters, classification, structure and reproduction of some bryophytes. **CO 2:** They will be able to identify the Archegoniates, with some information on Liverworts, hornworts and mosses. **CO 3:** The students will understand characters, classification, structure and reproduction of some pteridophytes, the vascular cryptogams. **CO 4:** They will also learn about role of pteridophytes in ecosystem and their other uses.

Course Outcome BOT 202

CO 1: The students will understand DNA structure and replication, Genetic Code and other forms of DNA. **CO 2:** This course introduces the students to Genetic Inheritance**,** Mendelism and Linkage etc. **CO 3:** The students will know about Mutations, transposable genetic elements; DNA damage and repair.

CO 4: After this course the students will also learn about Gene Expression, transcription, translation, structure of Proteins and extra-nuclear inheritance.

Course Outcome BOT 203

After this course, the students will acquire knowledge about Practical aspects of the components covered as per contents covered in BOT 101, 102, 201 & BOT 202. They will have hands on experience through practicals on:

Stages of Mitosis, Monohybrid and Dihybrid ratios, Gene Interactions, Chi-square analysis, type study of specimens from Algae, Fungi, Bryophytes and Pteridophytes as per theory syllabus.

They will also be doing field work to know about diversity of Archegoniates, plant diseases and preparation of Herbarium.

Course Outcome BOT 301

CO 1: The students will learn about General characters and diversity of Gymnosperms and their classification.

CO 2: This course tells them about Geological Time Table; Evolution of Seed Habit.

CO 3: The students will know about Palaeobotany, and reconstruction of some fossil plants

CO 4: After this course the students will also learn about reproduction, life-cycle and economic importance of important gymnosperms and also preliminary knowledge about primitive angiosperms

Course Outcome BOT 302

CO 1: The students will know about Diversity in plant forms, tissue forms, shoot system and role of vascular cambium.

CO 2: This course enables them to know about secondary growth, growth rings, various forms of wood and leaf types.

CO 3: The students will know about phyllotaxy, epidermal appendages, internal details of Monocot and Dicot leaves and stomatal apparatus.

CO 4: During this course the students will also learn about Root system of monocots and dicots, secondary growth, and structural modifications in roots.

Course Outcome BOT 401

CO 1: The students will learn fundamental components of Taxonomy and Systematics- identification, classification, description, nomenclature and phylogeny.

CO 2: They will also study about significance ofchemotaxonomy, cytotaxonomy and taximetrics, Botanical Nomenclature and principle of priority.

CO 3: The students will be able to know the Type concept, taxonomic ranks, identification keys, flowers and inflorescence.

CO 4: The course also introduces the students to Bentham & Hooker and Engler & Prantl's systems of classification, diversity of selected flowering plant families.

Course Outcome BOT 402

CO 1: The students will know about functions of various floral parts, microsporangium, microsporogenesis and pollen grains.

CO 2: The students will know about Pollen-pistil interaction; self-incompatibility, pollination and its agencies.

CO 3: This course will let the students know about male gametophyte, female gametophyte, types and significance of endosperm.

CO 4: The students will learn Embryogenesis, polyembryony, seed structure, fruit types and dispersal mechanisms.

Course Outcome BOT 403

After this course, the students can acquire knowledge about Practical aspects of the components covered in courses BOT 301, 302, 401 & BOT 402. They perform practicals on the following aspects:

Flower description, section cutting, morphology, anatomy and reproductive structures of *Cycas*, *Pinus*, *Ephedra*, they will also learn the preparing of permanent slides.

Morphological description of plant specimens, modifications, vegetative and floral parts, fruits etc.

Embryo dissection, field collection of seed and flowering plants, herbarium preparation.

Course Outcome BOT 501

CO 1: The students will know importance of water to plant life, imbibition, water relations of plants, transpiration etc.

CO 2: The students will learn the classification and role of macro and micro elements, mineral uptake by

plants and deficiency symptoms, Mechanism of phloem transport, source-sink relationship.

CO 3: The course also enables them to know about significance, machinery and process of photosynthesis, photosystems, C3, C4, CAM plants and photorespiration.

CO 4: The students will have a detailed study of respiration, seed dormancy, plant movements, senescence, fruit ripening.

Course Outcome BOT 502

CO 1: The students will learn about concepts of ecology, scope and levels of organization, environmental factors, atmosphere, topographical and biotic factors.

CO 2: The course introduces the students to edaphic factors, ecological modifications of plants in relation to water availability, salinity.

CO3: The course also gives knowledge about population ecology, biotic potential, qualitative and quantitative characteristics of community, ecological succession.

CO 4: The students will know about ecosystem ecology, energy flow, food chains, biogeochemical cycles, pollution, carbon trading, Indian phytogeography, Indian forest types, global warming and green-house gases.

Course Outcome BOT 601

CO 1: The students will know about nomenclature, characteristics, mechanism of action of enzymes, holoenzyme, apoenzyme, coenzyme and co-factors.

CO 2: The course enables the readers to understand growth and development, growth hormones, photo-morphogenesis and phytochromes.

CO 3: This course makes student aware of lipid metabolism, saturated and unsaturated fatty acids, storage and mobilization of fatty acids, biology of nitrogen fixation.

CO 4: The students will know about tools and techniques of recombinant DNA technology, cloning vectors, plant tissue culture, vectors for gene delivery and marker genes.

Course Outcome BOT 602

CO 1: The students will learn about origin, cultivation and importance of Cereals, Pulses, Vegetables, Fibres, Oil Yielding plants

CO 2: The students will learn about morphology of plant part used, brief idea of cultivation and uses of

some spices, important medicinal plants.

CO 3: The students will learn about Botanical description and processing of Tea, Coffee, Rubber, Sugarcane.

CO 4: The students will go through general account and sources of timber, energy plantations and bio-fuels.

Course Outcome BOT 603

After this course, the students acquire knowledge about Practical aspects of the components covered through BOT 501, BOT 502, BOT 601 & BOT 602. They will get hands on experience about:

Processes of Imbibition, Osmosis, plasmolysis, deplasmolysis, ascent of sap, osmotic pressure.

Comparing stomatal and cuticular transpiration, demonstration of transpiration, aerobic respiration, anaerobic respiration, paper chromatography, rate of photosynthesis, tropic movements of plants.

To find out pH of soil and water samples, soil physical properties, community structure, features of hydrophytes, xerophytes, parasites.

They will also prepare industrial visit report, on pollution.

Study of economically important parts of plants, preparation of various tissue culture media, culturing, sub-culturing etc.

Courses in Zoology

Semester – 01

Course –I   (ZOO 101) Life and Diversity from Protozoa to Porifera and Cell Biology-I
Course –II   (ZOO 102) Life and Diversity from Coelentrata to Helminthes and Cell Biology-II
Course–III   (ZOO 103) Practicals (Based on ZOO 101 & ZOO 102)

Semester – 02

Course –I   (ZOO 201) Life and Diversity from Annelida to Arthropoda and Genetics-I
Course –II   (ZOO 202) Life and Diversity from Mollusca to Hemichordata and Genetics-II
Course–III   Practicals (Based on ZOO 101, ZOO 102, ZOO 201 & ZOO 202)

Semester – 03

Course –I   (ZOO 301) Life and Diversity of Chordates-I
Course –II   (ZOO 302) Mammalian Physiology-I
Course–III   Practicals (Based on ZOO 301 & ZOO 302)

Semester – 04

Course –I   (ZOO 401) Life and Diversity of Chordates-II
Course –II   (ZOO 402) Mammalian Physiology-II
Course–III   Practicals (Based on ZOO 301, ZOO 302, ZOO 401 & ZOO 402)

Semester – 05

Course –I   (ZOO 501) Environmental Biology
Course –II   (ZOO 502) Evolution and Developmental Biology
Course–III   Practicals (Based on ZOO 501 & ZOO 502)

Semester – 06

Course –I   (ZOO 601) Aquaculture and Pest Management-I
Course –II   (ZOO 602) Aquaculture and Pest Management-II
Course–III   Practicals (Based on ZOO 501, 502, 601 & ZOO 602)

Course Outcome ZOO 101: After going through this course the students will know about/will be enabled to attain knowledge of/will find out:

CO 1: General characters and classification, diversity and significance of Protozoa, study of Plasmodium and parasitic Protozoans.   **CO 2:** General characters and classification, diversity and significance of Porifera, canal system and spicules in sponges.   **CO 3:** Ultrastructure of animal cell, details of Plasma membrane, ER, Golgi complex**,** Ribosomes, Lysosomes, Mitochondria etc.   **CO 4:** Microtubules, microfilaments, centriole and basal body, cilia and Flagella.

Course Outcome ZOO 102: After going through this course the students will know about/will be enabled to attain knowledge of/will find out:

CO 1: General characters and classification, diversity and significance of Coelentrata, type study *Obelia*, corals and coral reefs.   **CO 2:** General characters, diversity and classification with economic importance of Helminths, type study liver fluke and parasitic helminths.   **CO3:** Ultrastructure and functions of Nucleus, structure of chromosomes, nucleosome concept, role of histones, giant chromosomes.   **CO 4:** Cell division (equational and reductional, brief account of cancer, cellular basis ofImmunity.

Course Outcome ZOO 201: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: General characters, classification, diversity and role of Annelids, life of earthworm, metamerism in phylum annelida, trochophore larva.   **CO 2:** General characters, classification, diversity and role of Arthropods, life of grasshopper.   **CO 3:** Heredity and variations**,** gene interactions, linkage and recombination, gene mapping.   **CO 4:** Sex determination, genetic balance, Sex linked inheritance, extra chromosomal and cytoplasmic inheritance in *Paramecium*, snails, mice etc.

Course Outcome ZOO 202: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: General characters, classification, diversity and importance of Mollusca, life of *Pila*, Torsion and detorsion in gastropoda, Respiration and foot in Mollusca.

CO 2: General characters, classification, diversity and importance of Echinodermates, life of Sea Star (*Asteries*), Echinoderm larvae, Aristotle's Lantern

CO 3: Multiple Allelism, Human genetics, monozygotic and dizygotictwins, Inborn errors of metabolism (Alcaptonuria, Phenylketonuria, Albinism, sickle-cell anaemia).

CO 4: Nature and function of genetic material, Protein synthesis, eugenics, euthenics and euphenics, mutations, structural and numerical aberrations of chromosomes, genetic counseling, pre-natal diagnostics, transgenic animals.

Course Outcome ZOO 203

After this course, the students acquire knowledge about Practical aspects of the topics covered as per theory courses ZOO 101, ZOO 102, ZOO 201 & ZOO 202. The following aspects are specifically covered:

Study of Specimens and slides of: Protozoa: Lamination of culturing of *Amoeba, Euglena* and *Paramecium*; observing structure through permanent prepared slides. Parazoa, Coelenterata, Platyhelminthes, Aschelminthes, Annelida, Arthropoda, Mollusca, Echinodermata, Hemichordata.

Temporary Slide Preparation of *Volvos, Paramecium,* Gemmules and spicules of *Sycon;* mouth parts and trachea of *Periplanata* (cockroach), radula of *Pila,* pedicillarae of *Asterias*. Permanent slide preparation of *Hydra, Obelia, Sertularia, Plumularia* and *Bougainvillea.*

Internal details of Earthworm, Grasshopper/cockroach, *Pila*

Cell biology and Genetics: Slides of stages of mitosis and meiosis, Salivary gland and polytene chromosomes of *Drosophila*/*Chironomus*.

Course Outcome ZOO 301: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: General characters, classification, diversity economic importance and conservation measures for Chordates, origin and evolutionary tree.

CO 2: Systematic position, distribution, ecology, morphology and affinities of Urochordata, life of

Herdmania.

CO 3: Systematic position, distribution, ecology, morphology and affinities of Cephalochordata, life of *Amphioxus*, *Petromyzon*.

CO 4: Systematic position, distribution, ecology, morphology and affinities of Pisces, Scales & Fins, fish migration, detailed study of *Labeo*.

Course Outcome ZOO 302: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Introduction, Classification, Structure, function and general properties of proteins, carbohydrates and lipids, enzyme classification and mechanism, active and passive transport through bio-membranes.

CO 2: Nutrition and its components, feeding, digestion of dietary constituents, absorption and assimilation of nutrients, control of enzyme secretion.

CO 3: Types and ultrastructure of muscles, events during muscle contraction, muscle fatigue, Cori's cycle, single unit smooth muscles.

CO 4: Structure and types of bones, bone growth and resorption, effect of ageing on Skeletal system and bone disorders.

Course Outcome ZOO 401: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Origin, Evolutionary tree of Amphibia, life of frog (*Rana tigrina),* Parental Care in Amphibia.

CO 2: Origin, Evolutionary tree of Reptilia, life of Lizard (*Hemidactylus*), extinct reptiles, poisonous and non-poisonous snakes, poison apparatus in snakes.

CO 3: Aves, flight adaptation, aerodynamics and migration of birds, Type study of Pigeon (*Columba livia)*.

CO 4: Classification of Mammals, type study of rat, Adaptive radiations of mammal's dentition.

Course Outcome ZOO 402: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Origin, conduction and regulation of heart beat, cardiac cycle, electrocardiogram, cardiac output, composition and functions of blood & lymph, coagulation of blood.

CO 2: Respiration, transport of respiratory gases, oxygen dissociation curve of hemoglobin, Bohr's effect,

Haburger's phenomenon, regulation of respiration.

CO 3: Excretory products Amonotelic, ureotlic, uricotelic, ornithine cycle for urea formation, urine formation, osmoregulation, micturition.

CO 4: Nature, origin and propagation of nerve impulse, synapse, structure and mechanism of hormone action, hypothalamus, pituitary, thyroid, parathyroid, adrenal, pancreas and gonads, spermatogenesis, ovulation, menstrual cycle, fertilization.

Course Outcome ZOO 403

After this course, the students acquire knowledge about Practical aspects of the theoretical contents covered in ZOO 301, ZOO 302, ZOO 401 & ZOO 402. They specifically perform practicals on the following aspects:

Classification, habit, habitats, external characters and economic importanceof selected members from Protochordata, Cyclostomata, Chondrichthyes, Osteichthyes, Any of the Lung Fishes, Amphibia, Reptilia, Aves, Mammalia.

Examination of internal structure of *Herdmania*, *Labeo*, *Hemidactylus*, Rat.

Skeletal studies of *Scoliodon, Labeo, Rana* (Frog), *Varanus,* Pigeon/Gallusand any mammal.

Study of slides of Tornaria larva, *Amphioxus*, Oikopleura, Histology of rat, types of scales.

Making Permanent Stained slides of *Salpa,* Spicules and Pharynx of *Herdmania, Amphioxus*, Cycloid scales, Zoological excursion and its report is compulsory in the practical examination.

Qualitative tests for identification of simple sugars, disaccharides and polysaccharides, human salivary amylase activity, estimation of abnormal constituents of urine, use of Kymograph unit & respirometer, haematein crystal preparation, estimation of Hb, DLC of Man/RBC count/WBC count.

Course Outcome ZOO 501: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Basics of ecology, significance, habitat and niche, factors affecting environment (Abiotic and Biotic).

CO 2: Major ecosystems of the world, concept of ecosystem, ecological energetics, trophic structure, ecological pyramids.

CO 3: Biogeochemical cycles, reservoir pool, gaseous cycles and sedimentary cycles. Population growth and regulation, biodiversity and conservation of natural resources.

CO 4: Migration in fishes and birds, parental care in animals, competition, predation, parasitism, commensalisms and mutualism as population interactions, environmental pollution.

Course Outcome ZOO 502: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Origin of life, organic evolution, micro-, macro- and mega-evolution, concept of species.

CO 2: Horse phylogeny, human evolution, developmental biology, mammalian ovum, sperm, spermatogenesis, oogenesis, egg types, cleavage patterns.

CO 3: Blastulation and fate-map construction, gastrulation, primary organizers, extra-embryonic membranes.

CO 4: Concepts of competence, determination and differentiation, Concept of regeneration.

Course Outcome ZOO 601: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Introduction to world fisheries, fresh Water fishes of India, river system, captive and culture fisheries, cold water fisheries, fishing crafts and gears, culture of fin fishes, Crustaceans and Molluscs.

CO 2: Study of important insect pests of Sugarcane and cotton crops: leaf-hopper *(Pyrilla perpusilla)*, Whitefly *(Aleurolobus barodensis)*, top borer *(Sciropophaga nivella)*, root borer *(Emmalocera depresella)*, pink bollworm, red cotton bug, grey weevil, cotton jassid.

CO 3: Study of important insect pests of wheat and paddy crops: wheat stem borer (*Sesamiainferens*), Paddy Gundhi bug (*Leptocorisaacuta*), rice grasshopper *(Hieroglyphusbanian)*, Rice stem borer *(Scirpophaga incertullus)*, Rice Hispa *(Diceladispa armigera)*.

CO 4: Study of important insect pests of some vegetables: Red pumpkin beetle, the pumpkin fruitfly, the vegetable mite, the Hadda beetle.

Course Outcome ZOO 602: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Natural seed resources, Hatchery production, Sources of food (Natural, Artificial) and feed composition (Calorie and Chemical ingredients), field Culture, polyculture, biotechnology, gene manipulation and cryopreservation of gametes.

CO 2: Damage and control of pests of stored grains, with their life cycles: Pulse beetle *(Callosobruchus*

maculatus), Rice weevil *(Sitophilus oryzae)*, Wheat weevil *(Trogoderma granarium)*, Rust Red Flour beetles *(Tribolium castaneum)*, Lesser grain borer *(Rhizopertha dominica)*, Grain & Flour moth *(Sitotroga cerealella)*

CO 3: Insect control, Biological control, biological control agents, chemical control, categories of pesticides, their pest specificity, insect repellants and attractants.

CO 4: Integrated pest management, Important bird and rodent pests of agriculture & their management.

Course Outcome ZOO 603

After this course, the students can acquire knowledge about Practical aspects of the theory syllabus covered in ZOO 501, ZOO 502, ZOO 601 & ZOO 602. The practicals cover the following:

External morphology, identification marks, nature of damage and host of the pests: sugarcane leaf-hopper, Sugarcance whitefly, Sugarcane top borer, Sugarcane root borer, Gurdaspur borer, red Cottonbug, Wheat stemborer, Paddy Gundhi bug, Rice grasshopper, Rice stem borer, Rice hispa, *Aulocophora faveicollis*, *Dacus cucurbitas*, *Tetranychus tecarious*, *Epilachna*, Pulse beetle, Rice weevil, Grain & Flour moth, Rust-red flour beetle, lesser grain borer.

Stages of life history of silk moth and honeybee.

Identification of useful commercial fishes *Catla*, *Labeo rohita*, *L. calbasu, Cirrhius* etc. Prawns, crabs etc.

Chemical analysis of pond water and soil for pH, dissolved oxygen, free CO_2 nitrates, phosphates and chlorides.

Slide study of fish parasites, study of different types of nets, cast net, gill net, drift net and dragnet.

A visit to lake/reservoir/fish breeding centre.

Study of adaptive modifications in feet and beaks of birds.

Preparation of permanent/temporary slides of developmental stages of frog/mosquito, study of slides of chick embryo, stages of development in chick egg.

Preparation of permanent histological slides of testis, ovary, kidney, intestine, live of rat (H and E staining).

Courses in Chemistry
(B.Sc. Medical)

Semester 01

Inorganic Chemistry – CH-101

Physical Chemistry – CH-102

Organic Chemistry – CH-103

Semester 02

Inorganic Chemistry – CH-104

Physical Chemistry – CH-105

Organic Chemistry – CH-106

Practical- CH-107

Semester 03

Inorganic Chemistry – CH-201

Physical Chemistry – CH-202

Organic Chemistry – CH-203

Semester 04

Inorganic Chemistry – CH-204

Physical Chemistry – CH-205

Organic Chemistry – CH-206

Practical- CH-207

Semester 05

Inorganic Chemistry – CH-301

Physical Chemistry – CH-302

Organic Chemistry – CH-303

Semester 05

Inorganic Chemistry – CH-304

Physical Chemistry – CH-305

Organic Chemistry – CH-306

Practical- CH-307

Course Outcome CH-101

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to understand the atomic structure.

CO2. Will be familiar with Periodic Table and Atomic Properties.

CO3. Will understand the concept of bonding and will to able to analyze the bonding in compounds.

CO4. Will be able to Draw structure of ionic solids and understand its properties.

Course Outcome CH-102

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to discuss Kinetic Molecular Theory of Gases.

CO2. Will be able to understand real gas equation and its applications.

CO3. Will understand the critical phenomenon and importance of critical constants.

CO4. Will understand the symmetrical elements in crystals and structural determination of crystals.

Course Outcome CH-103

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to understand localized and de-localized Chemical bonds.

CO2. Will understand Electronic Effects, Isomerism, Configuration, E and Z, R and S Nomenclature, Conformations.

CO3. Will be able to draw the mechanism of Organic Reactions.

CO4. Will understand about the attacking reagents reaction Intermediates.

Course Outcome CH-104

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to elaborate Hydrogen Bonding, Vander Waal's forces, Metallic bond.

CO2. Will be familiar with the properties of S-block Elements and their compounds.

CO3. Will be familiar with noble gases and bonding in compounds of noble gases.

CO4. Will be familiar with p-block elements and compounds of B, C, N and halogen family.

Course Outcome CH-105

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will understand the rate of reaction, Order of reaction.

CO2. Will be able to derive integrated rate expressions of different ordered reactions.

CO3. Will be able to understand collision theory of reactions.

CO4. Will understand the effect of temperature on activation energy of the reaction.

Course Outcome CH-106

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to understand the preparation and properties of Alkenes, Arenes.

CO2. Will understand Aromaticity, Mechanism of Aromatic Electrophilic substitution.

CO3. Will be able to discuss the methods of preparation, structure, properties of Dienes, Alkynes, Alkyl and Aryl halides.

CO4. Will understand SN^1 and SN^2 mechanisms.

Course Outcome CH-107

After successfully completing this course, will be able to achieve the following outcomes:

CO1. Will be able to perform redox titrations, iodometric titrations and complexometric titrations.

CO2. Will be able to determine surface tension, viscosity and specific gravity of liquids.

CO3. Will be able to prepare and purify some organic compounds.

CO4. Will be able to study the sublimation and crystallization of the organic compounds.

Course Outcome CH-201

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to discuss the Classification, properties, Comparison of properties of 3d, 4d and 5d elements, Latimer and Frost diagrams.

CO2. Will be familiar with the Structure and properties of Transition element compounds.

CO3. Will understand nomenclature, Isomerism and bonding in Coordination compounds.

CO4. Will be able to understand Types of Solvents, Physical properties with special reference to liq. NH_3 and SO_2.

Course Outcome CH-202

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to study the types of system, Thermodynamic process.

CO2. Will be able to understand Heat capacity.

CO3. Will be able to understand Work, Joule-Thomson Effect.

CO4. Will be able to understand the application of Joule-Thomson Effect.

Course Outcome CH-203

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to elaborate the methods of preparation, properties of Alcohols, phenols, Epoxides.

CO2. Will understand Fries, Claisen Re-arrangement Riemer Tiemann, Kolbe's, Schotten and Baumann Reactions.

CO3. Will be able to discuss absorption laws and will understand the applications of UV spectroscopy.

CO4. Will understand the preparation and properties of carboxylic acid and its derivatives.

Course Outcome CH-204

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to discuss about the Electronic configuration, properties of Lanthanides, actinides, Lanthanide Contraction

CO2. Will understand the separation of Np, Pu, Am from Uranium, Trans-uranic Elements.

CO3. Will be able to elaborate the basic and acidic radicals, their identification.

CO4. Will be able to understand Interference by acidic radicals, solubility product, common ion effects.

Course Outcome CH-205

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to discuss the Equilibrium, Law of Chemical equilibrium, Claussius-Calpeyron Equation

CO2. Will be able to understand Nernst distribution law, degree of hydrolysis, process of Extraction.

CO3. Will be able to Study the Laws of Thermodynamics, Entropy and Enthalpy Change,

Spontaneity of Reaction.

CO4. Gibbs Free Energy, Collision Theory and Transition state Theory, Electrolytic and galvanic cell, S.H.E. and Nernst Equation

Course Outcome CH-206

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to discuss about IR spectroscopy in structure determination, Hook's law, Application of IR.

CO2. Will understand the separation of primary, secondary and tertiary amines, Preparation, reaction with Nitrous acid.

CO3. Will be able to discuss the diazonnium salts and synthetic applications, synthesis of aldehydes and ketones.

CO4. To understand special reagents, condensation reactions, oxidation and reduction reactions.

Course Outcome CH-207

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will understand gravimetric analysis, colorimetry and be able to prepare Cuprous chloride, tetra ammine cupric sulphate, chrome alum, potassium trioxalatochromate (III) and Nickel Hexammine chloride.

CO2. Will understand the Critical Solution Temperature (CST) and be able to determine the solubility of benzoic acid, enthalpy of neutralisation and dissolution.

CO3. To study the distribution of iodine between CCl4 and water. 6. Determine rate constant of hydrolysis of ethyl acetate.

CO4. Systematic identification (detection of extra elements, functional groups, determination of melting point or boiling point and preparation of at least one pure solid derivative) of the simple mono and bi-functional organic compounds.

Course Outcome CH-301

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to discuss the Crystal field theory and metal ligand bonding, Splitting octahedral, tetrahedral and square planar complexes.

CO2. Will understand thermodynamic stability of metal complexes, trans-effect.

CO3.	Will be able to discuss the magnetic materials ,magnetic susceptibility, method of determining magnetic susceptibility, spin only formula.
CO4.	Will understand orbital contribution to magnetic moments, application of magnetic moment data, Selection rules for d-d transition, orgel energy level diagram.

Course Outcome CH-302

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will understand Black-body radiation, Plank's radiation law, photoelectric effect.

CO2. Will be able to understand the importance of quantum mechanical operators.

CO3. Will understand about the Optical activity, magnetic susceptibility and types of magnetism.

CO4. Will be able to elaborate the basic features of Spectroscopy, Degrees of freedom. Rotational,Vibrational and Raman Spectrum

Course Outcome CH-303

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to discuss the NMR spectroscopy and its application in structure determination of Organic compounds.

CO2. Will be able to study the Structure, properties, inter-conversion of Carbohydrates.

CO3. Will understand the formation and chemical reactions of Organo magnesium.

CO4. Will understand the formation and chemical reactions of Organo zinc and Organo lithium compounds.

Course Outcome CH-304

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to study the concepts of Acids and bases, HSAB principle and its applications.

CO2. Will understand structure and bonding in organometallic compounds.

CO3. Will be able to discuss the metal ions present in biological system, Cooperative effect, Bohr's effect.

CO4. Will understand Nomenclature, classification, preparation and uses of silicones, and phosphagens.

Course Outcome CH-305

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will understand the importance of statistical thermodynamics, partition function and its physical significance.

CO2. Will be able to understand the Laws of photochemistry, fluorescence, phosphorescence and quantum yield.

CO3. Will understand about the Ideal and non-ideal solutions, Colligative properties, Applications in calculating molar masses of normal, dissociated and associated solutes in solution.

CO4. Will be able to understand Phase Rule, phase equilibria of one and two component systems.

Course Outcome CH-306

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to study the Organic synthesis using Enolates.

CO2. Will be able to study Structure and method of preparation and reactions of Heterocyclic compounds.

CO3. Will be able to study the structure, nomenclature, synthesis of amino acids and proteins.

CO4. Will understand synthetic polymers and their use.

Course Outcome CH-307

After successfully completing this course will be able to achieve the following outcomes:

CO1. Will be able to perform semi-micro qualitative analysis of mixture containing not more

than four radicals (excluding interfering, Combinations and insoluables).

CO2. Will understand the working of conductometer, pH meter and potentiometer.

CO3. Will be able to prepare buffer solutions and be able to determine the molecular weight of the organic compounds by Rast method.

CO4. Will be able to determine the Rf values and identification of organic Compounds by Thin Layer Chromatography.

1. **<u>NAME OF THE PROGRAM: B. Sc. (Medical with Biotechnology)</u>**

<u>OUTLINE of Courses for the Program</u>

BOTANY	ZOOLOGY	BIOTECHNOLOGY
1ˢᵗ Year		
<u>Semester 01</u> 2 Theory Courses 01 Practical Course **<u>Semester 02</u>** 2 Theory Courses 01 Practical Course*	**<u>Semester 01</u>** 2 Theory Courses 01 Practical Course **<u>Semester 02</u>** 2 Theory Courses 01 Practical Course*	**<u>Semester 01</u>** 2 Theory Courses 01 Practical Course **<u>Semester 02</u>** 2 Theory Courses 01 Practical Course*
2ⁿᵈ Year		
<u>Semester 03</u> 2 Theory Courses 01 Practical Course **<u>Semester 04</u>** 2 Theory Courses 01 Practical Course*	**<u>Semester 03</u>** 2 Theory Courses 01 Practical Course **<u>Semester 04</u>** 2 Theory Courses 01 Practical Course*	**<u>Semester 03</u>** 2 Theory Courses 01 Practical Course **<u>Semester 04</u>** 2 Theory Courses 01 Practical Course*
3ʳᵈ Year		
<u>Semester 05</u> 2 Theory Courses 01 Practical Course **<u>Semester 06</u>** 2 Theory Courses 01 Practical Course*	**<u>Semester 05</u>** 2 Theory Courses 01 Practical Course **<u>Semester 06</u>** 2 Theory Courses 01 Practical Course*	**<u>Semester 05</u>** 01 Theory Course 01 Practical Course 01 Project **<u>Semester 06</u>** 01 Theory Courses 01 Practical Course* 01 Project*

*Continuation of Previous Semester, as Applicable

Program Outcomes for B.Sc. (Medical with Biotechnology)

This 3- year degree Program (TDC) is intended to make the students capable of:

(a) **PO1**: Deciphering different components of Plant Sciences starting from Basic Botany to Applied Botany.

(b) **PO2**: Acquiring enough understanding of Anatomy, Taxonomy, Embryology and Physiology of Plants.

(c) **PO3**: Getting information about environment, its components, functioning of ecosystems and communities.

(d) **PO4**: Knowing the evolution of Animal Life and its diversity on earth, along with learning some economic zoology.

(e) **PO5**: Knowing the living systems with a considerable knowledge of intricacies of cells and cellular systems.

(f) **PO6**: Understanding the threats to life on earth including global warming, pollution and conservation issues.

(g) **PO7**: Understanding the theoretical and practical aspects of usage of Biotechnology in human welfare.

(h) **PO8**: Getting basic knowledge of Genetics, Molecular Biology, Enzyme Kinetics, Bioinformatics, Biochemistry, Microbial Genetics, Immune System, tissue culture, drug designing etc.

All these outcomes are so designed as to provide exposure to students about advanced fields of study, in a way that the students become capable of choosing their further field of interest.

Courses in Botany

Semester – 01

Course –I   (BOT 101) Diversity of Microbes
Course –II   (BOT 102) Cell Biology
Course–III   (BOT 103) Practicals (Based on BOT 101&BOT 102)

Semester – 02

Course –IV   (BOT 201) Diversity of Archegoniates
Course –V   (BOT 202) Genetics
Course–VI   Practicals (Based on BOT 101, BOT 102, BOT 201 & BOT 202)

Semester – 03

Course –VII   (BOT 301) Biology and Diversity of Seed Plants-I
Course –VIII   (BOT 302) Plant Anatomy
Course–IX   Practicals (Based on BOT 301 & BOT 302)

Semester – 04

Course –I   (BOT 401) Biology and Diversity of Seed Plants-II
Course –II   (BOT 402) Plant Embryology
Course–III   Practicals (Based on BOT 301, BOT 302, BOT 401 & BOT 402)

Semester – 05

Course –I   (BOT 501) Plant Physiology
Course –II   (BOT 502) Ecology
Course–III   Practicals (Based on BOT 501 & BOT 502)

Semester – 06

Course –I   (BOT 601) Biochemistry & Plant Biotechnology
Course –II   (BOT 602) Economic Botany
Course–III   Practicals (Based on BOT 501, BOT 502, BOT 601 & BOT 602)

Course Outcome BOT 101

CO 1: The students will gain in-depth knowledge about bacteria, cyanobacteria, their ecological and economic importance.

CO 2: They will know about the lower plants, algae, their features, diversity, and life-cycle through some type examples

CO 3: The students will learn basic fundamentals of life of viruses.

CO 4: The students will also learn about another diverse group of plants, i.e. Fungi as well as Lichens, through some examples.

Course Outcome BOT 102

CO 1: The students will gain in-depth knowledge about the cell, plasma membrane and other organelles of eukaryotic cell.

CO 2: After this course, the students will get knowledge about cell division, the most significant life activity.

CO 3: The students will learn basic structure and functions of chromosomes.

CO 4: They will also learn about chromosomal variations leading to metabolic or other disorders.

Course Outcome BOT 201

CO 1: The students will come to know about characters, classification, structure and reproduction of some bryophytes.

CO 2: They will be able to identify the Archegoniates, with some information on Liverworts, hornworts and mosses.

CO 3: The students will understand characters, classification, structure and reproduction of some pteridophytes, the vascular cryptogams.

CO 4: They will also learn about role of pteridophytes in ecosystem and their other uses.

Course Outcome BOT 202

CO 1: The students will understand DNA structure and replication, Genetic Code and other forms of DNA.

CO 2: This course introduces the students to Genetic Inheritance**,** Mendelism and Linkage etc.

CO 3: The students will know about Mutations, transposable genetic elements; DNA damage and repair.

CO 4: After this course the students will also learn about Gene Expression**,** transcription, translation, structure of Proteins and extra-nuclear inheritance.

Course Outcome BOT 203

After this course, the students will acquire knowledge about Practical aspects of the components covered as per contents covered in BOT 101, 102, 201 & BOT 202. They will have hands on experience through practicals on:

Stages of Mitosis, Monohybrid and Dihybrid ratios, Gene Interactions, Chi-square analysis, type study of specimens from Algae, Fungi, Bryophytes and Pteridophytes as per theory syllabus.

They will also be doing field work to know about diversity of Archegoniates, plant diseases and preparation of Herbarium.

Course Outcome BOT 301

CO 1: The students will learn about General characters and diversity of Gymnosperms and their classification.

CO 2: This course tells them about Geological Time Table; Evolution of Seed Habit.

CO 3: The students will know about Palaeobotany, and reconstruction of some fossil plants

CO 4: After this course the students will also learn about reproduction, life-cycle and economic

importance of important gymnosperms and also preliminary knowledge about primitive angiosperms

Course Outcome BOT 302

CO 1: The students will know about Diversity in plant forms, tissue forms, shoot system and role of vascular cambium.

CO 2: This course enables them to know about secondary growth, growth rings, various forms of wood and leaf types.

CO 3: The students will know about phyllotaxy, epidermal appendages, internal details of Monocot and Dicot leaves and stomatal apparatus.

CO 4: During this course the students will also learn about Root system of monocots and dicots, secondary growth, and structural modifications in roots.

Course Outcome BOT 401

CO 1: The students will learn fundamental components of Taxonomy and Systematics- identification, classification, description, nomenclature and phylogeny.

CO 2: They will also study about significance ofchemotaxonomy, cytotaxonomy and taximetrics, Botanical Nomenclature and principle of priority.

CO 3: The students will be able to know the Type concept, taxonomic ranks, identification keys, flowers and inflorescence.

CO 4: The course also introduces the students to Bentham & Hooker and Engler & Prantl's systems of classification, diversity of selected flowering plant families.

Course Outcome BOT 402

CO 1: The students will know about functions of various floral parts, microsporangium, microsporogenesis and pollen grains.

CO 2: The students will know about Pollen-pistil interaction; self-incompatibility, pollination and its agencies.

CO 3: This course will let the students know about male gametophyte, female gametophyte, types and significance of endosperm.

CO 4: The students will learn Embryogenesis, polyembryony, seed structure, fruit types and dispersal mechanisms.

Course Outcome BOT 403

After this course, the students can acquire knowledge about Practical aspects of the components covered in courses BOT 301, 302, 401 & BOT 402. They perform practicals on the following aspects:

Flower description, section cutting, morphology, anatomy and reproductive structures of *Cycas*, *Pinus*, *Ephedra*, they will also learn the preparing of permanent slides.

Morphological description of plant specimens, modifications, vegetative and floral parts, fruits etc.

Embryo dissection, field collection of seed and flowering plants, herbarium preparation.

Course Outcome BOT 501

CO 1: The students will know importance of water to plant life, imbibition, water relations of plants, transpiration etc.

CO 2: The students will learn the classification and role of macro and micro elements, mineral uptake by

plants and deficiency symptoms, Mechanism of phloem transport, source-sink relationship.

CO 3: The course also enables them to know about significance, machinery and process of photosynthesis, photosystems, C3, C4, CAM plants and photorespiration.

CO 4: The students will have a detailed study of respiration, seed dormancy, plant movements, senescence, fruit ripening.

Course Outcome BOT 502

CO 1: The students will learn about concepts of ecology, scope and levels of organization, environmental factors, atmosphere, topographical and biotic factors.

CO 2: The course introduces the students to edaphic factors, ecological modifications of plants in relation to water availability, salinity.

CO3: The course also gives knowledge about population ecology, biotic potential, qualitative and quantitative characteristics of community, ecological succession.

CO 4: The students will know about ecosystem ecology, energy flow, food chains, biogeochemical cycles, pollution, carbon trading, Indian phytogeography, Indian forest types, global warming and green-house gases.

Course Outcome BOT 601

CO 1: The students will know about nomenclature, characteristics, mechanism of action of enzymes, holoenzyme, apoenzyme, coenzyme and co-factors.

CO 2: The course enables the readers to understand growth and development, growth hormones, photo-morphogenesis and phytochromes.

CO 3: This course makes student aware of lipid metabolism, saturated and unsaturated fatty acids, storage and mobilization of fatty acids, biology of nitrogen fixation.

CO 4: The students will know about tools and techniques of recombinant DNA technology, cloning vectors, plant tissue culture, vectors for gene delivery and marker genes.

Course Outcome BOT 602

CO 1: The students will learn about origin, cultivation and importance of Cereals, Pulses, Vegetables, Fibres, Oil Yielding plants

CO 2: The students will learn about morphology of plant part used, brief idea of cultivation and uses of

some spices, important medicinal plants.

CO 3: The students will learn about Botanical description and processing of Tea, Coffee, Rubber, Sugarcane.

CO 4: The students will go through general account and sources of timber, energy plantations and bio-fuels.

Course Outcome BOT 603

After this course, the students acquire knowledge about Practical aspects of the components covered through BOT 501, BOT 502, BOT 601 & BOT 602. They will get hands on experience about:

Processes of Imbibition, Osmosis, plasmolysis, deplasmolysis, ascent of sap, osmotic pressure.

Comparing stomatal and cuticular transpiration, demonstration of transpiration, aerobic respiration, anaerobic respiration, paper chromatography, rate of photosynthesis, tropic movements of plants.

To find out pH of soil and water samples, soil physical properties, community structure, features of hydrophytes, xerophytes, parasites.

They will also prepare industrial visit report, on pollution.

Study of economically important parts of plants, preparation of various tissue culture media, culturing, sub-culturing etc.

Courses in Zoology

Semester – 01

Course –I   (ZOO 101) Life and Diversity from Protozoa to Porifera and Cell Biology-I
Course –II   (ZOO 102) Life and Diversity from Coelentrata to Helminthes and Cell Biology-II
Course–III   (ZOO 103) Practicals (Based on ZOO 101 & ZOO 102)

Semester – 02

Course –I   (ZOO 201) Life and Diversity from Annelida to Arthropoda and Genetics-I
Course –II   (ZOO 202) Life and Diversity from Mollusca to Hemichordata and Genetics-II
Course–III   Practicals (Based on ZOO 101, ZOO 102, ZOO 201 & ZOO 202)

Semester – 03

Course –I   (ZOO 301) Life and Diversity of Chordates-I
Course –II   (ZOO 302) Mammalian Physiology-I
Course–III   Practicals (Based on ZOO 301 & ZOO 302)

Semester – 04

Course –I   (ZOO 401) Life and Diversity of Chordates-II
Course –II   (ZOO 402) Mammalian Physiology-II
Course–III   Practicals (Based on ZOO 301, ZOO 302, ZOO 401 & ZOO 402)

Semester – 05

Course –I   (ZOO 501) Environmental Biology
Course –II   (ZOO 502) Evolution and Developmental Biology
Course–III   Practicals (Based on ZOO 501 & ZOO 502)

Semester – 06

Course –I   (ZOO 601) Aquaculture and Pest Management-I
Course –II   (ZOO 602) Aquaculture and Pest Management-II
Course–III   Practicals (Based on ZOO 501, 502, 601 & ZOO 602)

Course Outcome ZOO 101: After going through this course the students will know about/will be enabled to attain knowledge of/will find out:

CO 1: General characters and classification, diversity and significance of Protozoa, study of Plasmodium and parasitic Protozoans.

CO 2: General characters and classification, diversity and significance of Porifera, canal system and spicules in sponges.

CO 3: Ultrastructure of animal cell, details of Plasma membrane, ER, Golgi complex**,** Ribosomes, Lysosomes, Mitochondria etc.

CO 4: Microtubules, microfilaments, centriole and basal body, cilia and Flagella.

Course Outcome ZOO 102: After going through this course the students will know about/will be enabled to attain knowledge of/will find out:

CO 1: General characters and classification, diversity and significance of Coelentrata, type study *Obelia*, corals and coral reefs.

CO 2: General characters, diversity and classification with economic importance of Helminths, type study liver fluke and parasitic helminths.

CO3: Ultrastructure and functions of Nucleus, structure of chromosomes, nucleosome concept, role of histones, giant chromosomes.

CO 4: Cell division (equational and reductional, brief account of cancer, cellular basis ofImmunity.

Course Outcome ZOO 201: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: General characters, classification, diversity and role of Annelids, life of earthworm, metamerism in phylum annelida, trochophore larva.

CO 2: General characters, classification, diversity and role of Arthropods, life of grasshopper.

CO 3: Heredity and variations**,** gene interactions, linkage and recombination, gene mapping.

CO 4: Sex determination, genetic balance, Sex linked inheritance, extra chromosomal and cytoplasmic inheritance in *Paramecium*, snails, mice etc.

Course Outcome ZOO 202: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: General characters, classification, diversity and importance of Mollusca, life of *Pila*, Torsion and detorsion in gastropoda, Respiration and foot in Mollusca.

CO 2: General characters, classification, diversity and importance of Echinodermates, life of Sea Star (*Asteries*), Echinoderm larvae, Aristotle's Lantern

CO 3: Multiple Allelism, Human genetics, monozygotic and dizygotictwins, Inborn errors of metabolism (Alcaptonuria, Phenylketonuria, Albinism, sickle-cell anaemia).

CO 4: Nature and function of genetic material, Protein synthesis, eugenics, euthenics and euphenics, mutations, structural and numerical aberrations of chromosomes, genetic counseling, pre-natal diagnostics, transgenic animals.

Course Outcome ZOO 203

After this course, the students acquire knowledge about Practical aspects of the topics covered as per theory courses ZOO 101, ZOO 102, ZOO 201 & ZOO 202. The following aspects are specifically covered:

Study of Specimens and slides of: Protozoa: Lamination of culturing of *Amoeba, Euglena* and *Paramecium*; observing structure through permanent prepared slides. Parazoa, Coelenterata, Platyhelminthes, Aschelminthes, Annelida, Arthropoda, Mollusca, Echinodermata, Hemichordata.

Temporary Slide Preparation of *Volvos, Paramecium,* Gemmules and spicules of *Sycon;* mouth parts and trachea of *Periplanata* (cockroach), radula of *Pila,* pedicillarae of *Asterias*. Permanent slide preparation of *Hydra, Obelia, Sertularia, Plumularia* and *Bougainvillea.*

Internal details of Earthworm, Grasshopper/cockroach, *Pila*

Cell biology and Genetics: Slides of stages of mitosis and meiosis, Salivary gland and polytene chromosomes of *Drosophila*/*Chironomus.*

Course Outcome ZOO 301: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: General characters, classification, diversity economic importance and conservation measures for Chordates, origin and evolutionary tree.

CO 2: Systematic position, distribution, ecology, morphology and affinities of Urochordata, life of

Herdmania.

CO 3: Systematic position, distribution, ecology, morphology and affinities of Cephalochordata, life of *Amphioxus*, *Petromyzon*.

CO 4: Systematic position, distribution, ecology, morphology and affinities of Pisces, Scales & Fins, fish migration, detailed study of *Labeo*.

Course Outcome ZOO 302: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Introduction, Classification, Structure, function and general properties of proteins, carbohydrates and lipids, enzyme classification and mechanism, active and passive transport through bio-membranes.

CO 2: Nutrition and its components, feeding, digestion of dietary constituents, absorption and assimilation of nutrients, control of enzyme secretion.

CO 3: Types and ultrastructure of muscles, events during muscle contraction, muscle fatigue, Cori's cycle, single unit smooth muscles.

CO 4: Structure and types of bones, bone growth and resorption, effect of ageing on Skeletal system and bone disorders.

Course Outcome ZOO 401: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Origin, Evolutionary tree of Amphibia, life of frog (*Rana tigrina),* Parental Care in Amphibia.

CO 2: Origin, Evolutionary tree of Reptilia, life of Lizard (*Hemidactylus*), extinct reptiles, poisonous and non-poisonous snakes, poison apparatus in snakes.

CO 3: Aves, flight adaptation, aerodynamics and migration of birds, Type study of Pigeon (*Columba livia)*.

CO 4: Classification of Mammals, type study of rat, Adaptive radiations of mammal's dentition.

Course Outcome ZOO 402: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Origin, conduction and regulation of heart beat, cardiac cycle, electrocardiogram, cardiac output, composition and functions of blood & lymph, coagulation of blood.

CO 2: Respiration, transport of respiratory gases, oxygen dissociation curve of hemoglobin, Bohr's effect,

Haburger's phenomenon, regulation of respiration.

CO 3: Excretory products Amonotelic, ureotlic, uricotelic, ornithine cycle for urea formation, urine formation, osmoregulation, micturition.

CO 4: Nature, origin and propagation of nerve impulse, synapse, structure and mechanism of hormone action, hypothalamus, pituitary, thyroid, parathyroid, adrenal, pancreas and gonads, spermatogenesis, ovulation, menstrual cycle, fertilization.

Course Outcome ZOO 403

After this course, the students acquire knowledge about Practical aspects of the theoretical contents covered in ZOO 301, ZOO 302, ZOO 401 & ZOO 402. They specifically perform practicals on the following aspects:

Classification, habit, habitats, external characters and economic importanceof selected members from Protochordata, Cyclostomata, Chondrichthyes, Osteichthyes, Any of the Lung Fishes, Amphibia, Reptilia, Aves, Mammalia.

Examination of internal structure of *Herdmania*, *Labeo*, *Hemidactylus*, Rat.

Skeletal studies of *Scoliodon, Labeo, Rana* (Frog), *Varanus,* Pigeon/Gallusand any mammal.

Study of slides of Tornaria larva, *Amphioxus*, Oikopleura, Histology of rat, types of scales.

Making Permanent Stained slides of *Salpa,* Spicules and Pharynx of *Herdmania, Amphioxus*, Cycloid scales, Zoological excursion and its report is compulsory in the practical examination.

Qualitative tests for identification of simple sugars, disaccharides and polysaccharides, human salivary amylase activity, estimation of abnormal constituents of urine, use of Kymograph unit & respirometer, haematein crystal preparation, estimation of Hb, DLC of Man/RBC count/WBC count.

Course Outcome ZOO 501: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Basics of ecology, significance, habitat and niche, factors affecting environment (Abiotic and Biotic).

CO 2: Major ecosystems of the world, concept of ecosystem, ecological energetics, trophic structure, ecological pyramids.

CO 3: Biogeochemical cycles, reservoir pool, gaseous cycles and sedimentary cycles. Population growth and regulation, biodiversity and conservation of natural resources.

CO 4: Migration in fishes and birds, parental care in animals, competition, predation, parasitism, commensalisms and mutualism as population interactions, environmental pollution.

Course Outcome ZOO 502: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Origin of life, organic evolution, micro-, macro- and mega-evolution, concept of species.

CO 2: Horse phylogeny, human evolution, developmental biology, mammalian ovum, sperm, spermatogenesis, oogenesis, egg types, cleavage patterns.

CO 3: Blastulation and fate-map construction, gastrulation, primary organizers, extra-embryonic membranes.

CO 4: Concepts of competence, determination and differentiation, Concept of regeneration.

Course Outcome ZOO 601: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Introduction to world fisheries, fresh Water fishes of India, river system, captive and culture fisheries, cold water fisheries, fishing crafts and gears, culture of fin fishes, Crustaceans and Molluscs.

CO 2: Study of important insect pests of Sugarcane and cotton crops: leaf-hopper *(Pyrilla perpusilla)*, Whitefly *(Aleurolobus barodensis)*, top borer *(Sciropophaga nivella)*, root borer *(Emmalocera depresella)*, pink bollworm, red cotton bug, grey weevil, cotton jassid.

CO 3: Study of important insect pests of wheat and paddy crops: wheat stem borer (*Sesamiainferens)*, Paddy Gundhi bug (*Leptocorisaacuta)*, rice grasshopper *(Hieroglyphusbanian)*, Rice stem borer *(Scirpophaga incertullus)*, Rice Hispa *(Diceladispa armigera).*

CO 4: Study of important insect pests of some vegetables: Red pumpkin beetle, the pumpkin fruitfly, the vegetable mite, the Hadda beetle.

Course Outcome ZOO 602: After going through this course the students will know about/will be enabled to attain knowledge of/will be able to decipher:

CO 1: Natural seed resources, Hatchery production, Sources of food (Natural, Artificial) and feed composition (Calorie and Chemical ingredients), field Culture, polyculture, biotechnology, gene manipulation and cryopreservation of gametes.

CO 2: Damage and control of pests of stored grains, with their life cycles: Pulse beetle *(Callosobruchus*

maculatus), Rice weevil *(Sitophilus oryzae)*, Wheat weevil *(Trogoderma granarium)*, Rust Red Flour beetles *(Tribolium castaneum)*, Lesser grain borer *(Rhizopertha dominica)*, Grain & Flour moth *(Sitotroga cerealella)*

CO 3: Insect control, Biological control, biological control agents, chemical control, categories of pesticides, their pest specificity, insect repellants and attractants.

CO 4: Integrated pest management, Important bird and rodent pests of agriculture & their management.

Course Outcome ZOO 603

After this course, the students can acquire knowledge about Practical aspects of the theory syllabus covered in ZOO 501, ZOO 502, ZOO 601 & ZOO 602. The practicals cover the following:

External morphology, identification marks, nature of damage and host of the pests: sugarcane leaf-hopper, Sugarcance whitefly, Sugarcane top borer, Sugarcane root borer, Gurdaspur borer, red Cottonbug, Wheat stemborer, Paddy Gundhi bug, Rice grasshopper, Rice stem borer, Rice hispa, *Aulocophora faveicollis*, *Dacus cucurbitas*, *Tetranychus tecarious*, *Epilachna*, Pulse beetle, Rice weevil, Grain & Flour moth, Rust-red flour beetle, lesser grain borer.

Stages of life history of silk moth and honeybee.

Identification of useful commercial fishes *Catla*, *Labeo rohita*, *L. calbasu, Cirrhius* etc. Prawns, crabs etc.

Chemical analysis of pond water and soil for pH, dissolved oxygen, free CO_2 nitrates, phosphates and chlorides.

Slide study of fish parasites, study of different types of nets, cast net, gill net, drift net and dragnet.

A visit to lake/reservoir/fish breeding centre.

Study of adaptive modifications in feet and beaks of birds.

Preparation of permanent/temporary slides of developmental stages of frog/mosquito, study of slides of chick embryo, stages of development in chick egg.

Preparation of permanent histological slides of testis, ovary, kidney, intestine, live of rat (H and E staining).

Courses in Biotechnology
Semester – 01

Course –I   (BT 101) Introduction to Biotechnology
Course –II   (BT 102) Biochemistry I
Course–III   (BT 103) Practicals (Based on BT 101 & BT 102)

Semester – 02

Course –I   (BT 201) General Microbiology
Course –II   (BT 202) Biochemistry II
Course–III   Practicals (Based on BT 101, 102, 201 & BT 202)

Semester – 03

Course –I   (BT 301) Biochemistry II
Course –II   (BT 302) Molecular Biology
Course–III   Practicals (Based on BT 301 & BT 302)

Semester – 04

Course –I   (BT 401) Recombinant DNA Technology
Course –II   (BT 402) Bioinformatics
Course–III   Practicals (Based on BT 301, BT 302, BT 401 & BT 402)

Semester – 05

Course –I   (BT 501) Animal Biotechnology
Course –II   (BT 502) Plant Biotechnology
Course–III   Practicals (Based on BT 501 & BT 502)

Semester – 06

Course –I   (BT 601) Microbial Biotechnology
Course –II   (BT 602) Project Work (In House)
Course–III   Practicals (Based on BT 501, BT 502, BT 601 & BT 602)

Course Outcomes BT 11

❖ By studying introduction to Biotechnology Students will be able learn Basics of biotechnology importance and scope different techniques such as immobilized enzymes, monoclonal antibodies.

❖ IVF and embryo transfer technique, DNA Fingerprinting, forensic analysis and their application in different fields of Medicine and Agriculture.

Course Outcomes BT 12

❖ Introduction to Biochemistry study includes study of the structure and function of biomolecules such as carbohydrates, protein, Nucleic acids and lipids.

❖ Students will able to learn various techniques used in this field such as qualitative and quantitative analysis of carbohydrates and proteins, lipid testing parameters such as Acid value, iodine number, saponification and chromatography: TLC etc.

Course Outcomes BT 21

❖ In Microbiology students will learn Importance and scope of Microbiology as a modern Science Branches of microbiology.

❖ Microbial techniques Sterilization: Principles and Applications of Physical Methods. Autoclave, Hot air oven, laminar airflow, Seitz filter, Sintered glass filter, and membrane filter.

❖ Staining techniques: Simple, Negative staining, Gram staining, Endospore staining and fungal staining.

❖ Media preparation: Nutrients agar, MRBA and Nutrient broth Isolation of bacteria and fungi from soil, air, and water – dilution and pour plate methods.

Course Outcome BT 22

❖ In this cuorse students will learn Enzymes, Enzyme classification, Enzyme Kinetics.

❖ Vitamins and Hormones: Introduction

❖ Types of vitamins – structure of water soluble vitamins and their coenzyme derivatives, Fat soluble vitamins.

❖ Deficiency symptoms and dietary sources Starch hydrolysis by salivary amylase, Polyacrylamide Gel Electrophoresis of a biological sample, Gel Filtration chromatography.

Course Outcome BT 203

> After this course, the students acquire knowledge about Practical aspects of the contents covered in BOT 101, 102, 201 & BOT 202. They will perform practicals on the processes and experiments based on their syllabus.

Course Outcome BT 301

> ❖ The students will learn the concepts of Antigens and Antibodies.
>
> ❖ Structure, Types/Classes, properties and functions Precipitation and Agglutination reactions, RIA, ELISA etc.
>
> ❖ Techniques such as Radial Immuno-diffusion analysis Dot ELISA ABO blood grouping and Rh typing.
>
> ❖ Diagnosis of infectious disease – Widal test and VDRL.

Course Outcome BT 302

> ❖ By studying Molecular biology one can have knowledge of DNA and RNA and their structure and functions.
>
> ❖ Techniques such as Isolation and quantification of genomic DNA from bacteria (*E. coli*), animals and plants.
>
> ❖ Isolation of Plasmid DNA.
>
> ❖ Isolation of total nucleic acid etc.

Course Outcome BT 401

> ❖ In this subject students will learn Recombinant DNA Technology and Genetic Engineering.
>
> ❖ Tools of Recombinant DNA technology techniques such as Separation of DNA by Agarose Gel Electrophoresis, Restriction digestion of DNA and Agarose Gel Electrophoresis, DNA fingerprinting.
>
> ❖ Preparation of competent cells.
>
> ❖ Transformation of *E. coli* and selection of recombinants.

Course Outcome BT 402

> - ❖ Bioinformatics is latest technology where one can able to learn Internet Basics
> - ❖ Introduction to NCBI websites, Introduction to Data bases BLAST.
> - ❖ Multiple sequence alignment.
> - ❖ DATA base searching using BLAST and FASTA.

Course Outcome BOT 403

> After this course, the students acquire knowledge about Practical aspects of the contents covered in BT 301, BT 302, BT 401 & BT 402. They perform practicals on the above aspects.

Course Outcome BT 501

> - ❖ In Animal Biotechnology students will learn about Animal Cell & Tissue Culture.
> - ❖ Organ Culture: technique, advantages, applications and limitations, Artificial skin.
> - ❖ Hybridoma Technology: Production of monoclonal antibodies and their applications.
> - ❖ Practical applications of Lymphocyte culture/Animal tissue culture.

Course Outcome BOT 502

> - ❖ In Plant Biotechnology students will learn about Plant Tissue Culture: Introduction/Concept, Scope and Applications along with major achievements.
> - ❖ Genetic Engineering in plants.
> - ❖ Micro propagation through Shoot Tip Culture, Nodal Culture, Axillary bud culture, Anther or Pollen culture.

Course Outcome BT 601

> - ❖ Microbial Biotechnology students will learn about Screening and Isolation of Micro organisms.
> - ❖ Industrially important microbes' Basic design of fermenters.
> - ❖ Bioinsecticides, bioherbicides, biocontrol agents for disease control, advantages over chemical methods.
> - ❖ Biofertilizers, use of GEM in Agriculture, Production of alcohol and wine.

Course Outcome BT 602

The students carry out an in-house project on various aspects of Biotechnology or Applied Aspects of Biology. The project work makes them aware of the research methodology, team work and enhances analytical skills.

Course Outcome BT 603

After this course, the students acquire knowledge about Practical aspects of the contents covered in BOT 501, BOT 502, BOT 601 & BOT 602. They are supposed to perform practicals based on their syllabus, and are evaluated at the end of semester.

Scope of Commerce

The role of commerce students in India is marvelous since different career options are available in varied fields. A commerce student can pursue their career in fields like finance, banking, insurance, audit, human resource management, digital marketing, digital advertising, tax consultancy, teacher, hotel manager, product manager, entrepreneur, investment banker, research analyst, personal financial adviser etc. Students can also opt for the professional courses like Chartered Accountant (CA), Company Secretary (CS), Cost & Management Accountant (CMA), and Chartered Financial Analyst (CFA). Apart from this, students can also prepare for government exams like UPSC, PCS of different states, Bank PO, SSC CGL, RBI Grade B, Professor, etc. and can hold prestigious positions.

COURSE LEARNING OUTCOMES

Name of the Programme: B.Com. (General)

Semester 1

Paper: BC 101 Financial Accounting-I

CO1: It will make the students acquainted with the concept of Book-keeping, Journalizing and Rectification of Errors.

CO2: It will impart the knowledge of the classification of income and expenditure.

CO3: Students will understand the concept of Depreciation and methods of depreciation accounting.

CO4: The students will be able to prepare and maintain the final accounts of business organization and Non-profit Organizations.

CO5: It will help the students in preparing and maintain the Consignment Accounts

Paper: BC 102 Micro Economics

CO1: To make the students learn about the concepts of microeconomics like Theories of demand, cardinal utility approach and indifference curve approach.

CO2: It will help the students in developing the understanding about the law of demand and elasticity of demand.

CO3: The students will gain the knowledge of production function, law of variable proportions and cost theories and the application of these concepts in solving different economic problems.

CO4: To endeavor the students about the determination of equilibrium of firm and industry in different market situations and eventually helping them in taking business decisions with regard to profit and non-profit maximization objective.

Paper: BC 103 Principles of Business Management

CO1: The students will be able to exhibit the knowledge of concepts of business, commerce and management and the different approaches of Management thoughts.

CO2: It will assimilate the students about the concepts of planning and organizing functions of management, and about the organizational structure.

CO3: The students will be able to get to know about the delegation of authority and responsibility, decentralization and centralization, staffing and directing.

CO4: To comprehend the students with the concept and application of motivation, techniques of motivation, leadership styles and controlling techniques adopted in organizations.

Paper: BC 104 Computer Applications in Business

CO1: To disseminate the knowledge of computers, hardware devices and processors.

CO2: To make the students learn about the different types of software, programming languages used, and the operating systems used for different devices.

CO3: The students will be able to learn about the spreadsheets, word processors, database management software and hardware and software required for networking.

Paper: BC 105 Business Mathematics

CO1: To equip students with concepts of differentiation and integration.

CO2: To understand about system of linear equations.

CO3: To get awareness about different types of matrices and determinants.

CO4: To get familiarized with Calculus.

Paper: BC 106 Business Communication

CO1: It will enable the students to gain an in-depth knowledge of the basic business communication concept and theories.

CO2: To comprehend the knowledge about developing effective presentation skills and practices in business communication like group discussion, mock interview and seminars.

CO3: To make the students understand the different dimensions of self development and effective communication and the principle of effective listening.

CO4: Assimilate the skills of writing business letters and emails.

Semester 2

Paper: BC 201 Financial Accounting-II

CO1: The students will acquire the knowledge about the preparation and maintenance of branch accounts.

CO2: The students will be able to further explore the concept of hire purchase system and installment purchase system.

CO3: It will make the students comprehend about the preparation of the financial statements of partnership firm.

CO4: To enable the students in preparing the accounting statements in the different events of reconstitution of a partnership firm.

Paper: BC 202 Macro Economics

CO1: To disseminate the knowledge about the concepts of national income, flow of income between the four core sectors, consumption and investment function.

CO2: It will help in learning about the Classical and Keynesian theory of income, output and employment.

CO3: To help the students understand the concept of Inflation and the remedial measures to be used in real life.

CO4: To comprehend the different phases of Business Cycles and effective measures to be adopted for business cycles in real life.

Paper: BC 203 Fundamentals of Marketing

CO1: The students will be able to define the concepts & principles of marketing.

CO2: It will help the students in analyzing the marketing environment and segmenting the consumer groups which will help in understanding the consumer behavior.

CO3: It will enable the students in comprehending the concept of new product development process and product line decisions.

CO4: The students will be able to acquire the knowledge of promotion, pricing and product distribution strategies.

Paper: BC 204 E-commerce

CO1: The students shall be able to exhibit the knowledge of Internet, Transaction Processing System (TPS), Management Information System (MIS) and the effect of IT on business..

CO2: It will help the students in gaining insights about various e-commerce services used in business and different e-commerce models.

CO3: The students will have clarity about the concept of Electronic Data Interchange (EDI).

CO4: To disseminate the knowledge of the concept of m-commerce and e-governance and their usage in practical business world.

Paper: BC205 Business Mathematics

CO1: To understand the binomial theorem.

CO2: To equip students with the formulae related to permutations and combinations.

CO3: To make students understand about Linear Programming.

CO4: To equip students with methods of data representation and interpretation.

Paper: BC 206 Business Environment of Haryana

CO1: It will endeavor the students to know about the economy of Haryana with the help of some important parameters and Haryana agriculture along with effective measures that can be adopted for agricultural development.

CO2: Students will get the knowledge about the agricultural credit, different sources and institutions involved in providing the credit facilities.

CO3: It will help the students to explore about the Micro, Small and Medium Enterprises (MSMEs) and performance of SEZ in Haryana.

CO4: To describe the role of HSIDC, HFC, HAFED and HKVIB and about Budget of Haryana.

Semester-3

Paper: BC 301 Corporate Accounting-I

CO1: It will help the students in understanding the accounting treatment of Issue and Redemption of shares, debentures and preference shares.

CO2: To assimilate with the ability of maintenance and preparation of the Final accounts of companies.

CO3: Elaborate on the concept and accounting treatment in case of Amalgamation of companies.

CO4: To make the students understand the concept and accounting treatment in the event of Internal reconstruction of companies.

Paper: BC 302 Business Statistics-I

CO1: Disseminate about the concept of Statistics and different approaches adopted for the collection of the required data.

CO2: Exhibit the knowledge of appropriate measure of central tendency and measure of dispersion and using the same in decision making.

CO3: Understanding the construction and application of index numbers in practical scenarios and in solving real life problems.

CO4: Assimilate the students with the knowledge of analysis of time series and application of the same in making decisions regarding forecasting in different business activities.

Paper: BC 303 Business Laws-I

CO1: To comprehend the students with the basic regulatory framework of Indian Business Law, Indian contract act, 1872 and its various provisions.

CO2: It endeavors the students with the understanding of different types of special contracts including indemnity, contingent contracts, quasi contracts.

CO3: It will help the students to get the knowledge about the Sales of Goods Act 1930 and the different provisions under the act.

CO4: Disseminate with the knowledge of the consumer protection act 1986 and the how to pursue the consumer rights provided under the same.

Paper: BC- 304 Company Law

CO1: To endeavor the students with the knowledge of companies, types of companies and about promotion and incorporation of companies.

CO2: Comprehend the students with the contents of Memorandum and Articles of Association.

CO3: To impart the knowledge of the prospectus and the underlying contents of the same.

CO4: Students will explore about the shares and debentures, share certificates and buy-back of shares.

Paper: BC-305 Indian Financial System

CO1: To acquaint the students about the Indian Financial System and the different components of financial system financial markets and financial instruments and recent developments in the Indian capital market.

CO2: To develop the understanding among the students about the role of SEBI and the major components of the Debt market.

CO3: Comprehend the knowledge about the major financial institutions involved and their management and functions in Indian financial market.

CO4: To impart the students with the knowledge of objectives and functions of commercial and development banks and their role and contribution in the Indian economy.

Paper: BC-306 Rural Marketing

CO1: To make the students learn about concept of Rural marketing and the opportunities and challenges in the rural markets along with the factors influencing the same.

CO2: Help the students in analyzing the rural consumer behavior, strategies adopted for rural marketing and rural marketing mix.

CO3: Comprehend the students with the knowledge of the strategies adopted for Product planning, pricing, promotion and distribution in the rural areas.

CO4: It helps in the implementation of personal selling strategy for rural markets and adoption of the innovative techniques like E-commerce and e-chaupal and how these techniques can be helpful in their business.

Semester-4

Paper: BC-401 Corporate Accounting-II

CO1: To comprehend the students with the knowledge of valuation of Goodwill and Shares.

CO2: To develop the skills of preparing the accounts of Holding companies and consolidated balance sheet as per the relevant provisions.

CO3: To help the students in preparation of the accounts of Banking and Insurance companies.

CO4: To acquaint them with the preparation and maintenance of the Liquidators final statement of accounts at the time of Liquidation of companies.

Paper: BC-402 Business Statistics

CO1: To enable the students to illustrate and apply the knowledge of correlation analysis and the different underlying approaches to the same.

CO2: To enable the students to illustrate and apply the knowledge of regression analysis and the different underlying approaches to the same.

 CO3: Assimilate with the concept of Probability and the relevant theorems.

CO4: Acquaint the students with the concept of the relevant Probability distributions along with their properties and parameters.

Paper: BC-403 Business Laws-II

CO1: Enable the students with the contents of the Negotiable Act 1881 and the different types and uses of the negotiable instruments.

CO2: To make the students learn about the provisions of Indian Partnership Act 1932 and the necessary decisions to be taken in to in different scenarios.

CO3: To acquaint the students with the provisions of the Limited liability partnership act 2008 and apply the same in the real situations.

CO4: To provide them with the understanding of the Information technology act 2000 and RTI act 2005 and their necessary provisions.

Paper: BC-404 Company Law

CO1: To encourage the students for critical appreciation of the role of corporation and corporate law in modern society.

CO2: To give a description of the basic rules and corporate law, such as separate legal personality, limited liability, etc.

CO3: Acquaint the students with the procedure of meetings in corporate world, conduct, resolution and minutes and proxy.

CO4: To make the students learn about the accounts of companies, audit and necessary decisions to be taken in the events of reconstruction, amalgamation, winding up.

Paper: BC-405 Computerized Accounting System

CO1: To endeavor the students with the understanding of the concept of Tally, ERP9- Backup & Restore

CO2: Comprehend the students with the concept of Accounting, voucher entry, budget, cost center, profit & loss account, interest calculation.

CO3: To impart the knowledge about the inventory, stock item, sales order, delivery note and Computerized Tax Liability calculation.

CO4: Students will explore about the concept of Payroll, payroll masters, advanced payroll transactions, Pension, Provident Fund.

Paper: BC-406 (i) Advertising

CO1: To disseminate the knowledge about the concept of Advertising and its process, communication and the necessary elements of advertising mix.

CO2: Making the students learn about the creative aspects of advertising that can be incorporated practically.

CO3: Acquaint them with the knowledge of Advertising media, advertising agency and help them analyzing the consumer behavior.

CO4: To make them understand the knowledge of the effectiveness of advertising as a tool and strategy and how to apply the strategy in the practical scenario.

Paper: BC-406 (ii) Entrepreneurship Development

CO1: To acquaint the students about the concept of Entrepreneur, role and functions of entrepreneur in economic development; economic, social and psychological need for entrepreneurship; life cycle of a new business, factors affecting success of a new business.

CO2: To develop the understanding among the students about the Feasibility study, economic, technical, financial and managerial feasibility of project; selection of factory location; demand analysis and market potential measurement; capital and project costing; working capital requirements; source of finance; profit and tax planning.

CO3: Comprehend the knowledge about the Government support and incentives to new enterprise; role of govt., promotional agencies and institution in entrepreneurship development; entrepreneurship development programmes; Start-up India; Skill India.

Semester-5

Paper: BC-501 Cost Accounting

CO1: It will enable the students in understanding the cost concept, classification and application of the methods and tools adopted for the control and reduction of costs during the production process in real life.

CO2: Assimilate the students effectively with the handling of material costs, labor costs and overheads.

CO3: Disseminate the students with the different types of costing to be opted for as per suitability, like unit costing, job costing, and service costing.

CO4: Developing the knowledge among students about standard costing, variance analysis, cost control and cost reduction techniques and application of the same in real business problems.

Paper: BC-502 Financial Management

CO1: To make the students learn about the importance and need of finance in business.

CO2: Developing an understanding of the concepts of financial planning and forecasting and application of the same in real business situations.

CO3: To enable the students to evaluate the benefits, costs and risks associated with the different sources of finance and to decide the proportion in which different sources of finance should be used.

CO4: Inculcating the ability to manage the long term and short term funds in the business.

Paper: BC-503 Goods and Services Tax

CO1: To make the students learn about the concept of taxable person and tax registration process and documents required and collection of tax.

CO2: To learn the application of GST on supply of goods and services and the definition of supply.

CO3: To provide the knowledge regarding input tax credit and transfer of input tax credit.

CO4: Assimilate the students with the tax invoice credit, debit note, returns to be filed under GST, Payment of tax including TDS and offences and penalties.

Paper: BC-504 Income Tax-I

CO1: To make the students learn about the nature and sources of income so that they can identify various heads of Income: Salary Head, House Property, Business & Profession, Capital and other sources.

CO2: Assimilate the knowledge about calculation of total income with the application of rules of tax and deduction under 80C to 80U.

CO3: To learn about set and carry forwards of various different losses, TDS, advance payment of tax, penalty and prosecution.

CO4: To learn about the computation of tax liability of individual, HUF, and partnership firm.

Paper: BC-505 Auditing

CO1: Developing the understanding of the concept, types and methods of auditing.

CO2: To acquire the knowledge about vouching of cash and credit transactions.

CO3: Comprehend the knowledge about the appointment, rights, duties and responsibility of auditor.

CO4: To impart knowledge about preparation of audit reports, Investigation and professional ethics of auditing.

Paper: BC-506 (i) Supply Chain Management

CO1: To make the students learn about concept of Supply chain management, role of SCM in a firm and economy; SCM and marketing mix; SCM as coordination function; Strategic SCM: SCM strategy, implementation and management; interrelationship of SCM and marketing.

CO2: Help the students in analyzing the Elements of SCM; transportation: considerations in selecting the right mode; multimodal transportation; warehousing: types, site selection and management; customer service-strategy and practices; distribution channel design.

CO3: Comprehend the students with the knowledge of the media planning, print, broadcasting media and scheduling.

CO4: It enables the students in understanding about the Information system used in SCM; ERP and SCM; recent developments in SCM - third/fourth party logistics.

Paper: BC-506 (ii) Indian Economy

CO1: To comprehend the students with the knowledge of the Indian economy; infrastructure: importance & types, infrastructure development programmes in India, important issues.

CO2: To impart the knowledge about the Agriculture, agricultural production and productivity, rural indebtedness, agricultural marketing, agricultural finance, agricultural policy, new development in agriculture: contract farming, organic farming and corporate farming.

CO3: To make the students learn about the Industrial development during the planning period; Industrial Policy, National manufacturing Policy; Micro, Small and Medium Enterprises (MSME): importance, problems and Govt. Policy.

CO4: To acquaint them with the knowledge of Service sector in India: growth and contribution of services, Foreign trade of India: composition and direction. Problems of Indian economy: population, poverty, unemployment, inflation, unequal distribution of income and wealth, inter-state disparities in the pattern of development.

Semester-6

Paper: BC-601 Management Accounting

CO1: Inculcating the skills of decision making and problem solving in day to day business problems and understanding the concept of management accounting.

CO2: Acquaint the students with the concept of management reporting, management Information system and the practical application of these in real business world.

CO3: Disseminate with the analysis of financial statements with the help of several tools like comparative statements, ratio analysis, profitability, trend analysis and cash flow statements.

CO4: To provide the managers with the information required for decision making like margin of safety, angle of incidence, P/V ratio, etc. and budgetary control technique.

Paper: BC-602 Fundamentals of Insurance

CO1: To impart the knowledge about the concept of Insurance and role of insurance in the economic development of a country.

CO2: Assimilate with the principles, practices, parties to the contract and other essential elements of the contract of life insurance.

CO3: Acquaint the students with the concept, principles, conditions and claim settlement procedure of Fire and Marine Insurance.

CO4: To make the students learn about the terms and conditions of the accident and motor insurance, along with the working procedure of the insurance intermediaries.

Paper: BC-603 Human Resource Management

CO1: Acquaint the students with the concept of Human Resource Management, Human Resource Development and Human Resource Planning.

CO2: To impart the knowledge about the concept of Job Analysis, Recruitment and placement procedure, various elements therein and practical application of the same in real business scenario.

CO3: Assimilate with the concept of training, training programme and methods of training.

CO4: To make the students understand about the concept, procedure and approaches of performance appraisal.

Paper: BC-604 Income Tax-II

CO1: Disseminate about the deductions applicable to individuals under section 80C to 80U.

CO2: To inculcate the skills of computation of gross total income and tax liability of an individual, H.U.F. and firm and deduction of tax at source and advance payment of tax.

CO3: To impart the knowledge of the various income tax authorities, their functioning, procedure for assessment, filing e-return.

CO4: To summarize about the recovery and refund of tax, penalties, prosecutions, appeal and revision in different situations.

Paper: BC-605 Business Environment

CO1: Assimilate about the concept of Business environment and the necessary elements of business environment.

CO2: Disseminate about the operating procedure of the public, private and joint sectors and the economic systems.

CO3: To give a description about the economic planning in India, major achievements and failures, role of government through various policies in economic development of India.

CO4: Impart the knowledge about the concept of foreign investment, multinational corporations, contents of Competition act, Foreign Exchange Management Act and Foreign Exchange Management Act.

Paper: BC-606 (i) Retail Management

CO1: Enable the students with the Retailing: concept and importance; theories of retailing; strategic planning in retailing; choice of a general location, choosing and evaluating a particular site; material handling.

CO2: To make the students learn about the Organizational structure adopted in retail institutions; classification of retail institutions; store based and non-store based retail organizations; process of setting up a retail organization.

CO3: To acquaint the students with the concept of Store management: blueprinting operations, deciding stores layout, energy management, security issues; applications of information technology in retailing.

CO4: To provide them with the understanding of the Trends in retailing in India; FDI in retail.

Paper: BC- 606 (ii) Industrial Laws

CO1: To make the students learn about the concept of Industrial relations, constituents of industrial relations, industrial unrest. Factories Act, 1948: object, definitions, health, safety, leave with wages, special provisions, penalties and procedure.

CO2: To give a description of the Trade Union Act, 1926: object, definitions, registration of trade unions, rights and liabilities, office bearer, dissolution, returns, regulations, penalties.

CO3: Acquaint the students with the concept of The Employees' Compensation Act, 1923: object, definitions, employer's liability for compensation, amount of compensation, medical examination.

CO4: To make the students learn about the Industrial Disputes Act, 1947, procedure, powers and duties of authorities, award and settlement, strikes and lockouts, layoff and retrenchment, penalties. The Payment of Wages Act, 1936: object and scope, fixation of wage periods, time of wage payment, deductions, records, authorities, claims, appeal.

<p align="center">**COURSE LEARNING OUTCOMES**</p>

<p align="center">**Name of the Programme: Bachelor of Business Administration (BBA)**</p>

Semester- 1st

Paper: BBA- 101- Business Organization

CO1: It will make the students acquainted with the concept of Business, different forms of Business Organization like Sole Proprietorship, Partnership etc.

CO2: It will impart the conceptual framework of of Ethics, Values and Corporate Governance.

CO3: Students will understand the concept of formation of company & types of company.

CO4: The students will be able to understand about MNCs & Non-profit Organizations.

CO5: It will help the students in understanding about the working and functioning of trade association.

Paper: BBA-102-Business Accounting

CO1: To make the students learn about the basic terms of accounting and differentiate between accounting and accountancy.

CO2: It will help the students in developing the understanding about Accounting Principles and Accounting equation.

CO3: The students will gain the practical knowledge of Preparation of Journal, Ledger & Trial Balance.

CO4: To endeavor the students about the concept of Final Accounts & help them in Calculating the profitability measures such as Gross profit and Net profit from trading and Profit & Loss account.

CO5: To make aware the students about accounting software (Advance Tally version).

Paper: BBA-103- Managerial Economics

CO1: The students will be able to exhibit the nature, scope & terminology used in Managerial Economics and the concept of objectives of Firm.

CO2: It will assimilate the students about the concepts & determinants of Demand and Elasticity of Demand. It will help the students in calculation of Elasticity of Demand.

CO3: The students will be able to get to know about the Short run & Long run Production Function in detail.

CO4: To give an idea about the concept of Consumer behaviour & Indifference curve.

CO5: To comprehend the students with the concept and measuring the Price, Output & Equilibrium under different market structures like Perfect Competition, Monopoly, Monopolistic Competition, Oligopoly.

Paper: BBA- 104- Business Mathematics-I

CO1: To understand and use equations, formulae, and mathematical expressions and relationships in a variety of contexts.

CO2: To apply the knowledge in mathematics (algebra, matrices, calculus, optimization) in solving Business problems.

CO3: To make the students learn about the matrices and solution to linear equations (based on Payroll, Wages and Commission) using Cramer's rule and Matrix inversion method.

CO4: The students will be able to develop critical thinking & problem-solving skills.

CO5: To make the students aware about the permutations and combinations.

Paper: BBA-105- Hindi

CO1: To make aware the students about the official language Hindi.

CO2: To enhance the knowledge of the students by writing Essays/ Articles/ Letters on various issues in Hindi language.

CO3: To provide the knowledge to the students about antonyms and synonyms in Hindi.

Paper: BBA-106-Computer Fundamentals

CO1: It will enable the students to gain an in-depth knowledge of the fundamental components that make up computer hardware & the role of each of these components.

CO2: To Understand an operating system & an application program & what each is used for in a computer.

CO2: To comprehend the knowledge about Internet and different terminology used in Internet.

CO3: To make the students understand the concept and uses of different components of MS-Office like MS-Word, Power Point etc.

CO4: To teach the students how to make slides in Power Point and use of animation in presentation.

CO5: To give the practical use of MS-Excel and making spreadsheets & various commands.

Paper: BBA-107-Seminar

CO1: To enhance the communication skills of the students.

CO2: To develop Public Speaking Skills and help in removing stage phobia among students.

CO3: To conduct various Management games for the students for boosting their confidence.

CO4: To conduct debate & declamation for the students so that they can present their ideas on various issues.

CO5: To Prepare the students for interview by conducting Mock Interview.

Semester-2nd

Paper: BBA-108- Principles of Management

CO1: The students will acquire the knowledge about the concept & process of Management. This will teach the students how to manage in a company as well as in life.

CO2: The students will be able to further explore the various Management Approaches like Classical approach, Neo-Classical Approach & Modern Approach.

CO3: It will make the students comprehend about the different functions of Management in detail like Planning, Organizing, Staffing, Directing & Controlling.

CO4: To teach the students about the concept of Communication barriers & gateways to make communication effective. This course will also help in developing the knowledge of Delegation & Decentralization of Authority in Business.

CO5: To make aware the students about the concept of Corporate Social Responsibility (CSR) and obligations of business towards various parties of Business.

Paper: BBA-109-Analysis of Financial Statements

CO1: To disseminate the knowledge about the process of analysis & interpretation of Financial Statements.

CO2: It will help in learning & calculating the short-term liquidity, long-term solvency and profitability ratios in the Business.

CO3: To help the students in preparation of Cash Flow statements and help in understanding its significance.

CO4: It will help the students in understanding the concepts like Return on investments, return on capital employed & return on assets to evaluate overall performance of Business.

CO5: To help the students in preparation of Fund Flow statements and help in understanding its significance.

Paper: BBA-110-Managerial Economics

CO1: The students will be able to define the concepts of Macro Economics & its implications in Business.

CO2: It will help the students in analyzing & computation of National Income through different methods.

CO3: It will enable the students in comprehending the concept of Keynesian & Friedmanian theory of income determinants. The students will be able to know the concept & theories of Inflation.

CO4: The students will be able to acquire the knowledge of Classical theory of output & employment. This course will tell the students about how investors invest money in the market on the basis of their marginal efficiency of capital and rate of interest.

CO5: It will help the students to provide an idea about concept of Monetary & Fiscal Policies & their framework.

Paper: BBA-111-Understanding Social Behaviour

CO1: The students shall be able to exhibit the knowledge of different concepts, terminology & methods of Sociology.

CO2: It will help the students in gaining insights about Social Structure & Social institutions like family, Religion etc. This course also tells the students about relationship between man & society.

CO3: The students will have clarity about the concept of different types of social process like Co-operation, Conflict, Competition & Assimilation.

CO4: To disseminate the knowledge of the concept of Socialization and different stages & agencies of Socialization.

CO5: To make aware the students about how attitude is formed & changed. This Course also teach the students about various concepts like moral audit, values, Power, Politics & Bureaucracy.

Paper: BBA-112- Business Mathematics-II

CO1: To disseminate the knowledge of the concepts of the Cartesian coordinate system and the straight line.

CO2: It will help the students in gaining insights about Arithmetic, Geometric and Harmonic progressions.

CO3: To make the students understand the concept Integral calculus that include definite and indefinite integral to use it in business.

CO4: To make aware the students about Logarithm, Law of operations, log tables to use them in computer applications.

CO4: To teach the students about calculation of Compound interest, depreciation which is useful in business & economy.

CO5: To make the students understand the concept Integral calculus that include definite and indefinite integral to use it in business.

Paper: BBA-113- Business Communication-I

CO1: It will endeavor the students to know about the concept of Business Communication & how to make communication effective.

CO2: Students will get the knowledge about the basic parts of speech like Noun, pronoun, verb, adjective, paragraph writing.

CO3: It will help the students how to write business applications like applying for a loan, salary advance, job application, leave application etc.

CO4: To describe the role of non-verbal communication like Gestures, symbols, signs, Physical appearance etc.

CO5: To develop writing skills among the students.

Paper: BBA-115- Environmental Studies

CO1: To disseminate the knowledge about the Environmental studies and its need for public awareness.

CO2: It will help in teaching the concept of renewable & Non-Renewable sources and associated problems.

CO3: To help the students in knowing the role of an individual in conservation of natural resources. It will teach the students about human population & and the environment.

CO4: It will help the students in understanding the concept of Biodiversity and its conservation. will help the students in getting the knowledge about equitable use of resources for sustainable lifestyle.

CO5: To It will help the students in getting the knowledge about Environmental Pollution and social issues related with environment.

Semester-3rd

Paper: BBA-201- Understanding Human Behaviour

CO1: To comprehend the students with the concept and approaches for studying human behaviour like behavioral approach, cognitive approach and psychoanalytic approach.

CO2: It endeavors the students with the understanding of the concept and theories of personality and its implication for a manager.

CO3: It will help the students to get the knowledge about the concept and theories of motivation and its implication for a manager.

CO4: Disseminate with the knowledge of the attention and perception in an organization.

C05: It endeavors the students with the understanding of the concept and theories of emotions and learning. This course also teaches the students about the concept of memory and forgetting.

Paper: BBA-202-Micro Business Environment

CO1: To endeavor the students with the knowledge of concept, nature and factor affecting business environment like economic, social, political, global etc.

CO2: Comprehend the students with the concept of risk in business environment and also talk about country risk and political risk.

CO3: To impart the knowledge of the different types of economic systems like capitalism, socialism, mixed economy. This course also highlights on Indian economic system.

CO4: Disseminate about the concept of economy roles of government like regulatory role, promotional role, planning role etc.

CO5: Students will explore about the competitive environment of the business (MRTP Act and Competition Act)

CO6: To impart the knowledge of the social responsibility of business and its disclosure by Indian business. Students will also learn about constitutional environment and state intervention of the business.

Paper: BBA-203- Business Statistics-I

CO1: Disseminate about the concept of Statistics and different approaches adopted for the collection of the required data.

CO2: Exhibit the knowledge and calculation of central tendency like mean, median, mode etc.

CO3: Exhibit the knowledge of appropriate measure of central tendency and measure of dispersion, skewness and using the same in decision making. Understanding the construction and application of index numbers in practical scenarios and in solving real life problems.

CO4: It will help the students in computation of various statistical techniques with Microsoft excel and their implications in business.

CO5: Assimilate the students with the knowledge of concept of sampling, its methods and various sample errors in sampling. It will help the students in understanding the concepts and methods of forecasting.

Paper: BBA-204-Management Accounting

CO1: It will help the students in understanding the concept, usefulness and techniques of management accounting.

CO2: To develop the ability to collect, analyse, and communicate quantitative and non-quantitative information to assist management in making more effective planning and control decisions related to accounting.

CO3: To prepare various costing schedules where an analysis of cost classification, behaviour, and type is completed.

CO4: To make the students understand the concept of marginal costing and standard costing and their usefulness for the business. It provides an outline and apply management tools and techniques such as the balanced scorecard, operational performance measures, quality, and environmental cost management.

CO5: It will help the students in understanding the concept and calculation of different types of budgets in an organization. It teaches how to apply managerial accounting and its objectives in a way that demonstrates a clear understanding of responsibility accounting.

Paper: BBA-205-Fundamentals of DBMS and Oracle

CO1: To acquaint the students about the traditional file-oriented approach and database management system. It also highlights on DBMS architecture and different types of data models.

CO2: To develop the understanding among the students about the computerized system for inventory control, payroll order, bank and accounting.

CO3: Comprehend the knowledge about the concept, components and various commands used in SQL.

CO4: To impart the students with the knowledge of SQL functions, numeric functions, scaler functions and group functions.

CO5: To develop the understanding among the students about the commands and advantages of report writing.

Paper: BBA-206-Business Communication-II

CO1: To make the students learn about concept of business communication and different effective communication skills.

CO2: Help the students in analyzing the different forms of communication like verbal and non-verbal. It helps the students in understanding the concept of public speaking and knowing about listening and negotiating.

CO3: Comprehend the students with the knowledge of the listening, negotiating, interviews and meetings.

CO4: It gives an idea on mechanisms of writing skills and imparting the knowledge about the telephonic and face to face conversation.

CO5: Giving an idea on commercial letters, Knowledge about writing business and academic reports. It also helps the students in understanding the concept of effective listening and organization communication.

Paper: BBA-207-Seminar

CO1: To enhance the communication skills of the students.

CO2: To develop Public Speaking Skills and help in removing stage phobia among students.

CO3: To conduct various Management games for the students for boosting their confidence.

CO4: To conduct debate & declamation for the students so that they can present their ideas on various issues.

CO5: To Prepare the students for interview by conducting Mock Interview.

Semester-4th

Paper: BBA-208-Human Behaviour at Work

CO1: Enable the students with the understanding the basic concept and nature of Human Behaviour.

CO2: To make the students learn about the knowledge of Group along with Group development Process and Detailed knowledge of Group Dynamics at Work Place.

CO3: To acquaint the students with the classification and formation of Team. This course also tells about social loafing and social facilitation.

CO4: To provide them with the understanding of the concept of Interpersonal Communication, Verbal and Non-Verbal Communication and different Theories of Communication.

CO5: To make the students learn about the Interpersonal Trust and Career Roles and Role Identity.

Paper: BBA-209-Macro Business Environment

CO1: To Understand the macro environment concepts relevant for taking prudent business Decisions.

CO2: To give a description of economic reforms in India like liberalization, privatization and globalization.

CO3: Acquaint the students with the concept of different policies like Industrial Policy, monetary policy, fiscal policy and their framework.

CO4: To make the students learn about the nature and operations of multi-lateral economic institutions- World bank, WTO and international monetary fund.

CO5: To give a description of MNC's and regulation and promotion of foreign trade. It also helps in studying the impact of Exim policy of India on Indian exports and imports in various sectors.

Paper: BBA-210- Business Statistics-II

CO1: To enable the students to illustrate and apply the knowledge of correlation analysis and the different underlying approaches to the same.

CO2: To enable the students to illustrate and apply the knowledge of regression analysis and the different underlying approaches to the same.

CO3: Assimilate with the concept of Probability, relevant theorems and Probability distributions along with their properties and parameters.

CO4: Acquaint the students with the concept of time series and measurement of trend, seasonal, cyclical and random variation.

CO5: To enable the students to understand the concept and procedure for testing hypothesis test in attributes (small and large samples). It also helps in computation of various statistical techniques with Microsoft excel.

Paper: BBA-211-Marketing Management

CO1: To disseminate the knowledge about the concept of marketing and marketing environment.

CO2: Making the students learn about the psychology of customers and why their behaviour pattern varies in market. It also helps in Knowing the marketing mix elements and how they influence an organization decision.

CO3: Acquaint them with the knowledge of marketing information system, marketing research and their importance for managers.

CO4: To make them understand the knowledge of the branding, packaging and pricing decisions in an organization.

CO5: To disseminate the knowledge about the distribution channels, physical distribution, various promotional techniques and marketing organization & control.

Paper: BBA-212-Finnacial Management

CO1: To make the students learn about the importance, need and objectives of financial management in business.

CO2: Developing an understanding of the concepts of financial planning and forecasting and application of the same in real business situations.

CO3: To enable the students to evaluate the benefits, costs and risks associated with the different sources of finance and to decide the proportion in which different sources of finance should be used.

CO4: Developing an understanding the concept and methods of capital budgeting, cost of capital and capital structure.

CO5: To make the students learn about the dividend models and various dividend decisions. It also provides the knowledge about the management of the working capital in an organization.

Paper: BBA-213-Principles of Material Management

CO1: To disseminate the knowledge about the concept of material management and its organization.

CO2: Making the students learn about the aspects of system approach to material management, material planning, Material budget, material cycle and flow control system.

CO3: Acquaint them with the knowledge of principles, procedures, practices, legal aspects of purchasing.

CO4: To make them understand the knowledge of the value analysis, transportation, material information system and store management.

CO5: Making the students learn about the concepts and techniques of inventory control, operational research and statistical quality control.

Semester-5th

Paper: BBA-301-Business Law-I

CO1: To make the students learn about concept of Complete understanding of The Indian Contract Act, 1872.

CO2: Help the students in getting the knowledge of major provisions of the act relating to Contracts, Indemnity and Guarantee, Pledge & Bailment and Agency.

CO3: Comprehend the students with the knowledge of the Indian Sales of Goods Act, 1930, legal aspects relating to formation of contract of sales and their classification and Different aspects related to Sales of Goods Act such as Price, conditions and warranties, etc.

CO4: It enables the students in understanding about the procedure of transfer of property in goods and measuring the performance of the contract of sales, unpaid seller and his rights.

CO5: Help the students in getting the knowledge of Negotiables Instruments Act 1981, Importance and Implication and Learn about different type of Negotiable Instruments such as drafts and cheques.

Paper: BBA-302-Principles of Retailing

CO1: To comprehend the students with the knowledge of the concept and importance of retailing in Indian economy.

CO2: To impart the knowledge about the functions and classifications of retailers, the concept of organized and unorganized retail.

CO3: To make the students learn about the psychology of retail customer, stages of customer buying process and how a retail customer takes a buying decision.

CO4: To acquaint them with the knowledge of types and process for choosing store location, retail store layout and design and importance of both for a retailer.

CO5: To make the students learn about the different types of retail organization structures, merchandise planning, merchandise budget and control. It also helps in imparting the knowledge about various technologies used in retailing.

Paper: BBA-303-Principles of Banking

CO1: Acquaint the students with the concept, classification and legal framework of regulation and banks.

CO2: To impart the knowledge about The RBI Act, 1934, its amendments and functions.

CO3: Assimilate with the banking reforms like corporate banking, rural banking, retail banking, international banking etc. It also talks about e-banking reforms in banking after 1991.

CO4: To make the students understand about the concept of banker-customer relationship and sector lending and performance analysis of banks.

CO5: Acquaint the students with the concept of banking technology and various security issues.

Paper: BBA-304-Fundamentals of E-Commerce

CO1: Enable the students with the understanding of the foundations & importance of E-Commerce.

CO2: To make the students learn about the retailing in E-Commerce by studying various types of E-Commerce.

CO3: To acquaint the students with the concept of impact of E-Commerce on business models & strategy and Internet trading relationships including Business to Consumer, Business to Business etc.

CO4: To provide them with the understanding of the key features of Internet, Intranets & Extranets & explain how they relate to each other and privacy issues in E-Commerce.

CO5: To Assess electronic payment systems and recognize & discuss global E-Commerce issues. It also describes about the concept of intelligent agents, web-based marketing and control in risk management.

Paper: BBA-305-EXPORT PROCEDURE & DOCUMENTATION

CO1: To make the students learn about the procedure and formalities in entering the export business.

CO2: To give a description of the key documents required in export business and various stages and roles played by various parties in processing of an export order.

CO3: Acquaint the students with the concept of the methods of payments in international business and institutional infrastructure for Indian exporters.

CO4: To make the students learn about the latest Exim policy and various export incentives and schemes available for the exporter.

CO5: To make the students learn about the management of risk in export business.

Paper: BBA-306-Principles of Production Management

CO1: Acquaint the students with the concept of production system and decision making in production function.

CO2: To impart the knowledge about the concept of production management, production planning and control and production process.

CO3: Assimilate with the concept of storage, warehousing, ordering and purchasing.

CO4: To make the students understand about the techniques of inventory control like ABC, EOQ, FIFO, LIFO etc.

CO5: To impart the knowledge about the techniques of statistical quality control in production and ISO certification.

Semester-6th

Paper: BBA-308-Entrepreneurship Development

CO1: To acquaint the students about the concept of Entrepreneur, role and functions of entrepreneur in economic development; economic, social and psychological need for entrepreneurship; life cycle of a new business, factors affecting success of a new business.

CO2: To develop the understanding among the students about the Feasibility study, economic, technical, financial and managerial feasibility of project; selection of factory location; demand analysis and market potential measurement; capital and project costing; working capital requirements; source of finance; profit and tax planning.

CO3: To acquaint the students about the concept of Entrepreneurial strategies & Business plan. It helps the students in preparation of business plan with their components.

CO4: It will enable the students in understanding the stages of New Venture Development.

CO5: Comprehend the knowledge about the Government support and incentives to new enterprise; role of govt., promotional agencies and institution in entrepreneurship development; entrepreneurship development programs; Start-up India; Skill India.

Paper: BBA-309-Business Law-II

CO1: Developing the understanding the legal aspects relating to promotion and establishment of companies in India according to Indian Companies Act-2013.

CO2: To acquire the knowledge about how articles and memorandum of association are important in studying the objectives and charter of company and to give basic knowledge of procedure followed for issuing prospectus in the market which is required when you start your own company

CO3: To develop the understanding among the students about the provisions & legal implications of Security Exchange Board of India (SEBI).

CO4: To analyse the legal rule and borrowing powers and qualities of directors and managers for setting up a new venture & to gain knowledge of how to work under pressure in companies and how to deal with oppression and mismanagement.

CO5: To understand the legal implications in winding up of the company.

Paper: BBA-310-Logistics Management

CO1: Acquaint the students with the role and importance of logistics in today's scenario.

CO2: To impart the basic knowledge of various components of logistics which provide effective consumer service to all the concerned parties.

CO3: To make the students understand about the concept of customer services, warehousing and transportation.

CO4: Assimilate with the concept of supply chain management works and how it is helpful in starting your own venture in supply management.

CO5: To make the students understand about the system of inventory control management and role of technology in logistics.

Paper: BBA-311-Principles of Insurance

CO1: To impart the knowledge about the concept of Insurance and role of insurance in the economic development of a country.

CO2: Assimilate with the principles, practices, parties to the contract and other essential elements of the contract of life insurance.

CO3: Acquaint the students with the concept, principles, conditions and claim settlement procedure of general and life Insurance.

CO4: To make the students learn about the documentation in general and life insurance contracts.

CO5: To impart the knowledge about the concept of IRDA Act, 1999 and its guidelines for life and non-life insurance.

Paper: BBA-312-Introduction to Financial Services

CO1: To study the role and importance of financial services provided by financial institutions in modern world.

CO2: To get knowledge of saving and investment pattern related to various schemes of mutual funds, health and life insurance

CO3: To have basic knowledge of procedure followed by credit rating agencies for rating and

accreditation of companies

CO4: To have understanding of credit and debit cards & Lease financing companies in India.

CO5: To impart the knowledge about the concept of Merchant Banking & the concept of factoring in India.

COURSE LEARNING OUTCOMES

Name of the Programme: M.Com.

Semester 1

Paper: MC 101 Organizational Behaviour

CO1: It will make the students acquainted with the concept of Organizational Behaviour and the different approaches to organizational behavior.

CO2: It will impart the knowledge of the concept of Personality, determinants and various theories of personality.

CO3: Students will understand the concept of Perception and Learning, factors affecting and the managerial implications of the same.

CO4: The students will be able to acquire the knowledge of the Group Dynamics and its impact on the productivity.

CO5: It will help the students in understanding the concept of Transactional analysis and benefits of the same.

Paper: MC 102 Business Environment

CO1: To make the students learn about the concepts of business environment its scope and impact of the interaction mix of the different factors on the business.

CO2: It will help the students in developing the understanding about Economic planning, Business Ethics, Corporate governance and Corporate social responsibility.

CO3: The students will gain the knowledge of Fiscal policy, monetary policy, industrial policy, industrial licensing policy, EXIM policy of the government of India.

CO4: To endeavor the students about the Environment Protection Act, Consumer Protection Act, Foreign Exchange Management Act and Right to Information Act.

Paper: MC 103 Managerial Economics

CO1: The students will be able to exhibit the knowledge of concepts of managerial economics, Demand analysis and Production analysis.

CO2: It will assimilate the students about the determination of price under different market conditions and application of the same in solving real business problems.

CO3: The students will be able to get to know about the different phases and theories of business cycles.

CO4: To comprehend the students with the concept, characteristics, types of inflation and the effects of inflation on business.

Paper: MC 104 Company Law

CO1: It will enable the students to gain an in-depth knowledge of the history of company law, definition and characteristics of company under it, Memorandum of Association and Articles of Association.

CO2: To comprehend the knowledge about the concept of share capital, mortgages, membership, etc.

CO3: To make the students understand the appointment, powers and legal position of directors and company meetings, resolution and minutes.

CO4: Assimilate the students with the concept of Reconstruction, Amalgamation, prevention of oppression and winding up of companies.

Paper: MC 105 Accounting for Management Decisions

CO1: The students will acquire the knowledge about the conceptual framework of Management Accounting, Management Information System and Reporting.

CO2: The students will be able to further explore the concept of Responsibility Accounting and Divisional Performance Measurement and Budgeting.

CO3: It will comprehend the students about the Standard Costing and Variance Analysis and practical application of the same.

CO4: To impart the knowledge about the concepts of Marginal Costing and Break-even Analysis and the managerial applications of the same, along with the different contemporary issues in Management Accounting.

Paper: MC 106 Marketing Management

CO1: To disseminate the knowledge about the concepts of Marketing and evolution of marketing, managing the marketing mix and marketing environment.

CO2: It will help in learning about the Information system, marketing research and understanding the consumer behavior along with customer relationship management.

CO3: To help the students understand the concept of Product, new product development and strategies to be adopted in different phases of product life cycle.

CO4: To comprehend with the Price, promotion, distribution strategies to be opted for, along with entailing the social, ethical, legal aspects of marketing.

Semester- 2

Paper: MC 201 Human Resource Management

CO1: The students will be able to define the concepts of Human Resource Management, Global HRM and Human resource planning.

CO2: It will help the students in understanding the concepts of Job analysis, Recruitment, Selection, Induction and Placement.

CO3: It will enable the students in comprehending about dealing with the workforce, employee training, career planning and development.

CO4: The students will be able to acquire the knowledge about the significance of compensation, incentives, Job satisfaction and job stress management.

Paper: MC 202 International Business Environment

CO1: The students shall be able to exhibit the knowledge of International Business, conceptual framework for the international business environment, and multinational corporations.

CO2: It will help the students in gaining insights about the Technology transfers, Foreign investment and the international economic institutions.

CO3: The students will have clarity about the Regional economic cooperation institutions like EU, NAFTA, SAFTA, ASEAN.

CO4: To disseminate the knowledge of the Foreign exchange markets, exchange rate determinants, foreign exchange risk.

Paper: MC 203 Strategic Marketing

CO1: It will help the students in understanding the concept and hierarchy of strategies, strategic role of marketing, strategic marketing planning process, business strategies and their marketing implications.

CO2: To assimilate with the ability of analyzing the internal and external environment, SWOT analysis, market segmentation, targeting and positioning.

CO3: Elaborate on the concept of marketing strategies for new market entries and for mature and declining markets.

CO4: To make the students understand the relationship between business strategies and marketing mix with controlling and implementation of marketing strategies.

Paper: MC 204 Financial Management & Policy

CO1: Disseminate about the concept of financial management, functions of finance executive, time value of money and recent developments in financial management.

CO2: Exhibit the knowledge of the Financial planning and forecasting and the different techniques used therein along with the practical application of the same in real business scenarios..

CO3: Understanding the concept of cost of capital and computation of cost of capital including CAPM.

CO4: Assimilate the students with the knowledge regarding the decisions to be taken under working capital management and capital budgeting.

Paper: MC 205 Corporate Accounting

CO1: It will help the students in understanding the accounting treatment of Issue, forfeiture and valuation of shares.

CO2: To assimilate with the ability of maintenance and preparation of the Final accounts of companies, Amalgamation, absorption and reconstruction.

CO3: Elaborate on the concept of Human resource accounting, lease accounting and to enable the students in preparation of the consolidated financial statements of holding and subsidiary companies.

CO4: To make the students understand about the corporate reporting requirements, periodic reporting, segment reporting, social reporting and harmonization in the corporate reports.

Paper: MC 206 Business Statistics

CO1: Disseminate about the concept of the Multiple regression and correlation, Partial correlation.

CO2: Understanding the construction and application of index numbers in practical scenarios and in solving real life problems.

CO3: Assimilate the students with the knowledge of analysis of time series and application of the same in making decisions regarding forecasting in different business activities.

CO4: Exhibit the knowledge of the theory of probability, various approaches and theorems of probability and probability distributions.

Semester-3

Paper: MC 301 Computer Applications in Business

CO1: To comprehend the students with the computer system, basic computer software and hardware, System software and application software.

CO2: It endeavors the students with the understanding of databases, tables, queries, form generation and Fuzzy logic.

 CO3: It will help the students to get the knowledge about the Information Technology in Business, LAN, topologies, WAN, electronic data processing.

CO4: Disseminate with the knowledge of the concept of Intranet and extranet, World Wide Web, Multimedia technologies, and planning and designing of web pages.

Paper: MC- 302 Advanced Financial Management

CO1: To endeavor the students with the understanding of the concept of dividend decisions, capital structure decisions and various factors affecting the same.

CO2: Comprehend the students with the concept of the Corporate restructuring and the techniques to be adopted for the same by the companies.

CO3: To impart the knowledge of the Mergers and Takeovers, valuation and financing of mergers and takeovers along with various problems associated with mergers and takeovers in India.

CO4: Students will explore about the process of Financial Restructuring, reorganization of capital and financial management of sick units.

Paper: BC-304 Financial Institutions and Markets

CO1: To acquaint the students about the concept and role of financial system, financial markets and role of financial system in the economic development.

CO2: To develop the understanding among the students about the money market and capital market and recent developments in the Indian capital market along with the role of SEBI.

CO3: Comprehend the knowledge about the concept, functions and objective of development banks, state development banks and state financial corporations.

CO4: To impart the students with the knowledge of objectives and functioning of Merchant bankers, and mutual fund schemes.

Paper: BC-309 Advertising Management

CO1: To make the students learn about concept of advertising, communication process, advertising management process and ethics and advertising, and determining advertising objectives and budget.

CO2: Help the students in analyzing the concept of copy development and testing.

CO3: Comprehend the students with the knowledge of the media planning, print, broadcasting media and scheduling.

CO4: It enables the students in understanding about the organization and control of advertising efforts and evaluating the effectiveness of the advertising strategies adopted.

Paper: MC-310 Applications of Statistical Methods in Business

CO1: To comprehend the students with the knowledge of the probability and non-probability methods of sampling, sampling and non-sampling errors and efficiency of the sampling and non sampling methods.

CO2: To develop the skills of estimation and hypothesis testing using suitable approaches and different Non-parametric tests like sign test, Kruskall Wallis H test.

CO3: To make the students learn about the techniques of statistical quality control, quality control charts etc.

CO4: To acquaint them with the advanced statistical techniques like ANOVA, Discriminant analysis, factor and cluster analysis.

Paper: MC 316 Human Resource Development

CO1: Enable the students with the Human Resource Development: Concept, goals, scope, principles and functions; approaches to Human Resource Development; Human Resource Management and Human Resource Development.

CO2: To make the students learn about the Knowledge Management: meaning and forms of knowledge, barriers to knowledge management; Learning and HRD: meaning, principles, process and theories of learning, learning styles and strategies; Role analysis for HRD, Competency Mapping.

CO3: To acquaint the students with the Employee Socialization and Orientation, socialization approaches; Assessing HRD needs; Designing Training and Development programme; Implementation and Evaluation of training and development programmes.

CO4: To provide them with the understanding of the concepts of Organisation health, Organisation climate.

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Semester- 4

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Paper: MC 401 IT & E-commerce

CO1: To make the students learn about the concept of E-commerce:, business applications of e-commerce, Business models in E-commerce – e-shops, e-procurement, e-auctions, value chain integrators, information brokerage, telecommunication, collaboration platforms, etc.

CO2: To give a description of the Electronic payment system; E-Banking – concept, operations. Online fund transfer – RTGC, ATM, etc., Online share market operations.

CO3: Acquaint the students with the concept of Online marketing, Web-based advertising; Search engine, Email marketing; Social Networking and marketing – promotion, opinion formulation, Viral Marketing.

CO4: To make the students learn about the E-retailing, CRM and Information Technology, Tools to conducting online research, data mining from social networking sites; Cloud computing, Enterprise Resource Planning; Security issues in e-commerce, Privacy issues; Cyber laws including Information Technology Act.

Paper: MC 406 Multinational Financial Management

CO1: To disseminate the knowledge about the concept of International Financial Markets and Instruments, Role of financial intermediaries. International Capital and Money Market Instruments: GDRs, ADRs, IDRs, Euro bonds, Euro loans, Repos, CPs, Floating rate instruments, Loan syndication and Euro deposits.

CO2: Making the students learn about the Multilateral financial institutions: IMF, IBRD and European monetary system.

CO3: Acquaint them with the knowledge of Foreign Exchange Markets: Exchange rate theories; Fixed and flexible exchange rate system; Exchange rate quotes; Spot rates, forward exchange rates, forward exchange contracts; Foreign Exchange Management Act

CO4: To make them understand the knowledge of the Foreign Exchange Risk: Transaction exposure, translation exposure and economic exposure.

Paper: MC 407 Stock Market Operations

CO1: To acquaint the students about the Securities Markets, New financial instruments, Trading Mechanism, Internet based Trading.

CO2: To develop the understanding among the students about the National stock exchange, Cash and forward transactions, Share prices index.

CO3: Comprehend the knowledge about the role and need of Depositories, The Depository Act 1996, SEBI 1996, NSDL Ltd.

CO4: To impart the students with the knowledge of Derivative Trading, Futures and options, raising funds from International markets, FITs, ADRs, GDRs.

Paper: MC 411 Consumer Behaviour

CO1: It will enable the students in understanding the Consumer Behaviour, Theory and applications and Consumer buying process.

CO2: Assimilate the students effectively with the Internal Determinants of Consumer Behaviour, Consumer Perception; Learning: Attitude and attitude change; Personality; Psychographics; Values and life-style.

CO3: Disseminate the students with the External Determinants of Buying Behaviour, Influence of culture; Sub-cultural aspects of consumer behavior..

CO4: Developing the knowledge among students about the Opinion Leadership and Diffusion of Innovations: Opinion leadership-process, diffusion and adaptation process, Models of buyer behavior.

Paper: MC 412 Rural Marketing

CO1: To make the students learn about the concept, opportunities and challenges to rural market in India; Rural marketing environment.

CO2: Developing an understanding of the concepts of Rural marketing research; Rural consumer behavior; Segmenting rural markets; Rural marketing strategies; Rural market vs. urban market; New Product development for the rural market.

CO3: To enable the students to understand the concept of Rural marketing mix; Media planning for rural markets; Personal selling in rural market.

CO4: Inculcating the ability to explore about Marketing of consumer durables and non durables; Marketing of agricultural produce; Ecommerce in rural markets.

Paper: MC 415 International Human Resource Management

CO1: To make the students learn about the concept of International Management, recent trends, and Schools of thought of international management

CO2: To learn the application of Comparative Management; importance and scope; Models of comparative management; Issues in comparative management: legal, political, ethical and cultural.

CO3: To provide the knowledge regarding the Management styles and practices in US, Japan, China, Korea, Europe and India; Organisational design in different countries.

CO4: Assimilate the students with the Trans-national Organizational Behaviour and human resource management; motivation, perception, leadership, communication, job satisfaction, etc; and managing multinational business operation.

Programme Outcomes

B.Com. (General)

PO1: The students will understand the importance of business and inculcate the managerial and business skills.

PO2: It will enable them to understand the conceptual framework of accounting and gain the skills of preparation and maintenance of accounts.

PO3: Students will acquire the skills to independently establish and operate their business and to develop effective managerial and entrepreneurial mindset.

PO4: To inculcate value system and ethics.

PO5: To enhance good communication skills and development of overall confident personality eventually leading to a successful personal and professional life.

PO6: To develop competency among students in order to equip them with skills in the context of different areas like marketing manager, sales manager, production manager, finance manager etc.

PO7: To help them acquire knowledge about the various concepts like costing, banking, finance, insurance, financial accounting, organizational behavior.

PO8: To equip them with the knowledge of practical applications of different computer software and application software used in business.

Programme Specific Outcomes

B.Com. (General)

PSO1: It will enable the students to apply the various concepts of business in establishing and starting the business along with keeping in mind the business ethics and social responsibility.

PSO2: To equip them with the skills of preparation and maintenance of the financial statements using the accounting concepts and principles.

PSO3: Instituting them with the skills of practical application and implementation of the theories and strategies of different areas like economics, financial management, business management, organizational behavior, marketing, etc.

PSO4: To inculcate the knowledge about various statistical tools used in corporate world.

PSO5: They can build their career as management accountant, chartered account, company secretary, teacher, computer operator, tax consultant, etc.

Progamme Outcomes

B.Com. (Hons.)

PO1: This course will be helpful in acquiring managerial, legal and entrepreneurial skills to set up their business independently.

PO2: Instilling effective communication skills to make the students capable of presenting themselves at workplace and social interaction.

PO3: The students will acquire sufficient knowledge for maintaining various types of accounts required in business.

PO4: To strengthen their capacities in developing their careers in different fields like sales manager, finance manager, production manager, etc.

PO5: The students will be able to do tax planning and filing of income tax and GST returns.

PO6: To equip them with necessary skills required for preparing and maintaining the computerized accounts with the help of software like Tally.

PO7: To make them understand role of team spirit and maintaining good relations for the growth of the concerned business and to maintain harmony in the society.

PO8: Inculcate the skills to make their career in the field of audit, digital advertising, banking, insurance, tax consultant and other finance related services.

Programme Specific Outcomes

B.Com. (Hons.)

PSO1: To enable them in maintain various types of accounts as per Indian Accounting standards.

PSO2: Equip them with effective communication skills to develop healthy workplace culture and maintaining good social relations with various stakeholders of business and society.

PSO3: Inculcate skills among them for critical thinking and analysis eventually leading to better decision making in the areas of finance and economics.

PSO4: Assimilate the students with various approaches and theories of management & finance to be used globally.

PSO5: Instilling them with the capabilities required in building careers in the area of finance, marketing, digital advertising, tax consultancy, human resource manager, banking and insurance and other service sectors.

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Programme Outcomes

M.Com.

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PO1: Comprehend them with effective communication skills to present themselves in a constructive way at workplace as well as building harmonious relations in society.

PO2: Instilling them with good leadership, legal, managerial and entrepreneurial skills for better decision making.

PO3: To inculcate critical and analytical thinking to provide the platform for doing quality research.

PO4: To enable them developing innovative ideas and entrepreneurial mindset for establishing start ups.

PO5: To equip them with the skills of decision making abilities related to various business areas.

PO6: To build strong mindset for solving business, economic and other life related problems.

PO7: Enable them in building career in the fields of finance, marketing, banking, teaching, insurance, research, tax consultancy and other service sector.

PO8: Enhancing the adaptability and sociability to make them survive in ever changing scenario.

PO9: To equip the students with social values, ethics and environmental consciousness for their holistic development.

Programme Specific Outcomes

M.Com.

PSO1: To make them understand the financial and marketing concepts in the context of national and international problems, responsibilities and their solutions.

PSO2: To inculcate the computer skills and its applicability in business with the help of concept like e-commerce, m-commerce and e-business.

PSO3: To develop the research aptitude and its application in solving the contemporary issues related to commerce and management.

PSO4: To equip them with the abilities to make maximum utilization of resources like finance, human resources, etc.

PSO5: Students can make their career in the fields of marketing, banking, human resources, insurance, tax consultancy, auditing, logistics and other professional courses like CA, CS, CMA, Financial Analyst.etc.

DEPARTMENT OF ENVIRONMENT STUDIES

COURSE OUTCOMES (CO) (B.A./ B.Sc./ B.Com./ BBA/ BCA)

Course Title	Environmental Studies
	Course Outcome
CO1.	Understanding the multidisciplinary nature of environmental studies.
CO2.	To make students understand about renewable and non-renewable resources
CO3.	Cultivate habit of recycling for safeguarding the environment.
CO4.	To make students aware about social issues and environment

COURSE OUTCOME of B.A. Economics

Semester I

Course Code - EC21

Course Name- Microeconomics – I

COs: After successfully completing this course, students will be able to know

- How to deal with the problem of making choices in the scarcity of resources at the level of an individual consumer or producer
- Why and how much demand will respond to changes in prices
- Understand consumer behavior and producer behavior
- Understand the concepts of costs and revenue

Semester II

Course Code - EC22

Course Name- Microeconomics – II

COs: After successfully completing this course, students will be able to know

- About the different types of market i.e. perfect competition, monopoly, monopolistic competition and oligopoly and understand the basis of the classification of markets into different types.
- How price and output are determined under different forms of market.
- About the different factors of production i.e. land, labour, capital and entrepreneur and theories concerning the distribution of factor shares among different factors of production.

Semester III

Course Code - EC23

Course Name- Macroeconomics – I

COs: After successfully completing this course, students will be able to

- Know about the economic problems at the level of the economy as a whole
- Understand how there is a flow of national income among four sectors i.e. household sector, producing sector, Government and Rest of the world.
- Learn the concepts of domestic territory, normal residents for the purpose of calculation of National Income
- Have a practical knowledge of calculation of national income using different methods: Value Added Method, Income Method and Total Outlay Method.
- Understand what Classicals and Keynesians said about the determination of equilibrium level of income and employment.
- Understand the concepts of consumption function, saving function, relationship between APC-APS and MPC-MPS, Understand the Investment function, Marginal Efficiency of Capital in detail

Semester IV

Course Code - EC24

Course Name- Macroeconomics – II

COs: After successfully completing this course, students will be able to

- Understand the concepts of multiplier and accelerator and their working in an economy and their impact on steering the growth wheel.
- Understand why we demand money (Classical and Keynesian approaches) and how the monetary authority ensures money supply in an economy.
- What causes inflation (demand pull and cost push) and what are its effects on different sections of the society.
- Phillips curve analysis which will help the future policy makers in establishing the trade-off between inflation and unemployment.

- Phases of business cycles in an economy, viewpoints of economists (Hicks, Samuelson) on causes of business cycles.
- How interest rate is determined in the economy (classical and Keynesian views)

Semester V

Course Code - EC25

Course Name- International Economics

COs: After successfully completing this course, students will be able to

- Know about International trade, views of classical and Modern theorists on which commodities are to be exported and imported, factors governing the terms of trade between trading nations.
- How international trade serves as an engine of growth.
- Balance of payments account of a country and how demand and supply of foreign exchange determines the exchange rate.
- Role of WTO in boosting trade

Semester VI

Course Code - EC26

Course Name- Public Finance

COs: After successfully completing this course, students will

- Know about Public Finance, how government collects revenue and spends it on different heads.
- Know about fiscal policy and its broader components i.e. public expenditure, taxes, public debt and deficit financing in detail.
- About the impact and incidence of different types of taxes and how the government endeavours to ensure equitable distribution of income, increase production and employment and promote economic growth through its fiscal policy.

Kurukshetra University, Kurukshetra
Name of the Programme: BA (Marketing Management)
Duration: 3 Years

After completion of the BA (Marketing Management) Programme that aims at providing comprehensive insight into marketing management, the students shall be able to:

PO1	Capable of demonstrating comprehensive disciplinary Knowledge gained during course of study.
PO2	Develop an ability to communicate clearly, in an organized manner, the concepts of marketing in both oral written work.
PO3	Acknowledge roles of entrepreneurs, businessmen, managers and consultant etc., which will help leaners to possess knowledge and other soft skills and to react aptly when confronted with critical decision making.
PO4	Knowledge and skills that are learnt during the course are applied in realistic situations throughout the life.
PO5	Students can independently start up their own business with requisite knowledge of marketing aspects of entrepreneurship.
PO6	Develop self-confidence and can also start work independently and in a team.
PO7	Students can pursue higher education in marketing. Students can also pursue professional courses like MBA after completing their graduation.
PO8	Knowledge gained during this course will equip students with skills to compete worldwide.
PO9	Students learn traditional and modern strategies and practices of marketing to become a successful entrepreneur.
PO10	Understanding of how marketing fits with the other business disciplines within an organization.
PO11	Demonstrate the ability to critically evaluate a marketing programme from consumer and marketing practitioner viewpoints, including considerations of ethical implications.

Name of Programme: B.A. (Marketing Management)

Paper: Principles of Marketing

Class: B.A. Semester-I (Principles of Marketing)
Course Outcomes: At the end of this course, the students will be able to: CO 1: Understand the fundamental concepts of marketing and the scope of marketing covering different functions of a marketing. CO2: Able to develop a suitable marketing mix for a given marketing objective of a company. CO 3: Analyze the market based on segmentation, targeting and positioning environment for segmenting the consumer market. CO 4: Understand the theories of consumer behavior and factors influence the consumption process. CO 5: Understand the product concept and different product strategies of marketing. CO 6: Able to recommend a suitable strategies for various stages in the life cycle of the product. CO 7: Able to develop product identification by branding, packaging and labelling.

Name of Programme: B.A. (Marketing Management)

Paper: Principles of Marketing

Class: B.A. Semester-II (Principles of Marketing)
CO 1: Understand the recent trends in marketing.   CO 2: Evaluate traditional and digital channels of distribution options for a given company and their suitability for the company's product.   CO 3: Develop a suitable promotion mix (advertising, sales promotion, public relations, personal selling, and direct marketing etc.) for the product promotion.   CO 4: Understand various pricing policies, factors influencing pricing and different pricing strategies used by marketer to compete in market.   CO 5: Understand international marketing environment, India's presence in international marketing and international marketing strategies.   CO 6: Able to develop a suitable marketing mix i.e. product, price, place, promotion, physical evidence, people and process for marketing of services to achieve the marketing objectives.

Name of Programme: B.A. (Marketing Management)

Paper: Sales Management

Class: B.A. Semester-III (Sales Management)

CO 1: Understand, discuss and be able to critically analyses the role of the sales function as a part of an organization's marketing strategy.

CO 2: Analyze the role and importance of Salesman in promoting sales, Personal selling and its objectives

CO 3: Understand and evaluate the different stages of the sales process.

CO 4: Identify, explain and use tools and techniques necessary to be successful in personal selling in both national and international contexts.

CO 5: Identify the essential activities that are involved in salespeople recruiting and selection process.

CO 6: Appreciate the advantages and the disadvantages of different sales force organization structures.
CO 7: Understand the essential activities that are involved for training and motivation of sales
Force.

Name of Programme: B.A. (Marketing Management)

Paper: Advertising

Class: B.A. Semester-IV (Advertising)
CO 1: Understand the nature and significance of advertising and its economic role.
CO 2: To understand the role of communication in marketing, its process and models.
CO 3: Understand the economic, legal, ethical and social aspects of advertising.
CO 4: To know approaches of determining the size of advertising budget and its social effects.
CO 5: Enhance advertisement copy development skills, advertising testing and media planning.
CO 6: Know the methods for testing advertisement effectiveness and the role of advertising agencies.
CO 7: Understand the advertisers and advertising agencies relationship and how these relationship can be make better.

Name of Programme: B.A. (Marketing Management)

Paper: Rural Marketing

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Class: B.A. Semester-V (Rural Marketing)

CO 1: Understand the opportunities, challenges, growth and scope of rural marketing.

CO 2: Know the concept of rural marketing research and examine the difference urban and rural market.

CO 3: Discuss the role of media in rural marketing and main challenges in rural communication.

CO 4: Understand the factors influencing rural consumer behaviour and their brand loyalty.

CO 5: Understand different marketing strategies i.e. product, price, place & promotion based on the rural marketing environment.

CO 6: Analyze the market based on segmentation, targeting and positioning environment for segmenting the rural consumer market.

Co 7: To know E-commerce and innovation in rural market, recent initiatives in rural market.

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Class: B.A. Semester-VI (Retail Management)
CO 1: Knowledge of retailing concepts and functions of retail business.
CO 2: Understand traditional retail format and modern retail format.
CO 3: Articulate and implement industry standard approaches to the site selection, store planning and visual merchandising.
CO 4: Understand the security issues in retailing and how to minimize the retail threats by using IT technology.
CO 5: Understand the various strategies involved with retail sectors to bring market skill in place.
CO 6: Understand the recent trends in retailing in India.
CO 7: Knowledge of various information technology tools to make retailing transactions more effective.

संस्कृत विभाग, आई. बी. स्नातकोत्तर महाविद्यालय, पानीपत
पाठ्यक्रम विशिष्ट परिणामः स्नातक कक्षाएं
विषयः संस्कृत ऐच्छिक

प्रथम सत्र

- श्री नारायण पंडित द्वारा विरचित हितोपदेश के मित्रलाभ की सरल पशुकथाओं के माध्यम से जीवनोपयोगी ज्ञान प्राप्त होगा।
- भर्तृहरिकृत 'नीतिशतकम्' के श्लोकों में निहित गूढ़ सूक्तियों व जीवंत उदाहरणों से सामाजिक व व्यावहारिक ज्ञान की प्राप्ति होगी।
- शब्दरूपों व धातुरूपों के स्मरण से संस्कृत भाषागत शाब्दिक ज्ञान विकसित होगा।
- वर्ण संधियों के ज्ञान से मौलिक शब्द संरचना का ज्ञान।
- श्लोक कंठस्थ कर अभ्यास करने से उच्चारणगत अशुद्धियों का निराकरण।

द्वितीय सत्र

- श्रीमद्भगवद्गीता के 'सांख्ययोग' नामक द्वितीय अध्याय का व्याख्या पुरस्सर अध्ययन कर अध्येता गीता के प्रमुखतम कर्म सिद्धांत को जानेंगे एवं उन्नत कर्म करणार्थ प्रेरित होंगे।
- पुनः भर्तृहरि जी के अनुभवप्रसूत श्लोकों से मानविक गुण-दोषों का ज्ञान होगा।
- पूर्व सत्र से आगे बढ़कर अनेकानेक शब्दरूपों व क्रियापदरूपों का ज्ञान। कर्तादिकारकों का अध्ययन करके संस्कृत-वाक्य-निर्माण सीखेंगे।
- संस्कृत काव्य के शरीरभूत छंदों का लक्षणोदाहरण सहित ज्ञान प्राप्त करेंगे।

तृतीय सत्र

- महाभारत पर आधारित नाटक 'पंचरात्रम्' के अध्ययन से तत्कालीन राजनीति व लोकचर्या की जानकारी होगी।
- विद्यार्थी संस्कृत साहित्य के रचियताओं का विशद परिचय व नाटकों में प्रयुक्त पारिभाषिक शब्दों का अधिगम करेंगे।
- व्याकरण में समास का अध्ययन करेंगे। धातुओं से कृत् प्रत्ययों का संयोजन कर शब्दनिर्माण सीखेंगे।
- संस्कृत वर्णमाला (प्रत्याहार सूत्रों) यह स्मरण कर उनका प्रयोग सीखेंगे।संस्कृतभाषा में पत्रलेखन का अभ्यास करने से लेखन क्षमता विकसित होगी।

चतुर्थ सत्र

- रघुवंशी राजा दिलीप के चरित्र के माध्यम से राज्यधर्म व गुरु-आज्ञापालन, सेवा आदि गुणों का ज्ञान स्वतः प्राप्त होगा।
- 'शिवराजविजयम्' उपन्यास के अध्ययन से विदेशियों द्वारा आक्रांत भारतवर्ष की विषम स्थितियों की ऐतिहासिक जानकारी मिलेगी।
- छात्र वाच्यों का अध्ययन करेंगे साथ ही वाच्य -परिवर्तन भी सीखेंगे।
- तद्धित प्रत्ययों का प्रयोग जानकर भाषा की शुद्धता सीखेंगे। इससे छात्रों के शब्दभंडारमें भी वृद्धि होगी।
- सरल वाक्यों का हिन्दी से संस्कृत में अनुवाद सीखेंगे।

पंचम सत्र

- नाटकों में सर्वश्रेष्ठ 'अभिज्ञानशाकुन्तलम्' के अध्ययन से बहुत रुचिपूर्ण ढंग से सामाजिक,व्यावहारिक एवं राजनैतिक ज्ञान प्राप्त होगा कवि ने अद्भुत उपमाओं का वैचित्र्यपूर्ण वर्णन किया है जिससे छात्रों का बौद्धिक विकास होगा साथ ही नाटक के अध्ययन से कविशिरोमणि कालिदास जी के जीवन, बहुमुखी प्रतिभा रचना कौशल व लेखन शैली का ज्ञान होगा।

- छात्र वैदिक साहित्य (संहिता ब्राह्मण आरण्यक उपनिषद् आदि) शास्त्रों का ज्ञान प्राप्त कर सकेंगे।
- प्रथमादि सप्तमीपर्यंत विभक्तियों के विधायकसूत्रों की व्याख्या करने में सक्षम होंगे।वाक्य विन्यास सीखेंगे वह उन में अशुद्धि शोधन करना सीखेंगे।
- छात्र काव्यालंकरणभूत अनुप्रासादि अलंकारों की लक्षण– उदाहरणसमेत संगति करना सीखेंगे।

षष्ठ सत्र

- महाकवि द्वारा सूक्ष्मेक्षिकया वर्णित भू-आकाश के प्राकृतिक सौंदर्य से परिचित होंगे।इस नाटक के माध्यम से छात्र स्वतः कवि के वर्णन कौशल को उजागर कर सकते हैं।
- संस्कृत साहित्य के इतिहास का अध्ययन कर प्रमुख वह प्रसिद्ध रचनाकारों तथा उनकी रचनाओं का सामान्य परिचय प्राप्त करना।
- पाणिनीय व्याकरण के स्त्रीप्रत्ययप्रकरणगत सूत्रों की सोदाहरण सूत्र व्याख्या करना।
- छात्र सरल विषयों पर संस्कृत में निबंध लेखन करने में भी सक्षम होंगे।

तृतीय सत्र

- छात्र गद्य एवं मध्य का पृथक् पृथक् अध्ययन करके उसमें विभेद कर पाएंगे।
- संलग्न वेद मंत्रों के उच्चारण एवं अर्थविबोध में सक्षम होंगे।
- वाल्मीकीय रामायण के श्लोकों के माध्यम से धर्मशील श्रीराम के चरित्र का अध्ययन करेंगे। सज्जनों के अनुकरण की शिक्षा मिलेगी और अधर्माचरण के दुष्परिणामों को जानेंगे।
- तैत्तिरीय उपनिषद के प्रसिद्ध 'अनुशासन' भाग का अध्ययन करेंगे।
- पंचतंत्र वह हितोपदेश की सरल पशुकथाओं से जीवनोपयोगी तथ्य प्राप्त करेंगे ।
- संस्कृत क्रियापदरूपों का स्मरण करेंगे एवं वर्ण संधि सीखेंगे।

चतुर्थ सत्र

- अध्येता महाभारत गत अनेक उपदेशों का अध्ययन करेंगे। दारिद्रय की अभिशप्त स्थिति को जानेंगे।समाज व विश्व में दंड की महत्ता की जानकारी मिलेगी।
- श्रीमद्भगवद्गीता के स्थितप्रज्ञ प्रकरण का विशद वर्णन पढ़ेंगे, कर्मयोग का परिचय जानेंगे।
- अर्थशास्त्रगत नीति नियमों का ज्ञान होगा।
- विभिन्न शास्त्रों में उक्त मित्रता की परिभाषा को जान पाएंगे।
- सहज कथाओं द्वारा मानवीय गुण दोषों का परिशीलन करेंगे।
- शाब्दिक ज्ञान में वृद्धि होगी।

हिन्दी विभाग, आई. बी. स्नात्कोत्तर महाविद्यालय, पानीपत
पाठ्यक्रम विशिष्ट परिणाम: स्नातकोत्तर कक्षाएं

स्नात्कोत्तर पूर्वार्द्ध, प्रथम सेमेस्टर

भाषा विज्ञान एवं हिन्दी भाषा: भाषा और भाषा विज्ञान, स्वन विज्ञान, रूप विज्ञान, वाक्य विज्ञान एवं अर्थ - विज्ञान :-

भाषा – विज्ञान, भाषा – व्यवहार, भाषा संरचना और भाषिक प्रकार्य के माध्यम से भाषा के अध्ययन की दिशाएं एवं उसकी उपयोगिता को समझ पाएंगे।

स्वन विज्ञान के अध्ययन के द्वारा वाग्यंत्र के कार्य समझ कर उच्चारण में शुद्धता ला पाएंगे।

रूप एवं वाक्य विज्ञान के अध्ययन से वाक्य बनावट की गहनता को समझने के साथ ही भाषा के स्वरूप एवं अर्थ को समझ पाएंगे।

हिन्दी साहित्य का इतिहास: इतिहास लेखन परम्परा, आदिकाल, भक्तिकाल:-

साहित्य का इतिहास दर्शन, लेखन परम्परा, काल विभाजन, नामकरण के माध्यम से हिन्दी साहित्य के उद्भव एवं विकास को समझ सकेंगे।

आदिकाल की परिस्थितियां, रासो काव्य, सिद्ध, नाथ, जैन साहित्य की परम्परा एवं प्रवृत्तियां, अमीर खुसरो एवं विद्यापति के साहित्य के अध्ययन से हिन्दी साहित्य के आरम्भिक लेखन, विषय विविधता आदि को समझते हुए उसमें निहित सांस्कृतिक, धार्मिक एवं नैतिक मूल्यों को ग्रहण कर पाएंगे।

भक्ति आंदोलन के उदय के कारण, विस्तार एवं प्रभाव को जानने के साथ ही उत्तर एवं दक्षिण भारत की भक्ति परम्परा को समझ सकेंगे।

भक्तिकाल की विभिन्न धाराओं की परम्परा एवं प्रवृत्तियों के अध्ययन से समाज, संस्कृति, लोक जीवन एवं मानवीय मूल्यों के संबंधी संवेदना का विकास होगा।

आधुनिक गद्य साहित्य: कथाभूमि, गोदान, मैला आँचल:-

कथाभूमि में महत्त्वपूर्ण कहानीकारों की कहानियों के माध्यम से ऐतिहासिक घटनाओं, सामाजिक यथार्थ, बाल मनोविज्ञान, लोक जीवन, प्रेम के उदात्त रूप आदि को समझने का अवसर मिलेगा।

प्रेमचंद के महाकाव्यात्मक उपन्यास 'गोदान' के माध्यम से हिन्दी साहित्य के एक युग की चेतना, यथार्थ और आदर्श, गांव – शहर की संस्कृति, कृषि – व्यवस्था आदि को विस्तारपूर्वक समझ पाएंगे।

'मैला आँचल' उपन्यास के माध्यम से आँचलिक उपन्यास की परम्परा, आँचलिकता, लोक – संस्कृति, ग्राम्य जीवन के राजनीतिक – आर्थिक परवर्तन, सामाजिक संरचना को गहराई से समझ सकेंगे।

आधुनिक हिन्दी काव्य: कामायनी, राग – विराग, पंत – काव्य यात्रा:-

कामायनी के सर्ग 'चिन्ता, श्रद्धा और लज्जा' के माध्यम से प्रेम, प्रकृति एवं जीवन दर्शन के विस्तृत आयाम को समझ पाएंगे।

'राग – विराग' में निहित निराला की लंबी कविताओं 'राम की शक्ति – पूजा, सरोज – स्मृति एवं कुकुरमत्ता' की व्याख्या से आध्यात्मिक – दर्शन, व्यक्तिगत व्यथा तथा पूंजीवादी सभ्यता व प्रगतिवादी स्वर को समझ पाएंगे।

पंत की काव्य यात्रा के विभिन्न सोपान, जीवन – दर्शन, प्रकृति, सौन्दर्य – चेतना, कल्पनाशीलता आदि के अध्ययन से छायावाद, स्वछन्दतावाद, कल्पनाशीलता आदि को विस्तारपूर्वक समझ पाएंगे।

प्रेमचंद: गबन, सेवासदन, कर्बला:-

गबन उपन्यास के माध्यम से सामाजिक – पारिवारिक ताने – बाने को समझते हुए संवेदित होंगे व सामाजिक विद्रूपताओं को दूर करने में अपनी भूमिका निभा सकेंगे। साथ ही भारतीय स्वतंत्रता आंदोलन की प्रक्रिया एवं आवश्यकता को समझ सकेंगे।

 सेवासदन उपन्यास एवं कर्बला नाटक की विषय – वस्तु के अध्ययन से प्रेमचंद युगीन परिवेश, दर्शन, स्त्री - समस्या को समझेंगे तथा शिल्पगत अध्ययन से संपादन कला, रंगमंचीयता एवं नाटक परंपरा को जान पाएंगे।

स्नातकोत्तर पूर्वार्द्ध, द्वितीय सेमेस्टर

भाषा विज्ञान एवं हिन्दी भाषा: प्राचीन, मध्यकालीन एवं आधुनिक भाषाएं, उपभाषाएं, विशेषताएं और मानकीकरण, विविध रूप:-

इससे हिन्दी भाषा की उत्पत्ति, विकास तथा आधुनिक स्वरूप को विस्तारपूर्वक समझ सकेंगे।

हिन्दी भाषा परिवार की उपभाषाओं, बोलियों, उपबोलियों की विशेषताओं, क्षेत्र, उच्चारण आदि की विस्तारपूर्वक पहचान कर पाएंगे।

हिन्दी भाषा की लिपिगत संरचना, व्याकरण एवं मानकीकरण को समझ सकेंगे।

हिन्दी भाषा के विभिन्न रूप, उनका विस्तार एवं प्रयोग के तरीके को समझ पाएंगे।

हिन्दी साहित्य का इतिहास: रीतिकाल, आधुनिक काल:-

रीतिकाल का परिवेश, परिस्थितियां, प्रमुख कवि और उनके काव्य की विषय एवं शैलीगत विशेषताओं को समझ सकेंगे।

इस युग की प्रवृत्तियों, लोकजीवन एवं गद्य साहित्य के प्रादुर्भाव के बारे में ज्ञान प्राप्त कर साहित्यिक परम्परा के विकास को समझ सकेंगे।

आधुनिक काल के अध्ययन के माध्यम से भारतीय नवजागरण, विभिन्न काव्यधाराओं का विकास, काव्य की परम्परा एवं प्रवृत्तियों को जान पाएंगे।

आधुनिक काल के गद्य साहित्य में विभिन्न गद्य विधाओं के अध्ययन के साथ – साथ दक्षिणी हिन्दी तथा उर्दू साहित्य के अध्ययन से विद्यार्थियों में वैज्ञानिक, यथार्थवादी एवं तुलनात्मक दृष्टिकोण का विकास होगा।

आधुनिक गद्य साहित्य: चन्द्रगुप्त, निबन्ध – निलय, पथ के साथी:-

चन्द्रगुप्त नाटक के माध्यम से इतिहास, समाज, संस्कृति, मानवीय मूल्यों एवं युग बोध को जान सकेंगे।

'निबन्ध – निलय' में सम्मिलित बहुविषयक निबन्धों से साहित्य का उद्देश्य, सांस्कृतिक विमर्श, लालित्य चेतना, मनोविज्ञान आदि की समझ ग्रहण करेंगे।

'पथ के साथी' में मुख्य साहित्यकारों के जीवन – मूल्यों, साहित्यिक विशेषताओं, सामाजिक भूमिका को विस्तारपूर्वक जान सकेंगे।

आधुनिक हिन्दी काव्य: अंधेरे में, उर्वशी, अज्ञेय:-

'अंधेरे में' कविता के अध्ययन से सामाजिक अव्यवस्था, रहस्यवाद, मानव – मुक्ति, जीवन मूल्य, रचना – प्रक्रिया, प्रतीकात्मकता, फैंटेसी, कल्पनाशीलता आदि को समझ सकेंगे।

'उर्वशी' महाकाव्य के माध्यम से जीवन – दर्शन, अध्यात्म, प्रेम, सौंदर्य, नारी चेतना, मनोविज्ञान, अंतर्द्वन्द्व आदि पक्षों का उद्देश्यपूर्ण ज्ञान प्राप्त कर सकेंगे।

अज्ञेय के व्यक्तित्व तथा कृत्तित्व के अध्ययन से प्रयोगधर्मिता, मनोविज्ञान, व्यष्टि का समष्टि से संबंध, संरचनागत विशेषताओं को समझ सकेंगे।

प्रेमचंद: कहानियां, श्रेष्ठ निबन्ध, कर्मभूमि:-

'प्रेमचन्द की कहानियों' से समसायिक जीवन के विविध रूपों के पठन – पाठन से ग्रामीण गरीब किसानों, काश्तकारों, मजदूरों, दलितों, पीड़ितों के प्रति संवेदनशील बन सकेंगे।

प्रेमचन्द के श्रेष्ठ निबन्धों के अध्ययन से प्रेमचंद युगीन समाज, संस्कृति, लोक जीवन, युग बोध, स्वाधीनता आंदोलन आदि को समग्रता में समझ पाएंगे।

'कर्मभूमि' उपन्यास में अछूत – समस्या, कृषक जीवन, स्त्री – मर्यादा रक्षा, ब्रिटिश साम्राज्य का दमनकारी रवैया, स्वाधीनता आंदोलन की पृष्ठभूमि, धार्मिक पाखण्ड, ग्राम्य जीवन, गांधीवादी दर्शन आदि का ज्ञान प्राप्त कर सकेंगे।

स्नात्कोत्तर उत्तरार्द्ध, तृतीय सेमेस्टर

प्राचीन एवं मध्यकालीन काव्य: विद्यापति पदावली, कबीर, तुलसीदास:-

विद्यापति पदावली में निहित श्रृंगार, भक्ति, रहस्य, नीति आदि तत्त्वों की पहचान करते हुए आदिकालीन साहित्य की रूपरेखा एवं दृष्टि को समझ सकेंगे।

कबीरदास के साहित्य के अध्ययन से उनके समय के समाज के सभी पक्षों को समझने के साथ – साथ कबीर के साहित्य में निहित भक्ति भावना, निर्गुण का स्वरूप, रहस्यवाद, युग चेतना, विद्रोह का स्वर, काव्य भाषा, राम का स्वरूप आदि को समझ सकेंगे।

तुलसीदास के साहित्य से उनके युग, भक्ति भावना, लोकमंगल, काव्य सौष्ठव, रामकाव्य में तुलसीदास का स्थान आदि को विस्तारपूर्वक जान सकेंगे।

काव्यशास्त्र एवं साहित्यालोचन: संस्कृत काव्यशास्त्र, हिन्दी काव्यशास्त्र एवं समीक्षा पद्धतियां, व्यावहारिक समीक्षा:-

संस्कृत काव्यशास्त्र के विभिन्न संप्रदायों व उनके मतों के अध्ययन से काव्य के मूल तत्त्वों को समझ पाएंगे।

हिन्दी काव्यशास्त्र व समीक्षा पद्धतियों को समझने से साहित्य के मूल तत्त्व एवं सरोकारों को समझने की दृष्टि विकसित होगी।

काव्यांश की व्यावहारिक समीक्षा करने पर समीक्षात्मक लेखन में पारंगत होंगे।

प्रयोजनमूलक हिन्दी: हिन्दी के विभिन्न स्वरूप, कम्प्यूटर, पत्रकारिता, सम्पादकीय लेखन :-

हिन्दी भाषा के विभिन्न रूपों सर्जनात्मक, संचार, माध्यम, प्रशासनिक, कार्यलयी हिन्दी के विविध रूपों एवं पारिभाषिक शब्दावली के अध्ययन एवं व्यावहारिक प्रयोग के माध्यम से भाषा के विभिन्न क्षेत्रों में कुशलता अर्जित कर पाएंगे।

कम्प्यूटर की हार्डवेयर तथा सॉफ्टवेयर संरचना को तथा इंटरनेट के विस्तृत स्वरूप को समझकर अपने कार्यक्षेत्र में उनका सफलतापूर्वक प्रयोग कर पाएंगे।

पत्रकारिता के स्वरूप, लेखन कला, संपादक के गुण एवं दायित्व, प्रूफ शोधन, प्रेस प्रबंधन आदि का ज्ञान प्राप्त कर पत्रकारिता के विस्तृत क्षेत्र में सफलता प्राप्त कर सकते हैं।

भारतीय साहित्य: वर्षा की सुबह, भारतीय साहित्य और भारतीयता, बंगला और हिन्दी साहित्य का तुलनात्मक अध्ययन:-

'वर्षा की सुबह' काव्य संग्रह में निहित हताशा, आशा, क्षोभ आदि भावों के पठन – पाठन के साथ मनुष्य की चेतना पर प्रकृति के प्रभाव, प्रकृति तथा मनुष्य के बीच के रागात्मक संबंध को समझ पाएंगे।

भारतीय साहित्य का स्वरूप, अध्ययन की समस्याएं, भारतीयता का समाजशास्त्र, साहित्य में भारतीय मूल्यों की अभिव्यक्ति आदि के अध्ययन से भारतीय समाज, जीवन, साहित्य, संस्कृति आदि को समझने की विहंगम दृष्टि निर्मित होगी।

बंगला और हिन्दी साहित्य का तुलनात्मक अध्ययन के माध्यम से दोनों क्षेत्रों के भक्ति साहित्य, नाथ साहित्य, सूफी साहित्य, आधुनिक गद्य आदि के प्रारम्भ, परम्परा एवं विकास को विस्तार से समझ सकेंगे।

कबीरदास: कबीर ग्रंथावली, संतकाव्य:-

कबीरदास जी की साखियां तथा रमैणी के अध्ययन से व्यक्तित्व में मानवीय दृष्टिकोण, आध्यात्मिकता, सात्विक व्यवहार, सामाजिक सरोकार, विद्रोही चेतना आदि का समावेश होगा।

संतकाव्य की परम्परा, प्रवृत्तियां, अध्ययन की आधार सामग्री, कबीर का युग ओर व्यक्तित्व, शिष्य परम्परा, संत परम्परा में कबीर का स्थान, प्रतिपाद्य विषय, समाज चिन्तन, मानवतावाद, दार्शनिक विचारधारा, रहस्यवादी भावना आदि के अध्ययन से कबीर के संपूर्ण जीवन एवं साहित्यिक अवदान को समझ सकेंगे।

स्नातकोत्तर उत्तरार्द्ध, चतुर्थ सेमेस्टर

प्राचीन एवं मध्यकालीन काव्य: जायसी ग्रंथावली, घनानंद कवित, सूरदास – व्यक्तित्व और युग:-

जायसी ग्रंथावली के अध्ययन से हिन्दु – मुस्लिम संस्कृति का समन्वय, भारतीय लोकजीवन, बारहमासा पद्धति, संदेश काव्य परम्परा आदि को विस्तारपूर्वक समझ पाएंगे।

घनानंद कवित्त में प्रेम संवेदना तथा भक्ति संवेदना के भाव से रीतिकाल की मुक्त धारा की बारीकियों को समझ सकेंगे।

भक्तिकाल की कृष्ण काव्यधारा के प्रतिनिधि कवि सूरदास के व्यक्तित्व एवं कृतित्त्व के अध्ययन से तत्कालीन समाज, दर्शन, वात्सल्य, श्रृंगार, प्रकृति, गेयता, भ्रमरगीत परम्परा आदि

को समझ सकेंगे।

काव्यशास्त्र एवं साहित्यालोचन: पाश्चात्य काव्यशास्त्र, आधुनिक समीक्षा की पद्धतियां:-

पाश्चात्य काव्यशास्त्र में विभिन्न पाश्चात्य चिंतकों के सिद्धांतों को समझेंगे जिससे उनमें साहित्य के मूल्यांकन का दृष्टिकोण विकसित होगा।

आधुनिक समीक्षा पद्धतियों के अध्ययन से वे साहित्य की व्यावहारिक समीक्षा करने में पारंगत होंगे।

प्रयोजनमूलक हिन्दी: मीडिया लेखन, दृश्य – श्रव्य माध्यम, अनुवाद :-

मीडिया में लेखन के विभिन्न रूपों को समझ कर पत्रकारिता के क्षेत्र में सफलता प्राप्त कर सकेंगे।

दृश्य – श्रव्य माध्यमों की संरचना, लेखन, वाचन, विज्ञापन आदि का व्यावहारिक ज्ञान प्राप्त कर इसे रोजगार के रूप में अपना सकेंगे।

अनुवाद की प्रक्रिया एवं महत्त्व के ज्ञान से राष्ट्रीय तथा अंतर्राष्ट्रीय स्तर पर विभिन्न अवसर उपलब्ध होंगे।

कार्यालयी हिन्दी, आधिकारिक पत्र लेखन, प्रशासनिक शब्दावली आदि को सीख कर भाषायी कौशल विकसित कर सकेंगे।

भारतीय साहित्य: अग्निगर्भ, घासीराम कोतवाल, बंगला साहित्य का इतिहास:-

अग्निगर्भ उपन्यास में बंगाल की सामंती कृषि – व्यवस्था, सीमांत किसानों का संघर्ष एवं विद्रोह, आदिवासी समाज के संकट, नवनिर्माण की कामना आदि भावों से बांग्ला क्षेत्र की सामाजिक – आर्थिक पृष्ठभूमि को समझ सकेंगे।

घासीराम कोतवाल नाटक में वर्णित ऐतिहासिक वातावरण, राज – व्यवस्था, पतनोन्मुख समाज की समस्याएं, हिंसा, जातिवादी मानसिकता, बेरोजगारी आदि से शिक्षा लेकर समाज के इन स्याह पक्षों के बदलाव में अपनी भूमिका निभा सकेंगे।

बंगला साहित्य के इतिहास के अध्ययन से तुलनात्मक आधार पर हिन्दी साहित्य के इतिहास के विस्तार और प्रभावशीलता को समझ सकेंगे। आधुनिक गद्य साहित्य के उदय में बंगला साहित्यकारों व फोर्ट विलियम कॉलेज की भूमिका को जान पाएंगे।

कबीरदास: कबीर ग्रंथावली, विषय - वस्तु :-

कबीर के पदों में वर्णित विषयों गुरु की महिमा, साधनात्मक रहस्यवाद, अध्यात्म, नाम सुमिरण, उपदेश, समाज – सुधार आदि के ग्रहण से व्यक्तित्व में सकारात्मक परिवर्तन होंगे तथा श्रेष्ठ समाज निर्माण में अपनी भूमिका निभा सकेंगे।

कबीरदास के काव्य में निहित जीवन – मूल्यों, अध्यात्म – दर्शन की वर्तमान में प्रासंगिकता को जानकर जीवन में अपना सकेंगे। लोकभाषा की शक्ति तथा विस्तार को जान पाएंगे।

हिन्दी विभाग, आई. बी. स्नात्कोत्तर महाविद्यालय, पानीपत

पाठ्यक्रम विशिष्ट परिणाम: स्नातक कक्षाएं

स्नातक प्रथम वर्ष, प्रथम सेमेस्टर (HI - 01)

'मध्यकालीन काव्य कुंज' में निर्धारित कवियों के साहित्यिक परिचय तथा रचनाओं में निहित प्रवृत्तियों को समझ पाएंगे जिससे विद्यार्थियों में समग्रतावादी दृष्टिकोण पैदा होगा।

साहित्य इतिहास लेखन परंपरा, नामकरण, काल – विभाजन, विभिन्न काव्यधाराओं को समझते हुए युगीन परिस्थितियों, एवं साहित्यिक प्रवृत्तियों को समझ सकेंगे।

'काव्यशास्त्र' के माध्यम से काव्य के तत्व, रस, काव्य गुण, शब्द शक्तियां, अलंकार, छन्द आदि का ज्ञान प्राप्त कर भाषा - व्यवहार में प्रयोग कर पाएंगे।

स्नातक प्रथम वर्ष, द्वितीय सेमेस्टर (HI - 02)

जयशंकर प्रसाद द्वारा रचित नाटक 'ध्रुवस्वामिनी' से जहां विद्यार्थियों का संवेदनात्मक विकास होगा वहीं उनमें ऐतिहासिक दृष्टिकोण, अभिनेयता, संवाद कौशल के संदर्भ में परिपक्वता आएगी।

साहित्य इतिहास के कालखंड 'भक्तिकाल' के माध्यम से विद्यार्थियों को भक्ति की विभिन्न धाराओं का ज्ञान मिलेगा जिससे उनमें नैतिक और आध्यात्मिक विकास के साथ-साथ सामाजिक सरोकार विकसित होंगे।

'व्यवहारिक हिन्दी' के माध्यम से भाषा के साथ-साथ व्याकरण का भी ज्ञान मिलेगा जिससे विद्यार्थियों के संप्रेषण में स्पष्टता आएगी।

स्नातक द्वितीय वर्ष, तृतीय सेमेस्टर (HI - 03)

'आधुनिक हिन्दी कविता' पुस्तक में निर्धारित कवियों के साहित्यिक परिचय, काव्य रूप एवं शैलीगत विशिष्टता से परिचय पाकर विद्यार्थियों में मानवीय मूल्यों के विकास के साथ – साथ समाज और साहित्य के अंतर संबंध को समझने का दृष्टिकोण पैदा होगा

साहित्य इतिहास के कालखंड 'रीतिकाल' के वर्गीकरण, नामकरण, परिस्थितियों, उपलब्धियों तथा रीति, नीति एवं वीर काव्य के माध्यम से विद्यार्थी साहित्यिक परम्परा के विकास को समझ सकेंगे।

'प्रयोजनमूलक हिन्दी' में कम्प्यूटर और अनुवाद का ज्ञान प्राप्त कर आधुनिक तकनीकी युग में विद्यार्थी भाषायी क्षेत्र में अद्यतन होंगे।

स्नातक द्वितीय वर्ष, चतुर्थ सेमेस्टर (HI - 04)

'कथाक्रम' में निर्धारित कहानियों के वस्तु तथा कला पक्ष के विविध पहलुओं के अध्ययन से विद्यार्थियों में समग्र चेतना का विकास होगा।

साहित्य इतिहास के कालखंड 'आधुनिक काल' में गद्य की विभिन्न विधाओं के उद्भव तथा विकास

के अध्ययन द्वारा विद्यार्थी गद्य साहित्य की पृष्ठभूमि, परम्परा तथा विकास को समझ सकेंगे।

'पारिभाषिक शब्दावली' के स्वरूप, महत्त्व, गुण तथा विकास में सक्रिय विविध संप्रदायों की जानकारी प्राप्त कर हिन्दी भाषा के विस्तार में भूमिका निभा सकेंगे।

स्नातक तृतीय वर्ष, पंचम् सेमेस्टर (HI - 05)

'समकालीन हिन्दी कविता' में निर्धारित कवियों के साहित्यिक परिचय व रचनाओं के माध्यम से विद्यार्थी युग बोध, साहित्यिक – सांस्कृतिक संबंध, पारम्परिक एवं आधुनिक मूल्यों के सामंजस्य की महत्ता को समझ सकेंगे।

'हिन्दी साहित्य का आधुनिक काल' में कविता के परिचय, परम्परा एवं प्रवृत्तियों के द्वारा विद्यार्थी भारतीय स्वतंत्रता आंदोलन, सामाजिक सुधार तथा यथार्थ बोध को जान पाएंगे।

'प्रयोजनमूलक हिन्दी' में पत्र लेखन, संक्षेपण, पल्लवन के द्वारा औपचारिक भाषा संप्रेषण को सुदृढ़ कर सकेंगे।

स्नातक तृतीय वर्ष, षष्ठ सेमेस्टर (HI - 06)

'नव्यतर गद्य गौरव' में निर्धारित लेखकों की नवीन साहित्यिक विधाओं के बारे में ज्ञान प्राप्त करते हुए विद्यार्थी समसामयिक समाज, साहित्य एवं संस्कृति को समझ पाएंगे।

'हरियाणवी भाषा और साहित्य का इतिहास' में हरियाणवी भाषा के उद्भव और विकास, हरियाणवी की उपबोलियां एवं उनका क्षेत्र, हरियाणवी साहित्य के माध्यम से अपने प्रदेश की सांस्कृतिक विरासत तथा लोकजीवन को गहराई से समझ पाएंगे।

'प्रयोजनमूलक हिन्दी' से पत्रकारिता, फीचर लेखन, संपादन आदि महत्त्वपूर्ण विषयों को समझकर पत्रकारिता के क्षेत्र में आगे बढ़ सकेंगे।

बी – एस सी द्वितीय वर्ष, तृतीय सेमेस्टर (HI - 23)

'अभिनव काव्य गरिमा' में निर्धारित कवियों के साहित्यिक परिचय व वस्तु पक्ष में विद्यार्थी ऐतिहासिकता, राष्ट्रीयता एवं संस्कृति का ज्ञान प्राप्त कर सकेंगे।

विभिन्न विषयों पर 'निबंध लेखन' के द्वारा उनमें साहित्यिक, वैज्ञानिक, नैतिक व मानवीय दृष्टि का विकास होगा।

'पत्र लेखन तथा वैज्ञानिक शब्दावली' के माध्यम से विद्यार्थियों में व्यवहारिक भाषायी ज्ञान का विकास होगा।

बी – एस सी द्वितीय वर्ष, चतुर्थ सेमेस्टर (HI - 23)

निर्धारित एकांकियों के अध्ययन से विद्यार्थियों में ज्ञानात्मक संवेदना तथा अभिनय कौशल का विकास होगा।

'निबंध लेखन' के माध्यम से राष्ट्रीय एवं अंतर्राष्ट्रीय विषयों के बारे में समझ विकसित होगी।

'पत्र लेखन एवं वैज्ञानिक शब्दावली' के अध्ययन से उनके शब्द भंडार एवं भाषा व्यवहार में समृद्धि होगी।

बी बी ए द्वितीय वर्ष, तृतीय सेमेस्टर (105)

पत्राचार के विविध रूपों का व्यवहारिक ज्ञान प्राप्त कर विद्यार्थी वाणिज्य एवं प्रबंधन के क्षेत्र में इसका कुशलतापूर्वक प्रयोग कर पाएंगे।

अनुवाद, पल्लवन, संक्षेपण तथा पारिभाषिक शब्दावली के प्रयोग द्वारा वे वाणिज्य एवं प्रबंधन में दक्ष होकर उसे सरलता पूर्वक कर पाएंगे।

'निबंध लेखन' के द्वारा अपने क्षेत्र के विषयों एवं उप विषयों का ज्ञान प्राप्त कर सकेंगे।

Programme Outcomes (Pos) for Post Graduate Programme in English

PO1:   The students will learn to equip themselves with skills and techniques of English Language and Literature teaching at various levels.

PO2:   The students will be able to identify and pursue areas of research in literary and cultural studies.

PO3:   The students will attain knowledge of the history, forms and concepts associated with literature in English.

PO4:   The students will be trained in communication competence and skills in English, both spoken and written.

PO5:   The students will learn to demonstrate a high level of proficiency in analyzing and interpreting literary and other cultural texts.

PO6:   The students will develop a creative, aesthetic and critical awareness of the world surrounding them.

PO7:   The students get trained in displaying skills of translating English texts to other languages and vice-versa.

COURSE OUTCOMES

Name of Programme: M.A.

English

SEMESTER-I

Paper: ENL-511

CO 1: The students get the understanding of literary historical movements such as Renaissance, Jacobean, Puritanism, rise and fall of Drama.

CO 2: The students will come to know the major literary figures/works of the above mentioned periods.

CO 3: The students will come to know the development of English as a language along with poetry and drama of the period.

CO 4: Students will learn how the literature of the period paved the way for upcoming writers.

Paper: ENL-512

CO 1: The students get knowledge of Neo-classical Era in the history of England.

CO 2: The students know about the social, political, religious, economical and cultural milieu of the age.

CO 3: The students would understand the age of Prose and Reason and the city life reflected in the literature of the age.

Paper: ENL-513

CO 1: The students will read the poems by the leading poets and authors of Romantic and Victorian Age.

CO 2: The students shall learn about the linguistic shift in themes and presentation that happened at the advent of Romantic Age.

CO 3: The students will know Romantic Literature and crisis of faith in Victorian Age.

Paper: ENL-514

CO 1: The students will get exposed to the Modern and Post-Modern, the American Dream and the tragedy of common man.

CO 2: The students will learn about the major trends and work in the Modern Age, the twentieth century Indian Literature and Movement Poetry.

CO 3: Along with the western writers, the students will get an opportunity to respond to the Contemporary Indian writers.

Paper: ENL-515

CO 1: The students will come to know about the development novel from the nineteenth century to twentieth century.

CO 2: Students learn about various type of novels-Novel of Manners, Social Novel, Psychological novel.

CO 3: The students will learn the imaginative reconstruction of life and its various manifestations through fiction.

SEMESTER-II

Paper: ENL-521

CO 1: Students will know about different genres of literature as tragedy, comedy, romantic-comedy, melodrama.

CO 2: Students will learn the development of English as a language along with poetry and drama of the period.

CO 3: Students will learn about delineation of human emotions in various poetic and dramatic works.

Paper: ENL-522

CO 1:   The students come close to the zeitgeist of Neo-classical Era in the literary history of England.

CO 2:   The students will know about the city life reflected in the literature of the age.

CO 3:   The students will learn about the origin and development of the novel.

Paper: ENL-523

CO 1:   The course shall enable the students to peek into the questioning spirit of the Age that eventually resulted in Victorian Compromise.

CO 2:   The selected texts shall foster an understanding of various aspects responsible for the re-emergence of Drama and the strong foothold of Novel in the final decades of Victorian Age.

CO 3:   The course shall enable the students to understand and evaluate the journey towards the ethos of Modern Age.

Paper: ENL-524

CO 1:   The students will know about the aftermaths of two World Wars and the resultant disintegration.

CO 2:   The students will learn the major developments in the field of drama and the existential philosophy.

CO 3:   The students learn about the features of Indian English Poetry and the novels of Indian sensibility.

Paper: ENL-525

CO 1:   The students will learn about the theory and practice of fiction in this course.

CO 2:   The students will know about the concepts and representations of Colonial, Post-colonial and Philosophical Novel writings.

CO 3:   The students will learn about the complex human emotions in relation to subjugation and representation.

SEMESTER-III

Paper: ENL-531

CO 1: The students will know about the literary criticism from antiquity to the twentieth century.

CO 2: The students will be able to appreciate different schools of literary criticism.

CO 3: They will also learn how different literary critics over the ages have different conception of literature.

Paper: ENL-532

CO 1: Students learn the unique features of American Literature that established as a canon in World Literature.

CO 2: The students will come to know about the major differences between British Literature and American Literature.

CO 3: They will come to know about Puritanism, Transcendentalism, New Nationalism and Romanticism in American Literature.

Paper: ENL-533

CO 1: The students will get to know the emergence of English language in Indian literature.

CO 2: The students would be familiar with Indian milieu through the written in Modern India texts.

CO 3: The students come to know about the Indian values-social, cultural, religious and political.

Paper: ENL-534

CO 1: The students get enriched the knowledge through historical evolution of English language.

CO 2: This paper will develop the students' analytical fecundity and help them learn and appreciate nuances of language.

CO 3: The students will understand the levels of difficulty and endeavor to bridge the gaps.

Paper: ENL-535

CO 1:   The students will know how Patriarchy has constructed power structures to control women.

CO 2:   The students will learn important feminist theories and also how to apply these theories.

CO 3:   The students will know how the subjugation of women had taken place.

SEMESTER-IV

Paper: ENL-541

CO 1:   The students will be introduced to literary criticism from Romantic Age to twentieth century.

CO 2:   The students will be able to appreciate the different schools of literary criticism.

 CO 3:   The students will learn about the evolution of literary criticism and theories.

Paper: ENL-542

CO 1:   The students will come to know about the twentieth century American writers.

CO 2:   The students will be introduced to Post World War I American Literature.

CO 3:   The students will learn various techniques such as, expressionism, impressionism, Plastic Theater etc. that were a prominent part in the works of Modern Age.

Paper: ENL-543

CO 1:   The students shall have an advancement in their knowledge of Indian literature in English.

CO 2:   They would also be familiar with modern literary texts.

CO 3:   The students will inculcate the literary values by studying the course.

Paper: ENL-544

CO 1:   The knowledge of pedagogic strategies helps develop the teaching learning experiences.

CO 2:   The students will develop communicative skills through spoken and written modules.

CO 3:   It will enrich the student's vocabulary, strengthening cognitive acumen and analytical ability.

Paper: ENL-545

CO 1:   The students will learn about application of the feminist theories to study the texts in the course.

CO 2:   The students will know about the important feminist writers across the continents.

CO 3:   The students will learn about the place of "voice" in a narrative.

Programme Outcomes (POs) for B.A. (Honors) (English)

PO 1:   Adequate exposure to the basic trends and genres of English literature and language.

PO 2:   Fostering critical understanding of interpretations and translations from other languages of the world.

PO 3:   Imposing linguistic and communicative competence of the learners.

PO 4:   Inculcating capacity to negotiate intertextuality and appreciating literature in comparativist mode.

COURSE OUTCOMES

Name of Programme: B.A. (Honors) (English)

English

SEMESTER-I

Paper: I

CO 1:   Acquaintance with the golden era of English literature.

CO 2:   Introduction to drama and poetry of the time.

CO 3:   Enhancing grammatical competence through dialogues.

Paper: II

CO 1:   Understanding poetry as a literary genre.

CO 2:   To study the aesthetics of poetry.

CO 3:   Learning the use of figurative devices.

CO 4:   Introduction to the major authors and works of Renaissance.

SEMESTER-II

Paper: III

CO 1:   Introduction to the Restoration Age.

CO 2:   Understanding poetry and essay as a means of literary narration.

CO 3:   Appreciation of life as reflected in selected texts.

Paper: IV

CO 1:   Enhancing grammatical competence through dialogues.

CO 2:   Learning about the major authors and texts of Restoration Age.

CO 3:   Understanding Essay as a literary genre.

CO 4:   Learning about cohesion and coherence in paragraph writing.

SEMESTER-III

Paper: V

CO 1:   Understanding poetry as a literary genre.

CO 2:   Enhancing aesthetic competence through poetry.

CO 3:   Understanding the application and usage of figurative language.

Paper: VI

CO 1:   Developing human concern through exposure to literary essays.

CO 2:   Introduction to Novel as a genre.

CO 3:   Understanding Novel as a potent tool for expression.

Paper: VII

CO 1:   Developing linguistic skills.

CO 2:   Learning to use correct English in real-life situations.

CO 3:   Improvement in the active and passive vocabulary of students.

SEMESTER-IV

Paper: VIII

CO 1:   Enhancing the understanding of poetry.

CO 2:   Learning about the Victorian society through poetry.

CO 3:   Advancement in the knowledge of figurative language.

Paper: IX

CO 1:   Learning about the major writers and works of Victorian era.

CO 2:   Introduction to the prominent thinkers of the time.

CO 3:   Enhancing reading skills and understanding the society through ideas and experiences represented critically and creatively.

Paper: X

CO 1:   Development of linguistic skills.

CO 2:   Improvement in the active and passive vocabulary of the students.

CO 3:   Acquiring the ability to use correct English in real-life situations.

SEMESTER-V

Paper: XI

CO 1:   Introduction to the Modern English Literature.

CO 2:   Understanding the shift in studying English Literature that happened after Victorian Age.

CO 3:   Acquaintance with the assimilation of Irish Literature in the mainstream English Literature.

Paper: XII

CO 1:   Learning about Indian authors writing in English.

CO 2:   Understanding distinctive features of Indian Literature through texts and contexts of prose and poetry.

CO 3:   Advancing the understanding of the social fabric of Indian society.

Paper: XIII

CO 1:   Familiarizing the students with the intellectual backgrounds pertinent to the growth of Post-colonial Literature.

CO 2:   Developing understanding of major terms and concepts used in Post-colonial Literature.

CO 3:   Cultivating critical thinking through comprehensive discussion and analysis of the texts.

SEMESTER-VI

Paper: XIV

CO 1:   Familiarization with the new literature of Britain in the early decade of twentieth century.

CO 2:   Understanding the historical background including the socio-political changes in twentieth century Britain.

CO 3:   Analyzing the decay and decadence of human values in Modern Age.

Paper: XV

CO 1:   Advancing the understanding of Indian Writings in English.

CO 2:   Understand, analyze and appreciate prose and poetry of contemporary India.

CO 3:   Exploring varied aspects of Indian Writing in English across genre.

Paper: XVI

CO 1:   Exploring modern world literature across genre.

CO 2:   Understanding the need of "voice" in representation.

CO 3:   Analyzing the relevance of literary texts in establishing and forwarding human values.

SCOPE OF ENGLISH LANGUAGE

1. Teaching at school, college and university levels
2. Home tutoring
3. Freelance writer
4. Content writer
5. Technical writer
6. Copy Editor
7. Paralegal
8. Educational Consultant
9. Public Relations Manager
10. Records Manager
11. Archivist
12. Journalist/News Reader
13. Lexicographer
14. Proof-reader
15. Copywriter
16. Social media Manager
17. Interpreter/Translator

SCOPE OF ENGLISH

(LANGUAGE AND LITERATURE)

1. Teaching at school, college and university levels
2. Freelance writer
3. Creative writer
4. Script writer
5. Editor
6. Interpreter/Translator
7. Advertising Account Executive
8. Publisher
9. Archivist
10. Researcher
11. Social Media Manager
12. Copywriter
13. Paralegal
14. Educational Consultant
15. Lexicographer
16. Marketing Manager

Programme Outcomes (Pos) for Functional English

PO 1:   To help students identify different types of speech sounds and classify them as vowels, consonants.

PO 2:   To enable students write e-mails for official/business purposes.

PO 3:   To enhance their skills with respect to short speeches.

PO 4:   To enable the students to use English correctly and confidently.

PO 5:   To provide them support for preparing for the IELTS examination.

PO 6:   To help learners achieve a mastery over English pronunciation.

COURSE OUTCOMES

Name of Programme: Functional English

<u>English</u>

SEMESTER-I

CO 1: Improve listening and speaking skills for better understanding and production of speech sounds.

CO 2: Understand the definition and scope of linguistics.

CO 3: Understanding the various Grammar topics/ Units of English. (Parts of Speech, Articles, Tenses and their uses).

CO 4: Develop the ability to adjust ways of articulation to suit the sound system of English (The Speech Mechanism).

CO 5: Help the learner to get rid of pronunciation mistakes.

SEMESTER-II

CO 1: Develop a neutral accent to speak English with intelligibility (Word accent).

CO 2: Ability to analyze various Grammar topics/ units (Prepositions, use of Who, Whom, Much, Many, Still & Yet).

CO 3: Learn to use English language effectively (Intonation).

CO 4:   Understand the concept of Accent and Rhythm in English language.

CO 5:   Develop listening, speaking, reading and writing skills.

SEMESTER-III

CO 1:   Understand language rules, structure and usage for developing writing skills.

CO 2:   Understand and effectively apply the steps in writing process (e-mail, resume writing etc.)

CO 3:   Identify various writing styles (use of capital letters, punctuations)

CO 4:   Develop listening and comprehensive skills in English language.

CO 5:   Develop confidence to respond in English, in situations where English is important.

SEMESTER-IV

CO 1:   Acquire speech skills necessary for confident and intelligent participation in group discussion (Principles of effective communication)

CO 2:   Improve reading comprehension skills of the students (communication through mass media)

CO 3:   Develop writing skills to express themselves in writing (English in situations)

CO 4:   Produce coherent and cohesive paragraphs.

CO 5:   Identify various forms of communications in English (Body language, voice, facial expression)

CO 6:   Detect confusing words and spellings in English.

SEMESTER-V

CO 1:   Develop the ability to use English in real life situations.

CO 2:   To compose academic and non-academic writings including letters, essays on given topics and CV's for specific purposes.

CO 3:   To know the value of English as a global language.

CO 4:   To help students in developing speaking and writing proficiency in English language.

CO 5:   To provide good command over English language for academic study and career progression.

SEMESTER-VI

CO 1:   To understand and effectively apply the steps in the writing process.

CO 2:   To identify various writing styles in formal communication.

CO 3:   Develop confidence to respond in English language in formal setting.

CO 4:   Develop overall communication skills, which the students need to prepare for their career.

CO 5:   To enhance students' academic and professional use of language.

COURSE OUTCOMES

Name of Programme: B.A.

<u>English</u>

SEMESTER-I

CO 1:   Through the first chapter (Speech Sounds) of the text-book, the students will be familiar with speech sounds (Phonetics).

CO 2:   The 9 essays included in the textbook will improve the understanding of the students and will help them to become good human beings.

CO 3:   The students will acquire the basics of language through the textbook Literature and Language I. They will be strong in Grammar and its usage.

CO 4:   In order to improve the Vocabulary of the students, Vocabulary Exercises are given at the end of each essay.

CO 5:   The students will easily express themselves through a thorough command of English and its linguistic structures.

SEMESTER-II

CO 1: Through the Short Stories included in the text-book, the students will realize the beauty and communicative power of English.

CO 2: Through this course, the students will understand and practice Vocabulary Exercises given at the end of each chapter in the textbook.

CO 3: The students will learn, understand and practice Sentence and its types, Voices, Narration and various parts of grammar.

CO 4: The course will improve the pronunciation of the students through Speech Sounds and Symbols and will easily transcribe the words given at the end of the all the chapters.

CO 5: The course will enable the students to become competent users of English in real life situation.

SEMESTER-III

CO 1: The present course will make the students to learn how English poetry as a literary form expresses the ethos.

CO 2: The students will understand various basic elements of poetry such as tone, diction, rhyme and rhythm.

CO 3: The course will also introduce the students to some significant areas of language study.

CO 4: It will make them aware of some grammatical and compositional rules.

CO 5: It will help the beneficiaries to develop oratory and writing skills and expose them to the best samples of poetry and to make them understand creative uses of language in poetry.

SEMESTER-IV

Paper: EN-04 English

CO 1:   The student will be able to identify various basic elements in creative writing for performance and explain how they are used in practice.

CO 2:   The course shall enable the students to execute write ups for script.

CO 3:   Through Dialogue Writing, the students will improve their oral as well as written skills and incorporate personal experiences that can be used for creative writing.

CO 4:   This course will enable the students to learn the art of translation from Hindi into English and vice versa and help them in sharing ideas and communicating with each other effectively.

CO 5:   The end of the course will enable the students to use the grammatical structures, synonyms and antonyms accurately and systematically.

SEMESTER-V

Paper: EN-05 English

CO 1:   The students will understand the social, political, cultural, historical background of India during Indian Freedom Movement in 1930s through the reading of Raja Rao's novel Kanthapura.

CO 2:   The students will know about the various age-old social evils that prevailed in Indian Society during British Raj.

CO 3: The students shall learn and understand about Drama and the various forms of Drama.

CO 4: At the end of the course, the students will become familiarized to various literary forms and literary devices

CO 5: It will enhance their reading and writing skills.

SEMESTER-V1

Paper: EN-06 English

CO 1: William Shakespeare's The Merchant of Venice will familiarize the students with various forms of plays.

CO 2: They will think critically about the text and its themes.

CO 3: The students will read through the play and act out scenes and which improve their understanding and communication skills.

CO 4: The course will also increase their oral as well as reading fluency.

CO 5: They are able to demonstrate text structuring and organization of the same into paragraphs.

COURSE OUTCOMES

Name of Programme: B.C.A.

B.C.A. English

SEMESTER-I

CO 1:   The students will read and understand all the Essays, Short Stories and One-Act Plays prescribed in the text-book thoroughly and critically analyse them.

CO 2:   The students will be able to practice Vocabulary Exercise given at the end of each chapters.

CO 3:   Through this course, the students will improve their reading, writing, speaking and understanding skills.

CO 4:   The students will acquire the basics of language through the textbook (Reflections). After completion of the course, they will be strong in grammar and its usage.

COURSE OUTCOMES

Name of Programme: B.B.A.

B.B.A. English

SEMESTER-I

CO 1:   The course will help the students to develop their reading, writing, speaking and listening skills through the study of literary text.

CO 2:   The students will be able to communicate their ideas critically and creatively.

CO 3:   The course will help the beneficiaries to review the grammar portion of English and they will be able to use these forms in specific communicative contexts.

CO 4:   The course shall enhance their communicative skills and also increase their confidence.

Name of Programme: B.Sc.

B.Sc. English

SEMESTER-I

Paper: EN-01 English

CO 1:   The course will make the students aware about English poetry as a whole along with significant poets.

CO 2:   The students will improve their reading and writing skills and incorporate their personal experiences.

CO 3:   It will equip the students with the nuances of language that includes proficiency in grammar, and its effective usage in speaking and writing.

CO 4:   The students will learn and understand basic forms and elements of poetry such as tone, genre, diction figures of speech, symbolism etc.

CO 5:   The course will make them aware of translations, sentence formations, common errors and various grammatical rules.

SEMESTER-II

Paper: EN-02 English

CO 1: Through this course, the students will develop their proficiency in oral and written communication.

CO 2: They will easily interpret and analyze the literary text prescribed and develop a critical thinking and conceptual understanding of the same.

CO 3: The students will learn how to write different types of letters which will enhance their communication skill in accordance with the skills required at later stage of life.

CO 4: The conclusion of the course will enable the students to incorporate personal experiences that will eventually help them express themselves creatively.

PROGRAM OUTCOME

Students earn a Graduate Degree in Arts after 3 years of studying different combinations of subjects, political science is one amongst those combinations. After completion of graduation with political science as a subject a student is able to demonstrate some of the desirable learning outcomes which are as follows:-

PO1. Developing excellence in sub fields of Indian Political System, International Relations, Indian Political Thinkers, International Organisations.

PO2. Discuss the major theories and concepts of Political Science and its subfields and also deliver thoughtful and well-prepared presentations of research findings.

PO3. The students would be able to explain different approaches to politics and build their own understanding of politics.

PO4. Become an agent of change particularly in changing the voting behavior.

PO5. Students become able to write clearly and with purpose on issues of international and domestic politics and public policy.

PO6. Students participate as a civically engaged member of society (NGO).

PO7.Students use internet and college library resources to research key local, state, national and international policy issues and present results.

PO8. They demonstrate critical thinking, including the ability to form an argument, detect fallacies, and martial evidence, about key issues of public policy and politics.

PO9. Understand the United Nations Organisation

PO10. Distinguish between Unitary and Federal Systems.

PO11. Recognize key theories in International Relations (Liberal Idealist and Realist).

PO12. Differentiate Presidential from Parliamentary systems.

PO13. Identify key Political Philosophers.

PO14. Understanding the inter relationship between policy decisions and its effects on society. This is achieved through a comprehensive teaching of the Indian Political System.

PO15. The course curriculum inculcates among students a basic understanding of the rights and duties of citizenship and thereby to act as responsible citizens through the observation of important days such as Independence Day, Republic Day, and Constitution Day.

PO16. Debates, seminars, screening of movies and discussions are also regularly organised on relevant themes and participation is sought from experienced resource persons. Some of the events in this regard have been an interactive session on Shaheed Bhagat Singh, B.R Ambedkar, Subhash Chandra Bose.

PS17. Use of PPT method for analysing the working of important international and regional organisations like UN, EU, ASEAN etc.

COURSE OUTCOME:

INDIAN POLITICS

CO1. They will be able to answer how constituent assembly was formed.

CO2. They will be able to describe the significance of the Preamble, Fundamental Rights and Directive Principles of State Policy in the constitutional design of India.

CO3. They will be able to answer questions pertaining to the function and role of the president, Prime Minister, Governor, Chief Minister, The legislature: Rajya Sabha, Lok Sabha, Speaker, Committee System, State Legislature, The Judiciary: Supreme Court and the High Courts: composition and functions- Judicial Activism in the constitutional design of India.

CO4. They will be able to identify the power division in constitutional set up.

CO5. Looking at the Constitutional Amendment Procedure with focus on the main recommendations of the Constitutional Review Commission , constitutional morality.

CO6. Critically evaluating the Indian Party system – its development and looking at the ideology of dominant national parties

CO7. Evaluating the role of various forces on Indian politics: religion; language; caste; regionalism

CO8. Evaluating the Electoral Process in India with focus on the Election Commission: Composition, Functions and Role

INDIAN POLITICAL THINKERS

CO1. Tracing the evolution of Indian political thought from ancient India to modern India.

CO2. Analysing the nationalist thought of Raja Rammohan Roy.

CO3. Assessing the nationalist thought of Dayanand Saraswati, Vivekananda.

CO4. Discussing the nationalism of Lala Lajpat Rai, Bal Gangadhar Tilak, Dadabhai Naroji, Gokhale.

CO5.Discussing the contribution of eminent personalities like Gandhi .

CO6. Understanding the New Humanism of M. N. Roy.

CO7. Learning from the patriotism of Subhash Chandra Bose, Bhagat Singh.

CO8. Learning from the Philosophy of Jawaharlal Lal Nehru.

CO9. Discussing the contribution of Socialists like J.P Narayan, Ram Manohar Lohia.

CO10. Describing the movements against caste and untouchability, Ambedkar's views on Social Justice and the depressed classes.

INTERNATIONAL ORGANISATIONS:

CO1. Understanding Historical Evolution of International Organization: Concert of Europe, Hague Systems, Public International Unions, Genesis of League.

CO2. To dwell upon the reason for Origin of the United Nations, its nature and Principles;

CO3. To build a Comparison between League and UN systems.

CO4. Analysing organs of the United Nations and develop a fair understanding regarding General Assembly, Security Council, Economic & Social Council, Trusteeship, International Court of Justice, Secretariat; Role of the Secretary General.

CO5. Analysing the available procedure and way forward for Disarmament.

CO6. Describing the Changing Nature of the UN in the Post-Cold War Era

CO7. Critically evaluating Democratization of UN System and India's Claim for Permanent Seat in Security Council.

CO8. Analysing International Organization and Global Political Problems associated with Pacific and Coercive Methods for the Settlement of Disputes.

CO9. Describing Promotion of International Cooperation and Non-Political Agencies.

CO10. Critically evaluating the Role of Special

CO11. Agencies of the UN; United Nations and Socio-Economic Development.

INTERNATIONAL RELATIONS

CO1. Analysing the meaning, nature and scope of international relations.

CO2. Understanding how International Relations developed as an academic discipline and recognising them as an autonomous discipline of study.

CO3. Critically examining the approaches to the study of international relations.

CO4. Assessing the National Power along with its elements. Understanding the scope of its limitations in international law, international morality and world public opinion.

CO5. Discussing the theory of Balance of Power.

CO6. Dwelling upon the concept of collective security.

CO7. Developing sensitization around Environment.

CO8. Understanding concepts of Globalisation.

SCOPE:

1. Career in Civil Services
2. Career in other Govt. Jobs
3. Research Analyst
4. Legal Advisor to Political Parties
5. Political Scientist
6. Election and Campaign Manager
7. Teacher
8. Human Rights Activist
9. NGO
10. Journalism

Program Outcome of Home Science

I.B. (PG) College is a prestigious institute which has undergone a long successful journey of expansion in the field of Home Science by initiating need based and career oriented specialized programmes. The department offers five specific undergraduate programs namely Family Resource Management, Health, Hygiene and Applied Science, Human Physiology, Clothing and Textiles, Foods and Nutrition and Human Development.

The department also offers skill oriented certificate course in Fashion Designing and Nutrition Cuisine (Regional Snacks and Baking).

Programme Outcomes

- All semesters offer various relevant skill oriented courses.
- The course focuses on skill development, innovation and capacity building.
- Courses aim at making the students self-reliant and with necessary proficiencies for a wide variety of career with entrepreneurial skills and placement.
- Practical training and exposure through field visit, project work, expert lectures, demonstration, workshops and short-term trainings gives hands on experience to students.
- Students are sensitized toward challenges and solutions for societal department from grass-root level i.e. home.
- Continuous innovations evolved through scientific researches in Home Science subjects empower women and family with solutions to deal with everyday challenges.

Program Specific Outcomes

The program offered by this department

- Family Resource Management
- Health Hygiene & Applied Science
- Physiology
- Clothing & Textile
- Foods & Nutrition
- Human Development

COURSE OUTCOMES OF HOME SCIENCE

SEMESTER I

COURSE CODE	COURSE NAME	AFTER SUCESSFULLY COMPLETED THIS COURSE, STUDENTS WILL BE ABLE TO UNDERSTAND
Paper-I	Human Resource Management	- What is Home Science and job opportunities in all disciplines of Home Science - Management of Human and Non-Human Resources - Application of different color schemes in interior decoration - Using different work simplification techniques at home - Consumer education and their rights and responsibilities - Interior Decoration-Rangoli Flower arrangements, Table setting, Pot painting, Menu card preparation and floor plan.

SEMESTER II

COURSE CODE	COURSE NAME	AFTER SUCESSFULLY COMPLETED THIS COURSE, STUDENTS WILL BE ABLE TO UNDERSTAND
Paper-I	Human Hygiene and Applied Science	• Realizing the importance of a clean environment for a healthy life • Prevention from the spread of infectious diseases • Importance of immunity in life and the ways to improve it • Causes and prevention of common emerging problems in women like Breast Cancer and Cervical Cancer • Understanding the use of disinfectants • Cleaning of different metals, Preparation of articles for interior decoration, visit to Health center for vaccination and First Aid training

SEMESTER III

COURSE CODE	COURSE NAME	AFTER SUCESSFULLY COMPLETED THIS COURSE, STUDENTS WILL BE ABLE TO UNDERSTAND
Paper-I	Human Physiology	• Normal functioning of different systems of Human body like Digestive System, Respiratory System, Skeleton System, Circulatory System, Reproduction System, Nervous System, Endocrine System and Cell Division • Different embroidery stitches, Knitting, Tie & Dye and Drafting of Garments

SEMESTER IV

COURSE CODE	COURSE NAME	AFTER SUCESSFULLY COMPLETED THIS COURSE, STUDENTS WILL BE ABLE TO UNDERSTAND
Paper-I	Clothing & Textile	- Properties and manufacturing of different fiber - Use of finishes to be done on fabrics - Use of different weaves to add variety in the fabrics - Laundry and reagents and their usage - How to remove stains from the fabric - Creating with esthetic expression. Understanding the working of sewing machine and stitching of different garments

SEMESTER V

COURSE CODE	COURSE NAME	AFTER SUCESSFULLY COMPLETED THIS COURSE, STUDENTS WILL BE ABLE TO UNDERSTAND
Paper-I	Food & Nutrition	- Different food groups, essential Nutrients and the effect of their deficiency and excess in the body - Planning meals for different age groups keeping in mind their recommended allowances - Managing therapeutic diets to optimize the nutritional needs of the person in order to treat a variety of diseases and disorders and to improve treating capabilities of a patient - Help in promoting healthy life as well as reducing the risk of chronic diseases - Preventing the decay and spoilage of produced fresh foods and storing it under prescribed conditions - Preparation of different nutrition recipes by using different cooking methods - Meal planning for different age groups with reference to their nutritional requirements and therapeutic nutrition

SEMESTER VI

COURSE CODE	COURSE NAME	AFTER SUCESSFULLY COMPLETED THIS COURSE, STUDENTS WILL BE ABLE TO UNDERSTAND
Paper-I	Human Development	• The importance of child psychology with reference to all round development of child Personality development, Language development, Intelligence • The characteristics and problem of different stages of life cycle and suggest the solutions • The signs and discomforts of pregnancy, Care and feeding of a new born child • The importance of play during childhood • Various common ailments of childhood and their remedies

Scope of Program and Course Specific Outcomes/ Career Opportunities in Home Science

CLOTHING AND TEXTILE

- Textile and costume designer
- Quality assessment managers
- Fashion Merchandisers
- Retail Branch Managers
- Production Assistants
- Good Liasioning and networking with apparel and textile industry
- Eco-friendly dyeing and printing techniques

FOOD and NUTRITION

- Dieticion in Private and Government Hospitals
- Health and Fitness centers
- Counselors in Schools
- Hospitality and Tourism Industry
- Government Program (ICDS, MDM etc.)
- Government Agencies (NIPCCD)
- Catering Management Industry
- Food Industry
- Cafeteria
- Diet Clinics

FAMILY RESOURCE MANAGEMENT

- Interior Designer
- Landscape Designer
- Color Consultants
- Event Organizers
- Furniture Designers
- Interior Furnishing Experts
- Kitchen Planner and Designer
- Hotel Industry
- Tourism Industry

HUMAN DEVELOPMENT

- Social work
- Creche/Day Care Centers
- Counselor in Schools, Higher educational institute and Hospitals
- Special educators in schools and colleges
- Family life educators
- Counselor in National and International agencies like WHO, UNICEF, ICCW, ICMR etc.

हिन्दी विभाग, आई. बी. स्नात्कोत्तर महाविद्यालय, पानीपत

कार्यक्रम विशिष्ट परिणाम: स्नातक हिन्दी

- मातृ भाषा तथा राजभाषा हिन्दी में सफलतापूर्वक स्नातक कक्षा उत्तीर्ण करने के पश्चात विद्यार्थी परास्नातक कक्षाओं हेतु उपस्थित हो सकते हैं।
- देश – विदेश में हिन्दी के बढ़ते प्रभाव एवं लोकप्रियता के कारण विद्यार्थी हिन्दी शिक्षण के क्षेत्र में जा सकते हैं।
- हिन्दी अध्ययन के पश्चात विद्यार्थी पत्रकारिता, अनुवाद तथा वाचन के क्षेत्र में सफलतापूर्वक कार्य कर सकते हैं।
- हिन्दी साहित्य की विभिन्न विधाओं के ज्ञानार्जन से वे लेखन कार्य में दक्षता प्राप्त कर सकते हैं।
- हिन्दी अध्ययन के पश्चात वे शोध, समीक्षा के क्षेत्र में आगे बढ़ सकते हैं।
- साहित्य अध्ययन से उनके व्यक्तित्व में आलोचनात्मक दृष्टिकोण तथा ज्ञानात्मक संवेदना का विकास हो सकेगा।
- अतीत से वर्तमान तक साहित्य की अवधारणा का मूल्यांकन करने के साथ साहित्य के माध्यम से समाज को समझने की दृष्टि विकसित होगी।

Department of History, I B (PG) College, Panipat

Program Specific Outcomes

At the end of the three-year program in History the students will : -

- o have knowledge of major historical events and processes of Indian history from the earliest times to the modern times.
- o develop comprehensive understanding of social relationships, religious practices, cultural values, and administrative practices during different ages of Indian History.
- o be capable of developing intellectual flexibility and creative ideas.
- o have knowledge of the emergence of the modern world.
- o acquire knowledge of historical texts, sources and how historians interpret past.
- o promote nation building activities, peace, international understanding, and restoration of fruitful relations.
- o analyse relationship between past and present and have an idea of the direction of future.

इतिहास विभाग, आईबी (पीजी) कॉलेज, पानीपत
कार्यक्रम विशिष्ट परिणाम

इतिहास में तीन साल अध्ययन के उपरांत विद्यार्थी: -

- o प्राचीन काल से आधुनिक काल तक भारतीय इतिहास की प्रमुख ऐतिहासिक घटनाओं और प्रक्रियाओं को जान पाएंगे।
- o भारतीय इतिहास के विभिन्न युगों के दौरान सामाजिक संबंधों, धार्मिक प्रथाओं, सांस्कृतिक मूल्यों तथा प्रशासनिक प्रथाओं की व्यापक समझ विकसित कर पाएंगे।
- o बौद्धिक रूप से लचीलापन और रचनात्मक विचारों को विकसित करने में सक्षम होंगे।
- o आधुनिक दुनिया के उद्भव एवं विकास का ज्ञान प्राप्त करेंगे।
- o ऐतिहासिक ग्रंथों, स्रोतों और अतीत की समीक्षा प्रक्रिया का ज्ञान प्राप्त कर सकेंगे।
- o राष्ट्र निर्माण की गतिविधियों, शांति – व्यवस्था, अंतर्राष्ट्रीय परिदृश्य को समझते हुए उपयोगी संबंधों का विकास कर सकेंगे।
- o अतीत और वर्तमान के बीच संबंधों का विश्लेषण करते हुए भविष्य की दिशा का अनुमान लगा पाएंगे।

Department of History, I B (PG) College, Panipat

Program Specific Scope

- Students, acquainted with historical understanding, can opt for professions, such as guides for historical sites and museum curators etc.
- Students will be able to develop academic capability to teach History as a subject in schools and colleges. They can also go for research work in History.
- They will be able to prepare for various types of competitive exams.
- They will also be able to become columnists, designers, blog writers and documentary makers etc. with deep understanding of society and culture after studying this subject.

- ऐतिहासिक समझ से परिपूर्ण विद्यार्थी बहुत से व्यवसायों का विकल्प चुन सकते हैं - जैसे कि ऐतिहासिक स्थलों के लिए गाइड और संग्रहालय क्यूरेटर आदि।
- विद्यार्थी विद्यालयों और महाविद्यालयों में इतिहास को एक विषय के रूप में पढ़ाने के लिए शैक्षणिक क्षमता विकसित करने में सक्षम होंगे। वे इतिहास में शोध कार्य के लिए भी जा सकते हैं।
- वे विभिन्न प्रकार की प्रतियोगी परीक्षाओं की तैयारी कर सकेंगे।
- समाज और संस्कृति की गहरी समझ के साथ स्तंभकार, डिजाइनर, ब्लॉग लेखक और वृत्तचित्र निर्माता आदि बन सकेंगे।

हिन्दी विभाग, आई. बी. स्नात्कोत्तर महाविद्यालय, पानीपत

कार्यक्रम विशिष्ट परिणाम: स्नातकोत्तर कक्षाएं

महाविद्यालय में वर्तमान में संचालित स्नातकोत्तर कार्यक्रम की पूर्णता पर छात्र निम्न प्रकार से लाभान्वित होंगे:-

- प्रशासन, अनुवाद, पत्रकारिता, शिक्षण, लेखन, अलोचना के क्षेत्र में छात्र अपना कैरियर बना सकते हैं ।
- विभिन्न प्रतियोगी परीक्षाओं में पूछे जाने वाले हिन्दी शब्द भंडार से संबंधित प्रश्नों का उत्तर दे पाएंगे।
- उच्चारण शुद्धता तथा धाराप्रवाह से अभिव्यक्ति कौशल का विकास होगा ।
- हिन्दी साहित्य तथा भारतीय भाषाओं के साहित्य का एकल या तुलनात्मक अध्ययन करने के पश्चात विभिन्न क्षेत्रों में शोध कार्य को अपना सकेंगे।
- विभिन्न भाषाओं एवं साहित्य के अध्ययन से भारतीय समाज, संस्कृति, विरासत और मूल्यों को साहित्य के आधार पर समझ सकेंगे।
- हिन्दी साहित्य के इतिहास में प्राचीन, मध्यकालीन और आधुनिक साहित्य का ज्ञान प्राप्त करते हुए साहित्य के व्यापक आधार को समझकर उसके मुख्य सरोकारों को ग्रहण करते हुए सामाजिक बदलाव में आशातीत भूमिका निभा सकेंगे।
- आधुनिक हिन्दी साहित्य में दलित, स्त्री, आदिवासी, किसान, पर्यावरण, बाज़ारवादी आदि विमर्शों का ज्ञान प्राप्त कर राष्ट्रीय तथा अंतर्राष्ट्रीय स्तर पर बहुविषयक शोध के विभिन्न क्षेत्रों में आगे बढ़ सकते हैं।
- हिन्दी में कम्प्यूटर और सॉफ्टवेयर का ज्ञान प्राप्त कर तकनीकि क्षेत्र में कुशलतापूर्वक कार्य कर सकते हैं।

SUMMARY: DEPARTMENT OF MUSIC

The Department of Music, Vocal and Instrumental, is an esteemed department that has been nurturing musical talent since its inception in 1956. The department embarked on its journey with just two students, which has since grown into a hub of musical excellence.

Recognizing music as a spiritual art form, the department holds a deep appreciation for the transformative power of music. It offers a comprehensive curriculum that encompasses both vocal and instrumental training, fostering a well-rounded understanding of various musical styles and techniques.

As an integral part of the institution, the Department of Music plays a vital role in shaping the cultural landscape. It offers music as a subject for Bachelor of Arts students, allowing them to explore their passion for music alongside their chosen academic path. Additionally, the department extends its reach by providing music courses for students pursuing a Bachelor of Arts in English Honors, enriching their academic journey with the harmonious blend of language and melody. The department takes active participation in the activities organized by the University and Art and Culture Department, Haryana. Youth Festivals are also a gala event for the students where their showcase their talent on various levels. The students of IB PG College have carved a niche for themselves every year by their marvellous performances.

With a rich legacy spanning over six decades, the Department of Music continues to inspire and nurture aspiring musicians, creating a harmonious symphony that resonates within the hearts and minds of its students and the broader community.

SCOPE OF BACHELOR IN MUSIC PROGRAM

- Career Opportunities: A Bachelor's degree in Music opens up a wide range of career opportunities in the music industry. Graduates can pursue careers as performers, composers, music teachers, music therapists, sound engineers, music producers, music journalists, and more.

- Performance Skills: The program focuses on developing students' performance skills in their chosen instrument or voice. They receive comprehensive training in areas such as technique, interpretation, stage presence, and ensemble playing, enabling them to excel as performers.

- Music Theory and Composition: Students gain a deep understanding of music theory, composition, and arrangement. They learn to analyze musical works, write original compositions, and explore different genres and styles. This knowledge enhances their musical creativity and versatility.

- Music Education: The program equips students with the necessary skills to become music educators. They learn about curriculum development, instructional strategies, and assessment techniques. Graduates can work as music teachers in schools, colleges, community centers, and private studios.

- Music Technology: With the rapid advancement of technology in the music industry, students in a Bachelor's program in Music are exposed to music production software, recording techniques, and digital music tools. This prepares them to work in studios, production houses, and multimedia companies.

- Music History and Appreciation: Students study the history of music, exploring different periods, genres, and composers. They develop a broader perspective and appreciation for diverse musical traditions, enhancing their ability to interpret and perform music from various eras.

- Collaborative Skills: Collaboration is an essential aspect of the music industry. Students engage in ensemble performances, group projects, and interdisciplinary collaborations. They learn to work effectively as part of a team, adapting to different musical styles and collaborating with musicians from various backgrounds.

- Music Industry Knowledge: The program provides insights into the music industry's workings, including artist management, music marketing, copyright laws, and music publishing. Graduates are well-prepared to navigate the business aspects of the music industry and pursue entrepreneurial opportunities.

- Professional Development: Throughout the program, students receive guidance on career development, networking, and building a professional portfolio. They have

opportunities to showcase their talent through recitals, concerts, and competitions, gaining exposure and recognition in the music community.

- Advanced Studies: A Bachelor's degree in Music lays the foundation for further studies in music at the graduate level. Graduates can pursue Master's degrees or specialized programs in areas such as performance, composition, music education, music therapy, and musicology, deepening their expertise and opening up higher-level career opportunities.

PROGRAM OUTCOME: MUSIC VOCAL AND INSTRUMENTAL

- The outcome of the Bachelor of Music program can be summarized in the following 15 points:

- Musical Proficiency: Graduates of the program possess a high level of musicianship, with advanced skills in their primary instrument or voice.

- Technical Mastery: They demonstrate technical proficiency in areas such as music theory, composition, conducting, and music technology.

- Performance Skills: Students develop exceptional performance abilities through rigorous training, enabling them to excel as soloists, ensemble members, or accompanists.

- Aesthetic Sensibility: The program nurtures a deep appreciation for various musical genres, styles, and historical periods, fostering a well-rounded musical taste.

- Artistic Expression: Graduates are adept at expressing their artistic vision through their music, interpreting and conveying emotions effectively to captivate audiences.

- Critical Listening: They develop keen ears and analytical skills to discern and evaluate the nuances of sound, performance, and musical interpretation.

- Creative Composition: Students acquire the ability to compose original music, demonstrating creativity, innovation, and a firm grasp of compositional techniques.

- Collaborative Skills: The program emphasizes teamwork and ensemble playing, enabling graduates to effectively collaborate with fellow musicians and create cohesive musical performances.

- Music Education: Graduates gain a solid foundation in music pedagogy, enabling them to become effective teachers, imparting their knowledge and passion to future generations.

- Professional Ethics: The program instills a strong sense of professionalism, integrity, and ethical conduct in the music industry.

- Cultural Appreciation: Students develop an understanding and appreciation for diverse musical cultures, broadening their global perspective and promoting cultural inclusivity.

- Research Skills: Graduates acquire research methodologies, allowing them to engage in scholarly work, musicology, or music-related research projects.

- Lifelong Learning: The Bachelor of Music program fosters a love for continuous learning, encouraging graduates to pursue advanced degrees or engage in professional development opportunities.

- Performance Opportunities: Students are exposed to a wide range of performance opportunities, including recitals, concerts, competitions, and collaborations, honing their stage presence and confidence.

- Career Pathways: The program equips graduates with the skills and knowledge

necessary to pursue diverse career paths, such as performing musicians, composers, music educators, arts administrators, music therapists, and more.

- ◦ Overall, the Bachelor of Music program empowers students to become versatile, skilled musicians, ready to contribute to the vibrant world of music and embark on fulfilling careers in the industry.

COURSE OUTCOME MUSIC INSTRUMENTAL

- **BA 1st Semester**
- Paper1. Imparts knowledge about the basic principles of music.
- Paper2. Introduces the practical approach of the nuances of classical music and sitar.
- **BA 2nd Semester**
- Paper1. Imparts the knowledge of basic elements of music and the contribution of the legendary musicians.
- Paper2. Deals with the practical rendition of ragas and talas, hand techniques and other basics.
- **BA 3rd Semester**
- Paper1. Historical analysis of the basic nuances, genres and contemporary trends.
- Paper2. Study of the ragas and talas through practical demonstration.
- **BA 4th Semester**
- Paper1. The study of classical genres and advanced topics.
- Paper2. To demonstrate the ragas with proper vadan techniques.
- **BA 5th Semester**
- Paper1. Learning the inter-relationship of fine arts, study of notation system and the contributions of the musicologists.
- Paper2 Learning ragas and talas of advanced level.
- **BA 6th Semester**
- Paper1. Historical survey of music and instruments and music of different regions.
- Paper2. Ability to recite the ragas and talas in the proper performing artist manner.

COURSE OUTCOME: MUSIC VOCAL

BA 1st Semester

Paper1. Imparts knowledge about the basic principles of music.

Paper2. Introduces to the practical approach of the nuances of classical music.

BA 2nd Semester

Paper1. Imparts the knowledge of basic elements of music and the contribution of the legendary musicians.

Paper2. Deals with the practical rendition of ragas and talas

BA 3rd Semester

Paper1. Historical analysis of the basic nuances, genres and contemporary trends.

Paper2. Study of the ragas and talas through practical demonstration.

BA 4th Semester

Paper1. The study of classical genres and advanced topics.

Paper2. To demonstrate the ragas with proper gayaki.

BA 5th Semester

Paper1. Learning the inter-relationship of fine arts, study of notation system and the contributions of the musicologists.

Paper2 Learning ragas and talas of advanced level.

BA 6th Semester

Paper1. Historical survey of music and instruments and music of different regions.

Paper2. Ability to recite the ragas and talas in the proper performing artist manner.