



HISLOP COLLEGE

Nagpur

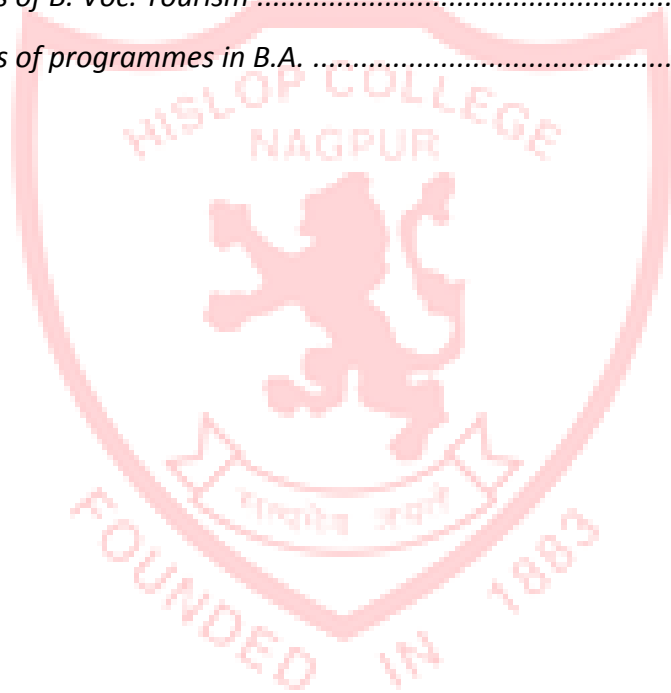
2.6.1. Programme and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students

- [Outcomes of Undergraduate Programmes offered by the Institution](#)
- [Outcomes of Post Graduate Programmes offered by the Institution](#)
- [Outcomes of Diploma Programmes offered by the Institution](#)

Outcomes of Undergraduate Programmes offered by the Institution

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Programme outcomes of programmes in B.Sc.

- PO1. Domain knowledge:** Students will possess a breadth and depth of disciplinary knowledge in the field of Science.
- PO2. Scientific Judgment & Critical Thinking:** Students will be able to analyze information objectively and make a reasoned judgment by observation, understanding and evaluation of sources, such as data, facts and research findings.
- PO3. Problem solving & Analytical Skills:** Students will be able to think rationally, analyze situations and solve problems skillfully.
- PO4. Environment and sustainability:** Ability to understand the issues related to environmental contexts and sustainable development
- PO5. Effective Communication:** Students will be able to present ideas clearly and confidently with skills to negotiate with others. They will be able to evaluate primary literature, in oral and written form and subsequently articulate the information.
- PO6. Leadership & Team work:** Ability to work as a leader as well as in a team for group projects and group activities and participate actively, in a healthy spirit
- PO7. Ethical & Moral values:** Students will bear the core characters of honesty, integrity and commitment and imbibe qualities of empathy for fellow human beings.
- PO8. Effective Citizenship and Social Interaction:** Students will develop tolerance and harmony towards cultural, regional, linguistic, communal, socioeconomic and other diversities and respect for national symbols of pride.

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Programme Specific Outcomes for Programmes in Life Sciences

Programmes in Life Sciences:

1. B. Sc. with Chemistry, Botany, Zoology (CBZ)
2. B. Sc. with Chemistry, Botany, Biochemistry (CBBc)
3. B. Sc. with Chemistry, Zoology, Biochemistry (CZBc)
4. B. Sc. with Chemistry, Botany, Biotechnology (CBBt)
5. B. Sc. with Chemistry, Zoology, Biotechnology (CZBt)

Programme Specific outcomes

- PSO1. **RECOLLECTION:** Students will be able to identify the major groups flora and fauna and be able to classify them within a phylogenetic framework. Students will be able to compare and contrast the characteristics, macromolecular structures of biomolecules at cellular and molecular level.
- PSO2. **UNDERSTANDING:** Students will be able to associate the theoretical concepts with the practical observations and draw inferences for better comprehension
- PSO3. **APPLICATION:** Students will be able to apply the domain knowledge and present their ideas in order to extrapolate science to everyday life. Students will be able to integrate classroom knowledge with field work to develop entrepreneurial skills like Floriculture, Apiculture, Diagnostics, Dietetics, Phenyl making, Bioinformatics etc.
- PSO4. **ANALYSIS:** Students will gain analytical skills and research ability. This will be facilitated by making observations, collecting data in laboratory and in the field. They will be trained to analyze these results, derive conclusions and report their findings.
- PSO5. **EVALUATION:** Students will be equipped to judge, support or critique the scientific information like global warming, forest fires, vaccine drives, oil spills etc.
- PSO6. **CREATION:** Students will be able to design, author and present scientific ideas as presentations, popular science articles, scientific write ups and graduate research projects.
- PSO7. Students will be able to use instruments independently pertaining to their domain knowledge and understand the principles of instrumentation and their application

Subject wise Course Outcomes (CO)

BIOCHEMISTRY

- CO1. Successful completion of the course will provide them the understanding of Biochemistry as a discipline and milestone discoveries in life sciences that led establishment of Biochemistry as a separate discipline.
- CO2. This course will make them learn the contributions of Louis Pasteur, Edward Jenner and Robert Koch in microbiology and immunology. They will get acquainted with importance of microorganisms as model systems in genetics and biochemistry.
- CO3. Students will get trained in performing routine microbiological practices such as sterilization, media preparation, maintenance of microbial culture, staining and screening microbes for antibiotic resistance etc.
- CO4. Students will have the understanding of human physiology and acquire practical training for qualitative and quantitative analysis of biological samples such as RBC, WBC, haemoglobin, protein, uric acid, creatinine, urea, phosphorus etc.
- CO5. Curriculum will make them understand the fundamental properties of elements, their role in formation of biomolecules and in chemical reactions within living organisms.
- CO6. The course will enable them to understand the concepts of biophysical chemistry and fundamental laws relating to photochemistry and photometry, centrifugation and radiometry in analytical determination and characterization of biomolecules.
- CO7. The students will develop competence and hands-on training in basic separation techniques in biochemistry like electrophoresis, chromatography, spectrophotometry and immune techniques, their applications in biological investigations.
- CO8. Study of Enzymology will give them fundamental knowledge on enzymes, their importance in biological reactions, concept of activation energy, role of enzymes in clinical diagnosis. And practical skills to determine enzyme activity, isolation and assay of enzymes.
- CO9. The course will enable to understand the properties of carbohydrates, proteins, Lipids, cholesterol, DNA, RNA, glycoprotein and glycolipids and their importance in biological systems.

- CO10. Students will know the basic concepts of bioenergetics, catabolic and anabolic mechanisms of metabolism and mechanism of ATP synthesis under aerobic and anaerobic conditions.
- CO11. Students will gain the understanding of mechanism of signal transduction by Steroid and peptide hormones and the role of second messengers in signal transduction.
- CO12. Molecular Biology paper will enable them to understand the role of DNA as genetic material, replication, transcription, genetic code, translation and gene regulation.
- CO13. Techniques in genetic engineering. Acquire practical skills to isolate RNA, DNA, total nucleic acids and total RNA from bacteria, yeast and plant tissues.

BIOTECHNOLOGY

- CO1. Describe the contribution of microbiologists, the principle and application of various types of microscopic techniques, and different staining protocols
- CO2. Describe the ultrastructure of a bacterial cell structure
- CO3. Classify microorganisms on the basis of physiological and nutritional requirements
- CO4. Discuss characteristics of viruses, classification and life cycles of viruses
- CO5. Describe the structure and function of DNA and RNA in the cell
- CO6. Describe the structure of proteins, including the significance of amino acid R-groups and their impact on the three-dimensional structure of proteins.
- CO7. Quantitative and qualitative estimation of proteins, nucleic acids
- CO8. Discuss the structure of Microtubules, microfilaments & can differentiate the organisms by its cell structure
- CO9. Discuss the classification, biological function and chemical and physical properties of macromolecules
- CO10. Describe the various metabolic pathways in the cell
- CO11. Describe principle, working and applications of various biophysical techniques
- CO12. Explain immune system, properties of immune system, types of immunity, pathways of complement systems
- CO13. Explain molecular processes like DNA replication, transcription, translation, mutations and repair systems
- CO14. Application of PCR and rDNA technology in human health and agriculture

BOTANY

- CO1. Understand general characters, classification, life cycle and economic importance of Prokaryotes (Mycoplasma, Bacteria, Virus) and Algae (Chara, Vaucheria, Batrachospermum and Ectocarpus). Skill Development – Biofertilizers
- CO2. Understand general characters, classification, life cycle and economic importance of Fungi (Albugo, Mucor, Puccinia, Cercospora), Lichens, Bryophytes (Marchantia, Anthoceros, Funaria). Study symptoms, disease control and host pathogen relation of common plant diseases (Citrus Canker, Leaf Curl of Papaya and red rot of Sugarcane). Skill Development – Mushroom Cultivation
- CO3. Study of Paleobotany with respect to Geological Time Scale, Fossilization theories and types of fossils with special reference to Glossopteris. Understand general characters, classification, life cycle and economic importance of Pteridophytes (Rhynia, Selaginella, Equisetum), Gymnosperms (Cycas, Pinus, Cycadeoidea). To study the concepts of apogamy, apospory, stelar system, heterospory and seed habit in Pteridophytes. Skill Development – Soil Analysis
- CO4. Comprehension of Angiospermic morphology (Root, Stem, Leaf, Inflorescence, Flower and floral parts) and fruits. Skill Development – Floriculture
- CO5. To study origin of angiosperms, their phylogeny and fossil history with reverence to fossil angiosperm (Sahnianthus). Study of Angiospermic taxonomy and nomenclature. Description of angiospermic classifications, systems, modern trends and study of selected families of dicots (Malvaceae, Euphorbiaceae, etc) and monocots (Poaceae).
- CO6. Study of structure, ultra-structure and functions of Cell and cell organelles. Describe chromosome organization, sex chromosome cell division on plants and plant breeding. Basics of biostatistics and evolution.
- CO7. Comprehension of basic body plan, modular growth, meristematic and permanent tissue system in plants and theories on RAM & SAM. Study of primary, secondary and anomalous growth in root stem and leaf. Description of pollination mechanisms, micro, megasporogenesis and embryogenesis with reference to monocot and dicot embryo development.

- CO8. Study of Mendelian and Non Mendelian Inheritance ratios, linkage, crossing over, structural and numerical aberrations in chromosomes. Structure and replication of DNA, concept of gene, regulation of gene expression, transcription, translations and mutations.
- CO9. Characteristics and chemical properties of some biomolecules, basic enzymology, plant water relations and mineral nutrition. To study basic concepts of physiological processes like photosynthesis, respiration and nitrogen metabolism.
- CO10. Study of Ecology, branches and significance, climatic, edaphic and physiographic factors. Description of Biogeochemical cycles, components of ecosystems, autecological and synecological studies. Comprehension of principles of phytogeography and climatic regions of India.
- CO11. To study photo morphological principles like phytochromes, circadian rhythms, plant movements and photoperiodism. Study of plant growth regulators and applied aspects of tissue culture and genetic engineering.
- CO12. Description of ecological succession and plant adaptations. To study environmental pollution, causes, control and Natural resource management. Study of economically and ethanobotanically important plants. Understanding of basic principles and applications of microscopy, electrophoresis, spectroscopy and chromatography.
- CO13. Students will acquire knowledge of applications of the studied theory by indulging in the self-study modules that cover the applied aspects of the subject.
- CO14. Students will also gain a practical exposure to every topic enumerated

CHEMISTRY

- CO1. Be able to understand the atomic structure based on quantum mechanics and explain periodic properties of the atoms and the periodic properties of the different groups of compounds focusing on production methods and application of selected elements and compounds.
- CO2. Be able to describe the characteristics of the three states of matter and to predict the pattern of crystal structures depending upon their unit cells.
- CO3. Be able to perform qualitative analysis of inorganic salt mixture containing two acidic radicals of different group and two basic radicals of same groups. Also be able

understand basic concept thermodynamics, adsorptions, surface tension and viscosity to perform various quantitative experiments.

- CO4. Be able to understand basic bonding, general stereochemistry and different types of organic compounds.
- CO5. To restate definition of system, surrounding, closed and open system, extensive and intensive properties and to calculate absolute and gage pressure, and absolute temperature and be able to calculate changes in kinetic, potential, enthalpy and internal energy along with derivation of the ideal and real gas equations of state.
- CO6. Be able to understand various aspects of qualitative organic analysis and determination of M.P and B.P. Also to get acquainted with the wider experimental techniques of solution chemistry and phase equilibrium.
- CO7. Get acquainted with the definition of coordination compounds, naming them and decide isomerism and to explain the theory of the determination of the electron structure of d-metal complexes and explain the properties of these complexes.
- CO8. Be able to conceptualize the understanding of organic reaction mechanisms and understanding of fuel chemistry along with more advanced understanding of different organic functional group and their reactivity's.
- CO9. Facilitate the learner to make solutions of various molar concentrations. It will include: The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration; Dilution of Solutions; Making different molar concentrations.
- CO10. Be able to understand the consequences of lanthanide contraction and to gain understanding of the unique chemical and physical characteristics of f-element compounds and the role of the elements in modern applications.
- CO11. Be able to recognize the reaction of electrochemical cells and types. Also get understanding of the applications of EMF measurement, electrode polarization, decomposition potential and concentration over potential.
- CO12. Be able to understand the synthesis protocols of various inorganic complexes and chromatographic separation of binary mixtures on the basis of R_f values. To perform conductometric titration analysis used to identify the concentration of a given analyte in a mixture.
- CO13. Be able to better understand the heterocyclic compounds and introductory understanding of organic spectroscopy.

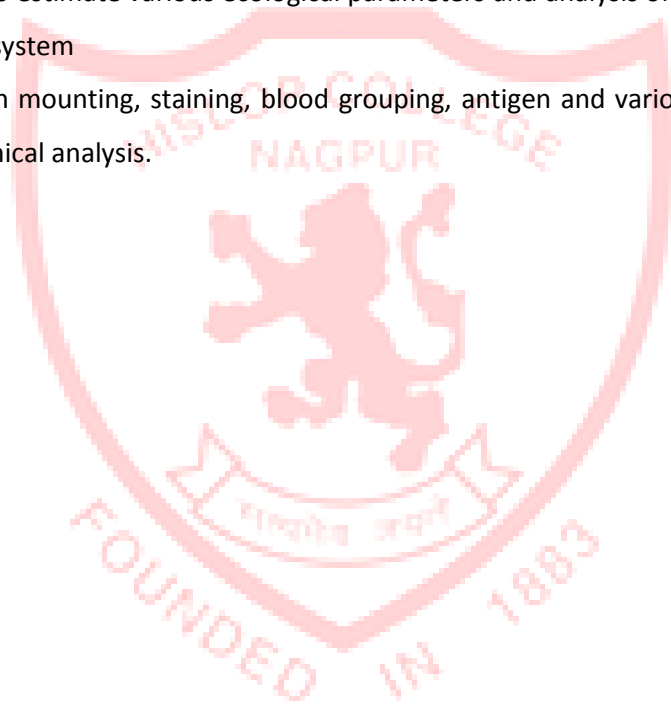
- CO14. Be able to describe quantum yield and the method of its determination and to derive quantum yield of fluorescence and phosphorescence. Also be able to define lowering of vapour pressure, elevation of B.P. and depression of F.P. and establish the relationship between molality and elevation of B.P. or depression of F.P.
- CO15. Be able to perform quantitative estimations of organic functional groups along with experiments of potentiometric applications on redox systems.
- CO16. Be able to predict the d-orbital splitting pattern in different geometries like octahedral, tetrahedral and to calculate magnetic moment & crystal field stabilization energy of metal complexes.
- CO17. Be able to understand better fundamentals of more advanced organic materials like peptides, other biomolecules and NMR spectroscopy.
- CO18. Be able to separate of an organic mixture containing two solid components using NaOH /NaHCO₃ and identification of the components and preparation of suitable derivatives.

ZOOLOGY

- CO1. To familiarize, identify and classify (up to class level) the invertebrates, understand the basis of life processes and recognize the economic importance of important invertebrate fauna.
- CO2. To create awareness in maintaining the balance of the nature by understanding the structure, composition and function of basic environmental components so that the correlation between biotic and abiotic factors of nature can be better described.
- CO3. To facilitate an understanding of the basis of life processes of the invertebrate fauna.
- CO4. Develop deeper understanding of what life is and how it functions at cellular level by describing cellular membrane structure and function, fine structure and function of cell organelles.
- CO5. Describe the general characteristics, classification and diversity in form, structure and habits of fishes, amphibians, reptiles, birds and mammals.
- CO6. Understanding of various aspects of embryology in fish, frog, chick and mammals.
- CO7. Distinguish classical genetics and molecular genetics and familiarize with the tools and techniques of Genetics
- CO8. Understand the molecular basis of cellular activities, distinguish innate immunity and acquired immunity and understand the importance of immune system

- CO9. Understand the function of digestive, excretory, respiratory and circulatory systems and apply the knowledge to lead a healthy life
- CO10. Understand the scope and relevance of Aquaculture, Prawn culture, Pearl culture, Sericulture, Apiculture and Lac culture
- CO11. Understand the function of Control and coordination systems and various ailments associated with the system and apply the knowledge to lead a healthy life.
- CO12. Familiarize with various techniques involved in biological studies; understand the importance of various tools and applications of biotechnology, bioinformatics and probability.
- CO13. Ability to estimate various ecological parameters and analysis of different components of the ecosystem
- CO14. Study on mounting, staining, blood grouping, antigen and various immunity organs and biochemical analysis.

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Programme Specific outcomes for Programmes in Mathematical Sciences

Programmes in Mathematical Sciences:

1. B. Sc. with Physics, Chemistry, Mathematics (PCM)
2. B. Sc. with Physics, Electronics, Mathematics (PEM)
3. B. Sc. with Physics, Statistics, Mathematics (PSM)
4. B. Sc. with Physics, Computer Science, Mathematics (PC/SM)
5. B. Sc. with Statistics, Computer Science, Mathematics (S/CSM)

Programme Specific outcomes

- PSO1. **RECOLLECTION:** Enabling students to develop a keen interest in the subjects, which they have opted for in their graduate programme. The programmes help the students to develop conceptual understanding so that, they can recognize, recall and apply the definitions, concepts and techniques which they have studied.
- PSO2. **UNDERSTANDING:** Helping the students to acquire good knowledge and understanding in advanced areas so that, they are able to set appropriate goals and choose their future career by pursuing higher education in the areas / courses like- M. Sc., M.C.A, M.B.A, Actuarial Science, Clinical research, Data Science, Machine Learning, Financial Mathematics, Biostatistics etc.
- PSO3. **APPLICATION:** Knowledge in Mathematics, Physics, Electronics, Statistics, Computer Science subjects will be helpful for students in working on field projects / market surveys and real life problems/ technical issues, in order to provide them experiential training on- applying statistical techniques / electronic technical tools / computational algorithms / mathematical modeling etc , for arriving at the conclusion / problem solving status.
- PSO4. **ANALYSIS:** Mathematical Science develops scientific temper and analytical ability amongst students so that, they are ever ready to welcome new project, new knowledge and experiments or to join research development in multidisciplinary research.
- PSO5. **EVALUATION:** Studying three subjects throughout a 3- year degree programme in Mathematical Sciences enhances student's overall development, critical thinking, analytical aptitude and problem solving skill.

- PSO6. **CREATION:** Students will be able to demonstrate understanding of their scientific knowledge by participating / presenting their ideas /work in student seminars / research talks as well as will be keen in knowing the current trends in their subject(s) of interest.
- PSO7. Studying three subjects in a degree programme increases students' creativity. Students will be able to expand their learning horizons and can keep a track of scientific developments from multidisciplinary aspect.

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Subject wise Course Outcomes (CO)

COMPUTER SCIENCE

- CO1. Implement Number conversion System
- CO2. Classify memory as Primary memory and Secondary
- CO3. Understand working and types of input, output and storage devices
- CO4. Describe Networking Topologies and networks and Classify Networking Protocols as per their implementation
- CO5. Working with Basic Controls and Implement built in functions Visual Basic 6.0
- CO6. Create Menus and Popup Menus using VB6.0
- CO7. Handle Procedure, Methods and Arguments of a Function
- CO8. Handle Data Base Management Systems
- CO9. Classify Inheritance with specific features and implement Exception Handling Model
- CO10. Describe Elements of Object Oriented programming and Classify types of constructors with examples using Examples
- CO11. Describe operator overloading with examples
- CO12. Understand Order of Construction and Destruction of constructor and destructor
- CO13. Describe Tokenization in Lexical Analysis Phase of Compilation
- CO14. Describe Parsing in Syntax Analysis Phase of Compilation
- CO15. Convert Source Code into Optimized Three Address Code
- CO16. Generate Target code from the Source code using model

CHEMISTRY

- CO19. Be able to understand the atomic structure based on quantum mechanics and explain periodic properties of the atoms and the periodic properties of the different groups of compounds focusing on production methods and application of selected elements and compounds.
- CO20. Be able to describe the characteristics of the three states of matter and to predict the pattern of crystal structures depending upon their unit cells.
- CO21. Be able to perform qualitative analysis of inorganic salt mixture containing two acidic radicals of different group and two basic radicals of same groups. Also be able

- understand basic concept thermodynamics, adsorptions, surface tension and viscosity to perform various quantitative experiments.
- CO22. Be able to understand basic bonding, general stereochemistry and different types of organic compounds.
- CO23. To restate definition of system, surrounding, closed and open system, extensive and intensive properties and to calculate absolute and gage pressure, and absolute temperature and be able to calculate changes in kinetic, potential, enthalpy and internal energy along with derivation of the ideal and real gas equations of state.
- CO24. Be able to understand various aspects of qualitative organic analysis and determination of M.P and B.P. Also to get acquainted with the wider experimental techniques of solution chemistry and phase equilibrium.
- CO25. Get acquainted with the definition of coordination compounds, naming them and decide isomerism and to explain the theory of the determination of the electron structure of d-metal complexes and explain the properties of these complexes.
- CO26. Be able to conceptualize the understanding of organic reaction mechanisms and understanding of fuel chemistry along with more advanced understanding of different organic functional group and their reactivity's.
- CO27. Facilitate the learner to make solutions of various molar concentrations. It will include: The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration; Dilution of Solutions; Making different molar concentrations.
- CO28. Be able to understand the consequences of lanthanide contraction and to gain understanding of the unique chemical and physical characteristics of f-element compounds and the role of the elements in modern applications.
- CO29. Be able to recognize the reaction of electrochemical cells and types. Also get understanding of the applications of EMF measurement, electrode polarization, decomposition potential and concentration over potential.
- CO30. Be able to understand the synthesis protocols of various inorganic complexes and chromatographic separation of binary mixtures on the basis of R_f values. To perform conductometric titration analysis used to identify the concentration of a given analyte in a mixture.
- CO31. Be able to better understand the heterocyclic compounds and introductory understanding of organic spectroscopy.

- CO32. Be able to describe quantum yield and the method of its determination and to derive quantum yield of fluorescence and phosphorescence. Also be able to define lowering of vapour pressure, elevation of B.P. and depression of F.P. and establish the relationship between molality and elevation of B.P. or depression of F.P.
- CO33. Be able to perform quantitative estimations of organic functional groups along with experiments of potentiometric applications on redox systems.
- CO34. Be able to predict the d-orbital splitting pattern in different geometries like octahedral, tetrahedral and to calculate magnetic moment & crystal field stabilization energy of metal complexes.
- CO35. Be able to understand better fundamentals of more advanced organic materials like peptides, other biomolecules and NMR spectroscopy.
- CO36. Be able to separate of an organic mixture containing two solid components using NaOH /NaHCO₃ and identification of the components and preparation of suitable derivatives.

PHYSICS

- CO1. The students will be able to learn application in daily life like the cantilever in of buildings, bridges and diving boards of swimming pools.
- CO2. Students learn about static charges and the principles governing the production, the theories behind them.
- CO3. Students also learn about different capacitors, dielectric and insulating materials and their uses like running of ceiling fans, electrical motors.
- CO4. Students learn novel concepts in transformer making; have critical thinking about design and fabrication of transformers for potential uses in laboratory.
- CO5. The transformers used in amplifying the A.C. voltage and theory behind them is learnt by the students. The theories behind the A.C. current flow, the use of complex numbers for the calculation of complex A.C circuits are learnt.
- CO6. The students will be able to learn the concepts of Astrophysics and Astronomy and visualize the motion of planets, evolution of universe and latest developments in the field of astronomy and astrophysics.
- CO7. Principles governing basic concepts of Super Conductivity are learnt.
- CO8. Students learn basic properties of magnets and their application in accessories using the concept of magnetism.

- CO9. The phenomenon of electromagnetism is introduced to the students and how contactless current measuring devices are made using the principles of electromagnetism.
- CO10. Students learn about the electrical devices which use the concepts of magnetism for their operation.
- CO11. The students will be able to learn details about human ear, the limits of audibility, musical instruments, different tones and harmonics.
- CO12. How Physics helps the people to design new instruments for melodious music is a part of this topic.
- CO13. It helps the students to get factual and physics backed information related to Transducers and their characteristics (Crystal microphone, Moving coil loud speaker).
- CO14. Recording and reproduction of sound (Magnetic tape, Cine film, Compact disc) and acoustics of a building, music hall and cinema theatre.
- CO15. The students will be able to learn details and applications on interferometers, newton's rings, gratings used in spectroscopy, blue colour of sky, how light affects us due to atmosphere.
- CO16. Detailed study of Electromagnetic waves, how the electromagnetic waves propagate and have relevance in transmission through different media with different refractive indices.
- CO17. The students will be able to get exposed to different Crystals systems, the structure of Crystals and diamond.
- CO18. Laser applications, basics of how lasers are manufactured. Different types of Lasers and their uses for human, industries and hospitals
- CO19. Students also learn about Light emitting diode, Solar Cell, Photovoltaic cell, Bipolar transistor- Construction and working, transistor characteristics in CE and CB Mode.
- CO20. Students learn about field effect transistors like MOSFET, JFET and their applications in IC fabrication.
- CO21. The basics of Molecular spectra are studied so that the students can explore the application part in research field.
- CO22. Application of Magnetic Resonance Imaging (MRI) using concepts of Nuclear Magnetic Resonance (NMR) are learnt.
- CO23. Student will be able to describe the atomic spectra of one and two valence electron atoms and explain the change in behavior of atoms in external applied electric and

magnetic field and learn free electron gas model to explain, thermal conductivity, electrical conductivity, optical behaviour in solids.

- CO24. Students get acquainted with all the three statistics to distinguish between different types of particles like bosons, fermions and classical particles distributed among energy levels and used for deriving thermodynamic expressions.
- CO25. The student will be able to apply Schrodinger Wave equation to solve the problems in wave mechanics.
- CO26. The students will get an insight into many aspects of Nano Science and Technology and their applications in Materials Science.
- CO27. The students will learn concepts of Relativity which deals objects and heavenly objects.
- CO28. The students will learn about different radiations from radioactive elements and their reactions with matter.
- CO29. The student will get exposure to medical equipments like ECG, EEG, ERG, Sonography etc. which are used to analyse the changes in human body.
- CO30. The student learns different types of Amplifiers, OP-AMP technology, Oscillators and Communication technology.
- CO31. The student learns about basics of digital electronics which are the basics of computer hardware.

PHYSICS AND ELECTRONICS

- CO1. Familiarization with basic circuit elements and passive components
- CO2. Understand DC circuit theorems and their use in circuit analysis
- CO3. Understanding characteristic features of semiconductor devices
- CO4. This Module will enable students to familiarize with elementary electronic components and Circuits.
- CO5. Familiarization with concepts of digital electronics.
- CO6. Learning number systems and their representation.
- CO7. Understanding basic logic gates, Boolean algebra and k-maps
- CO8. Designing and Understanding arithmetic circuits, combinational circuits and sequential circuits.
- CO9. This module will help student understand and design basic digital electronic circuits.
- CO10. Understanding Applications Based on Basic Semiconductor Devices

- CO11. Understanding Basic Concepts of Amplifiers
- CO12. Enables Designing Aspects of Basic Amplifier Circuits.
- CO13. This module gives students hand on experience of active devices and designing aspect of these various applications.
- CO14. Enables Designing and Understanding Sequential device.
- CO15. Application of Sequential Device (counters and Shift Register).
- CO16. Understanding of Logic families' enables and Logic Circuits
- CO17. Understanding Basic Concept of Memories and memory device.
- CO18. This module will enhance students advance digital circuit designing skills.
- CO19. Designing and Understanding Elements of Power supply
- CO20. Acquaintance with various Voltage Regulator Circuits.
- CO21. Understanding Multistage Amplifier and its Application (OP-Amp)
- CO22. After completion of this Module, student will be able to design Power supply and different OP-AMP Application.
- CO23. Familiarization with Basic designing aspect of Instrumentation system
- CO24. Understanding Circuit maker Software.
- CO25. Designing basic electronic Circuits using Circuit maker Software
- CO26. After Completion of this Module, student will be able to design analog and digital circuits using Software thereby enhancing their Virtual Instrumentation skills.
- CO27. Familiarization with Basic Concept of Electronic Oscillator Principle and Circuits.
- CO28. Designing Advance Applications of Operational amplifier
- CO29. Familiarization With Converter Circuits and its necessity.(D/A and A/D Converters).
- CO30. After the end of this Module, student will be able to design advance Analog electronic devices
- CO31. Familiarization with Basic Concept of Transducers
- CO32. Understanding working of Various Transducers
- CO33. Designing basic Instrumentation system using Transducers
- CO34. Familiarization with Basics of Biomedical Instruments and its circuits
- CO35. After completion of this Module, students will be able to design small projects with transducers.
- CO36. Understanding Basic Elements of Electronic Communication
- CO37. Acquaintance with Various Electronic communication system

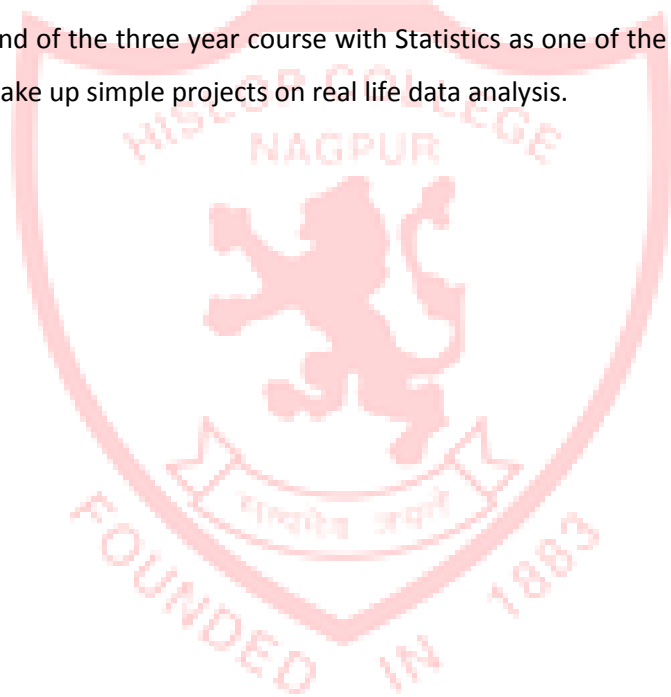
- CO38. Understanding medium and mode of data transfer in communication system
- CO39. After completion of this Module, student will have knowledge of Modern electronic Communication system
- CO40. Understanding Architecture of Basic Microprocessor
- CO41. Acquaintance with its various Elements like data type, instruction set and registers
- CO42. Programming the microprocessor with advance instruction set
- CO43. After completion of this Module, students are enable to write assembly language programming for microprocessor
- CO44. Understanding Basic Concept of C - language
- CO45. Acquaintance with its various data format and functions
- CO46. Understanding and Advance programming skills
- CO47. After the completion of this Module, students will be able to develop Application using C - language.
- CO48. Basic Designing Aspect of Microcontroller (Architecture)
- CO49. Acquaintance with its various Instruction sets which enhance programming skills
- CO50. Understanding Enhanced Architecture for Complex programs
- CO51. This module will enhance students programming skills for various microcontroller applications.

STATISTICS

- CO1. Understanding importance of data collection, its accuracy, methods of data collection and basics of Descriptive Statistics.
- CO2. Knowledge of the concepts of random experiments, definitions of probability and the results to compute the probabilities of events.
- CO3. Understanding discrete & continuous Probability distributions and its applicability in real life situations.
- CO4. Understanding concepts of measures of location, dispersion and skewness of a frequency distribution and knowing the techniques of correlation and linear regression with their real life applications.
- CO5. Understanding the concepts of bivariate probability distributions, Point estimation, UMVUE, as well as sampling distribution of an estimator.
- CO6. Knowing and understanding Applications of Statistics in Economics.

- CO7. Understand and apply the theories of classical inference involving estimation of parameters and testing of hypotheses.
- CO8. Knowing and understanding Applications of Statistics in Demography and Psychology & Education.
- CO9. Learning the techniques of Statistical Quality Control & Linear Programming.
- CO10. Knowing and understanding the techniques of survey sampling.
- CO11. Learning techniques of Project Management and Operations Research.
- CO12. Understand and apply basics and the techniques used in design of experiments
- CO13. Students will be able to understand, differentiate and apply the qualitative and quantitative analysis meaningfully.
- CO14. At the end of the three year course with Statistics as one of the subjects, students will be able to take up simple projects on real life data analysis.

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Programme outcomes of programmes B.Com

- PO1.** Domain Knowledge: Students will acquire theoretical knowledge and practical exposure within various disciplines of Commerce, Finance, Accounting, Economics, Marketing, Taxation and Auditing.
- PO2.** Critical Thinking and Decision Making: Students will be able to objectively analyze information in various sectors of commerce and trade. The programme will open up better professional opportunities by augmenting the decision making capability of the students.
- PO3.** Problem solving and Analytical Skills: Students will be able to think rationally, analyze situations and solve problems skillfully. The programme will cultivate entrepreneurial skills among the learners enabling them to setup their own business start ups.
- PO4.** Environment and Sustainability: Ability to understand the issues related to environmental contexts and sustainable development.
- PO5.** Effective Communication: Students will be able to present ideas clearly and confidently with skills to negotiate with others. They will be able to evaluate primary literature, in oral and written form and subsequently articulate the information.
- PO6.** Leadership and Team work: Ability to work as a leader as well as in a team for group projects and group activities and participate actively, in a healthy spirit.
- PO7.** Ethical and Moral Values: Students will bear the core characters of honesty, integrity and commitment and imbibe qualities of empathy for fellow human beings.
- PO8.** Effective citizenship and Social Interaction: Students will develop tolerance and harmony towards cultural, regional, linguistic, communal, socio-economic and other diversities and respect for national symbols of pride.

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Programme Specific Outcome

- PSO1. RECOLLECTION:** Students will be able to identify the changing trends in economy, business cycles, financial performance of business units, legal requirements of contract, marketing strategies, and HR policies etc.
- PSO2. UNDERSTANDING:** Students will be able to associate the theoretical concepts with the practical observations and draw inferences for better understanding.
- PSO3. APPLICATION:** Students will be able to apply the quantitative and qualitative knowledge acquired from the domain subjects to their future careers.
- PSO4. ANALYSIS:** Students will be able to analyze different Economic Policies, trends in Stock Markets, Statistical techniques, Cost analysis, Production Process etc. through classroom teaching and industrial visits.
- PSO5. EVALUATION:** Students will be equipped to judge, support or critique the commerce and trade related information like globalization, trade policies, fiscal budget, taxation structure, performance of financial institutions etc.
- PSO6. CREATION:** Students will be able to design, author and present business ideas as presentation, popular commerce articles, write ups and research projects.
- PSO7.** Wide employment opportunities in different fields such as Banking, Auditing, Company Secretary, Stock Markets, Teaching, Government Employment apart from the regular areas of Accounting and Management.

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Subject wise Course Outcomes (CO)

COMMERCE

- CO1. (Financial Accounting-I) The subject will make the students aware of the basic concepts in Financial Accounting and create awareness among students regarding concepts and conventions of Accounting.
- CO2. (Company Law) The students will understand the statues under the new companies act and the difference between the old and the new act .The students will be appraised with the latest developments in the corporate sector.
- CO3. (Business Economics-I) To make students understand the importance of Business Economics in Business Decisions and to define and identify the concept of Micro, Macro Economics and theories of Cost & Revenue.
- CO4. (Business Organization) To make students familiar with the modern management practices being used by the corporate world and to obtain theoretical knowledge about the firm by focusing on business organization and functions of management like planning, decision-making, organization, and control activities.
- CO5. (Statistics and Business Mathematics) Students will be able to understand basics of statistics needed to enter the job force. Students will be able to communicate key statistical concepts to non-statisticians.
- CO6. (Business Management) The subject makes a modest attempt to help young students in understanding the subject in a systematic manner with lucid exposition of its different facts. It also exposes the students for applicability of recent trends in management practices.
- CO7. (Secretarial Practice) The subject will appraise the students with the functions and responsibilities of a company secretary as per the latest law. The students will learn the various formats to be prepared and compliance required to be followed by a secretary
- CO8. (Business Economics-II) Student will be able to define market and classify market structure. Student will be able to analyze the mechanisms for Pricing of Products. Students will understand the concepts of Business Cycles and National Income.
- CO9. (Financial Accounting-II) The objective of this course is to expose students to advanced accounting issues and practices. To facilitate the students to know company final

accounts and to enable the students to prepare financial statements of Insurance and Banking Companies

- CO10. (Business Communication and Management) The student will understand the importance of being an effective business communicator in today's changing workplace and also make them aware of the basic concepts in Business Communication and Management.
- CO11. (Monetary Economics-I) Student will be able to demonstrate the meaning and functions of money, to analyze the causes and effects of inflation and deflation on the economy. The students will also understand the concepts of Monetary Policy and Fiscal Policy.
- CO12. (Business Law)The students after completion of the course will understand the basic business laws as required.The students will be able to tackle the basic legal issues that arise in the course of business.
- CO13. (Financial Accounting III) The subject attempts to familiarize the students with the latest developments taking place in the standards as well as practice of accounting in banking & general insurance companies and also to understand the concept of valuation of goodwill and liquidation of company with practical.
- CO14. (Monetary Economics-II) The students will identify types of banks, meaning and functions of Commercial banks and the students will also understand E-Banking, Core Banking operations, Central Bank and Credit Control by Central Bank.
- CO15. (Income Tax) The students will understand the provisions and procedure to compute income under head salaries, House property, and other sources and also will understand the various deductions to be made from gross total income u/s 80C to 80 U in computing total income.
- CO16. (Skill Development) In keeping with the directives of the Govt. of India the course will equip the students with basic skills required to succeed in organizations and also they will understand the concept of motivation, morale, and human behaviour.
- CO17. (Financial Accounting – IV) The subject will make the students aware about the concepts of amalgamation, absorption, and reconstruction and also will understand the accounts of public utility companies and various aspects of valuation of shares
- CO18. (Cost Accounting) The students will be able to fill the tender by understanding the elements of cost and also will be able to implement costing in process costing and contract costing.

- CO19. (Auditing) The Students will understand the fundamental concepts of auditing and also gain knowledge about preparation of audit reports under different provisions.
- CO20. (Indian Economy-I) The Students will develop ideas of the basic characteristics and objectives of Indian Economic Planning and understand NITI Aayog, Economic Growth and Economic Development, Infrastructure and Transport System in India
- CO21. (Marketing Management) The subject will create awareness among students about Market and Marketing and establish link between Commerce, Business, and Marketing and will also develop an analytical ability to plan for various marketing strategies.
- CO22. (Business Finance – I) To develop understanding of overall role and importance of the finance function and also to make Students learn how to take decision in different business situations.
- CO23. (Financial Accounting – V) The Students will be able to identify and understand the concepts of holding company, insurance claim, use of accounts of investment accounts and profit prior to incorporation in organization
- CO24. (Management Accounting) To prepare the students regarding application of management accounting in decision making functions and use of various tools and techniques of management accounting as per the requirement.
- CO25. (Business Finance II) Students will develop understanding about Financial Market and its various segments in India. The subject will provide an introductory knowledge of the operation in Financial Market and role of non-banking financial companies.
- CO26. (Indian Economy-II) To understand the role of Agriculture, Industries and Service Sector industries in Indian Economy and also to provide them knowledge about contribution of Indian economic thinkers in economic development.
- CO27. (Human Resource Management) To deal with the concept of Human Resource management and Qualities needed for an ideal Human Resource Managers and to give the clear idea about Recruitment Selection, Human Resource Planning, and Accounting
- CO28. (Advanced Statistics) Students will be able to understand the utility and application of correlation, regression and students will also get an understanding about Index numbers. They will be able to understand the various components of Time Series and practical application of Trends.

Programme outcomes of BCA

- PO 1: Domain knowledge:** Students will possess a breadth and depth of disciplinary knowledge in the field of Commerce and Computer Application. To build a strong foundation for students to become proficient in all academic concepts and technical skills necessary to become an IT Professional.
- PO 2: Scientific Judgment & Critical Thinking:** Students will be able to analyze information objectively and make a reasoned judgment by observation, understanding and evaluation of sources, such as data, facts and research findings of the dynamic developments and trends in the application of information technology.
- PO 3 : Problem solving & Analytical Skills:** Students will be able to think rationally, analyze situations, apply fundamental knowledge of software development and various systems domain in order to analyze, identify, formulate and provide the solution to given problem.
- PO 4: Environment and sustainability:** Ability to understand the issues related to environmental contexts and sustainable development .
- PO 5: Effective Communication:** Students will be able to present ideas clearly and confidently with skills to negotiate with others. They will be able to evaluate primary literature, in oral and written form and subsequently articulate the information.
- PO 6: Leadership & Team work:** Ability to work as a leader as well as in a team for group projects and group activities and participate actively, in a healthy spirit.
- PO 7: Ethical & Moral values:** Students will bear the core characters of honesty, integrity and commitment and imbibe qualities of empathy for fellow human beings.
- PO 8: Effective Citizenship and Social Interaction:** Students will develop tolerance and harmony towards cultural, regional, linguistic, communal, socioeconomic and other diversities and respect for national symbols of pride. To involve students in sustainable IT practices and community services.

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Programme Specific Outcomes for BCA

- PSO 1: Recollection:** Remember and have proficiency in the basic and advanced knowledge of the core information technology subjects viz. Programming in C, C++ & C#, VB.NET, Core Java, Advanced Java and Android, Python, Dynamic Web Designing, Database Management Systems and Oracle, Operating Systems and Computer Commerce as well as the core Commerce subjects of Accountancy, Business Economics, Business Laws etc.
- PSO 2: Understanding:** Develop logic and understanding in the specialized knowledge of Programming Languages, Database Management Systems, Management Information Systems, Web designing and key areas of Financial Accountancy, Management Accountancy, Cost Accountancy, Economics, Business Laws.
- PSO 3: Application:** Application to design and develop algorithms and implement them as programs, with analysis and interpretation of data.
- PSO 4: Analysis:** Be competent to serve in various industries and sectors especially in the field of information technology, banking and insurance sectors, finance companies, logistical services etc. in various positions viz. system administrator, network system and data analyst, database administrator, chief information officer etc. Laws, E-Commerce.
- PSO 5: Evaluation:** Evaluate the problems to provide technical solutions for them. Identify, evaluate, analyze, interpret and apply information technology to address problems by developing a customized software solution for individuals & organizations.
- PSO 6: Creation:** Creating the impact of professional engineering solutions in environmental contexts and the need for sustainable development. Develop skills in software development so as to enable the graduates to take up employment/self-employment in local, Indian & global software market
- PSO 7: General:** Students will be prepared to make their career in the IT segments like Software services, Business Process Management (BPM/BPO), Technical support engineer, Content developer, Programmer and freelancing. Students can also appear for various competitive exams including IT officers in various organizations and can pursue for higher studies.

Subject wise Course Outcomes (CO)

- CO1. Computer Fundamentals Demonstrate a deep understanding of the IT methodologies and frameworks used to solve complex computing problems related to at least one IT Body-of-Knowledge. Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
- CO2. C Programming To impart adequate knowledge on the need of programming languages and problem solving techniques. To develop an in-depth understanding of functional and logical concepts of C Programming. . To provide exposure to problem-solving through C programming.
- CO3. Statistical Methods Learn about sampling theory. Learn to draw Graphs and Diagrams Understand basic Idea of Permutations and Combinations and Probability concepts. Familiarity with Measures of Central tendency and Measures of Dispersion
- CO4. Discrete Mathematics – I Understand, analyze and create mathematical arguments. Understand sets, perform operations and algebra on sets, describe sequences and summations. Understand basic concepts of number theory and familiarize public and private key cryptosystems. Determine properties of relations, identify equivalence and partial order relations, sketch relations.
- CO5. Operating Systems Students will gain knowledge of basic operating system concepts. To have an in-depth understanding of process concepts, deadlock and memory management. Students will familiarize on the general structure of an operating system and case study is also provided
- CO6. Office Automation Familiar with parts of computer: Understand the input and output devices. Basic ideas of storage devices, computer Networks and Operating System.
- CO7. Programming In 'C++': Understand fundamental constructs of OOP. Apply object oriented programming concepts in problem solving through C++. Understand the file handling and error handling mechanisms in C++
- CO8. System Analysis and Design: Student will be able to know the methods and tools for the design of information systems that support the activities of the organization, and features of its reorganization in case of changes. To be able to apply the tools and techniques of system analysis for organizational design in practice.

- CO9. Numerical Methods: Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.
- CO10. Discrete Mathematics – II: Define graphs, trees and their properties. Define fundamental logic operations and relate Boolean expressions to truth tables and logic diagrams. Solve systems of linear equations in matrix form. Acquire ability to describe computer programs in a formal mathematical manner.
- CO11.** Linux Operating System: To know the basic concepts of Linux Operating System. Familiar with Linux commands. Understand shell programming Familiar with system administration. Understand various types of servers
- CO12. E Commerce: ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer based systems.
- CO13. Visual Basic Programming: Student will be able to demonstrate fundamental skills in utilizing the tools of a visual environment such as command, menus and toolbars. Implement SDI and MDI applications using forms, dialogs, and other types of GUI components.
- CO14. Data Base Management System : Student will be able to understand and use data manipulation language to query and manage a database. Analyze and design a real database application to apply normalization concepts for designing a good database with integrity constraints.
- CO15. Data Structures: To access how the choices of data structure & algorithm methods impact the performance of program. To Solve problems based upon different data structure & also write programs. Choose an appropriate data structure for a particular problem..
- CO16. Operations Research – I: Formulate a real-world problem as a mathematical programming model. Understand the theoretical workings of the simplex method for linear programming and perform iterations of it by hand.
- CO17. Web Technology – I: Understand, analyze and apply the role of languages like HTML, DHTML,CSS, XML, JavaScript, VBScript, ASP, PHP and protocols in the workings of the web and web applications. Analyze a web project and identify its elements and attributes in comparison to traditional projects. Understand, analyze and create web pages using HTML, DHTML and Cascading Styles Sheets.

- CO18. Digital Electronics – I: Perform conversions among different number systems, become familiar with basic logic gates and understand Boolean algebra and simplify simple Boolean functions by using basic Boolean properties & design of combinational circuits such as MUX, DEMUX, Encoder and Decoder etc.
- CO19. Software Engineering-I: Work as an individual and as part of a multidisciplinary team to develop and deliver quality software. Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle.
- CO20. Sql And Pl/Sql: Develop a broad understanding of database concepts and database management system software, data models, schemas and instances, data constraints, relational algebra, and calculus. Be able to write SQL and PL/SQL commands to create and manipulate database objects.
- CO21. Theory of Computation: Understand the basic concepts and application of Theory of Computation. Apply this basic knowledge of Theory of Computation in the computer field to solve computational problems and in the field of compiler also.
- CO22. Operations Research – II: Understand the relationship between a linear program and its dual, including strong duality and complementary slackness. Solve specialized linear programming problems like the transportation and assignment problems.
- CO23. Web Technology – II: Understand, analyze and build dynamic web pages using JavaScript and VB Script (client side programming). Understand, analyze and build interactive web applications.
- CO24. Digital Electronics – II: Understand the design of sequential Circuits such as Flip-Flops, Registers, and Counters. Obtain a basic level of Digital Electronics knowledge and set the stage to perform the analysis and design of Complex Digital electronic Circuits.
- CO25. Computer Graphics – I: Provide comprehensive introduction about computer graphics system, design algorithms and two dimensional transformations. Make the students familiar with techniques of clipping, three dimensional graphics and three dimensional transformations.
- CO26. Compiler Construction: Develop the parsers and experiment the knowledge of different parsers design without automated tools. Apply for various optimization techniques for dataflow analysis.
- CO27. VB.Net: Learn about MS.NET framework developed by Microsoft. To develop, implement, and demonstrate Component Services, Threading, Remoting, Windows

services, web. To understand and be able to explain Security in the .NET framework and Deployment in the .NET.

- CO28. Software Engineering – II: Select and implement different software development process models. Extract and analyze software requirements specifications for different projects. Develop some basic level of software architecture/design. Define the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.
- CO29. PHP – I: Understanding the entire concepts of web technology. To create forms using the functions and work with the form data To implement the security strategies while developing the applications
- CO30. Data Communication And Network – I: Understand the basics of data communication, networking, internet and their importance. Analyze the services and features of various protocol layers in data networks. Identify the basic security threats of a network
- CO31. Computer Graphics – II: Provide comprehensive introduction about computer graphics system. Design algorithms to generate the basic primitives. Familiar with techniques of clipping, three dimensional graphics and three dimensional transformations
- CO32.** Programming In Java: Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc. Understand the fundamentals of object-oriented programming in Java, including managing classes, objects, invoking methods etc and exception handling mechanisms.
- CO33. ASP.Net: Understand the Microsoft .NET Framework and ASP.NET page structure. Design web application with variety of controls. Access the data using inbuilt data access tools.
- CO34. Software Testing: To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods. To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.
- CO35. PHP – II: Understand process of executing a PHP-based script on a webserver. Learn Software Testing and Automation basics from a professional trainer from your own

desk. Understand basic PHP syntax for variable use and standard language constructs, such as conditionals and loops.

- CO36. Data Communication And Network – II: Illustrate the TCP/IP and OSI Reference model and identify their differences in implementation within and across enterprises. Determine the various modulation and error detection and correction techniques and their application in communication systems.

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Programme outcomes of programmes BCCA

- PO1. Domain knowledge:** Students will possess a breadth and depth of disciplinary knowledge in the field of Commerce and Computer Application. To build a strong foundation for students to become proficient in all academic concepts and technical skills necessary to become an IT Professional
- PO2. Scientific Judgment & Critical Thinking:** Students will be able to analyze information objectively and make a reasoned judgment by observation, understanding and evaluation of sources, such as data, facts and research findings of the dynamic developments and trends in the application of information technology
- PO3. Problem solving & Analytical Skills:** Students will be able to think rationally, analyze situations, apply fundamental knowledge of software development and various systems domain in order to analyze, identify, formulate and provide the solution to given problem
- PO4. Environment and Sustainability:** Ability to understand the issues related to environmental contexts and sustainable development.
- PO5. Effective Communication:** Students will be able to present ideas clearly and confidently with skills to negotiate with others. They will be able to evaluate primary literature, in oral and written form and subsequently articulate the information.
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Programme-Specific Outcomes for BCCA

- PSO1. RECOLLECTION:** Remember and have proficiency in the basic and advanced knowledge of the core information technology subjects viz. Programming in C, C++ & C#, VB.NET, Core Java, Advanced Java and Android, Python, Dynamic Web Designing, Database Management Systems and Oracle, Operating Systems and Computer. Commerce as well as the core Commerce subjects of Accountancy, Business Economics, Business Laws etc
- PSO2. UNDERSTANDING:** Develop logic and understanding in the specialized knowledge of Programming Languages, Database Management Systems, Management Information Systems, Web designing and key areas of Financial Accountancy, Management Accountancy, Cost Accountancy, Economics, Business Laws
- PSO3. APPLICATION:** Application of programming skills by the students to become successful IT professionals
- PSO4. ANALYSIS:** Be competent to serve in various industries and sectors especially in the field of information technology, banking and insurance sectors, finance companies, logistical services etc. in various positions viz. system administrator, network system and data analyst, database administrator, chief information officer etc. Laws, E-Commerce
- PSO5. EVALUATION:** Evaluate the problems to provide technical solutions for them. Identify, evaluate, analyze, interpret and apply information technology to address problems by developing a customized software solution for individuals & organizations
- PSO6. CREATION:** Designing and developing Software by implementing the computer application skills. The project development in one of the programming language/technology learnt during program enhances creative problem solving
- PSO7.** Students will be prepared to make their career in the IT segments like Software services, Business Process Management (BPM/BPO), Technical support engineer, Content developer, Programmer and freelancing. Students can also appear for various competitive exams including IT officers in various organizations and can pursue for higher studies.

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Subject wise Course Outcomes (CO)

B.Com Computer Application BCCA

- CO1. (English and Business Communication – I) Student will be able to understand and appropriately apply modes of expression, i.e., descriptive, expositive, narrative, scientific, and self-expressive, in written, visual, and oral communication. To understand and apply basic principles of critical thinking, problem solving, and technical proficiency in the development of exposition and argument. To develop the ability to research and write a documented paper and/or to give an oral presentation.
- CO2. (Financial Accounting) Student will be able to interpret the business implications of financial statement information. Preparing accounting information for planning and control and for the evaluation of finance. Prepare Bank reconciliation statement from incomplete statement.
- CO3. (Fundamentals of Computer) Student will be able to understand the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming Write, compile and debug programs in C language and use different data types for writing the programs.
- CO4. (Programming in 'C') Student will be able to develop programming skills using the fundamentals and basics of C Language. Develop programs using the basic elements like control statements, Arrays and Strings. Enable effective usage of arrays, structures, functions and pointers.
- CO5. (English and Business Communication - II) Student will be able to understand and demonstrate writing and speaking processes through invention, organization, drafting, revision, editing, and presentation. To participate effectively in groups with emphasis on listening, critical and reflective thinking, and responding.
- CO6. (Principles of Business Management) Student will be able to analyze effective application of PBM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions. Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.
- CO7. (Programming in C++) Student will be able to describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects. Classify

inheritance with the understanding of early and late binding, usage of exception handling, generic programming.

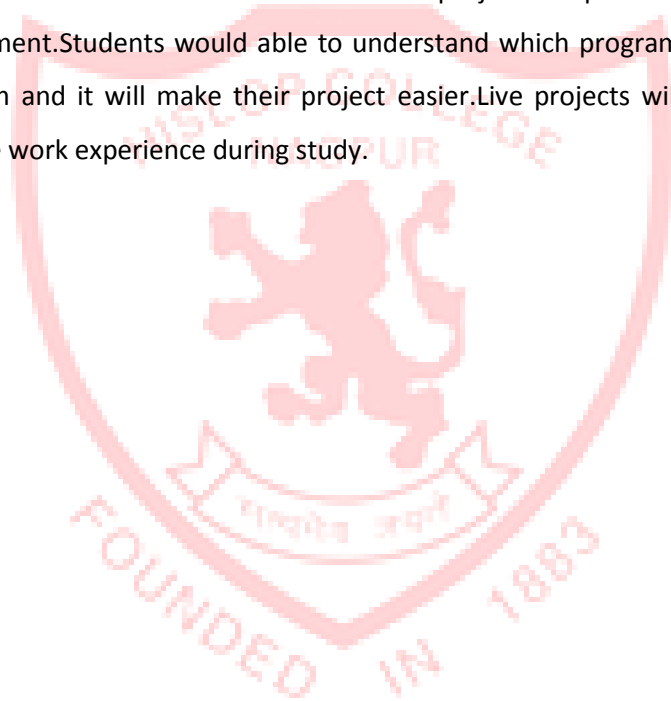
- CO8. (E-Commerce and Web Designing) Student will be able to understand the basic concepts and technologies used in the field of E-Commerce. Understand the processes of developing and implementing Websites.
- CO9. (Environmental Studies) Student will be able to understand and evaluate the global scale of environmental problems; Reflect critically on their roles, responsibilities, and identities as citizens, consumers and understand environmental factors in a complex world.
- CO10. (Business Economics) Student will be able to understand the demand and supply analysis in business applications. To familiarize students with the production and cost structure under different stages of production.
- CO11. (Visual Basic Programming) Student will be able to demonstrate fundamental skills in utilizing the tools of a visual environment such as command, menus and toolbars. Implement SDI and MDI applications using forms, dialogs, and other types of GUI components.
- CO12. (Database Management System) Student will be able to understand and use data manipulation language to query and manage a database. Analyze and design a real database application to apply normalization concepts for designing a good database with integrity constraints.
- CO13. (Statistical Techniques) Student will be able to analyze statistical data using measures of central tendency, dispersion and location. Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events.
- CO14. (Business Law) Student will be able to classify various negotiable instruments and reason of its dishonor. Enumerate the types of companies its management and its rules of corporate governance.
- CO15. (Core Java) Student will be able to write programs using Java collection API as well as the java standard class library. Solve the inter-disciplinary applications using the concept of inheritance.
- CO16. (PHP & MySQL) Students will learn how to connect to any ODBC-compliant database, and perform hands on practice with a MySQL database to create database-driven HTML forms and reports etc. Students also learn how to configure PHP and Apache Web Server.

Comprehensive lab exercises provide facilitated hands on practice crucial to develop competence web sites.

- CO17. (Computerized Accounting using Tally) Student will be able to develop computer skills of recording financial transactions, preparation of annual accounts and reports using Tally. Financial Tally to apply the knowledge of quantitative tools & techniques in the interpretation of data for managerial decision – making.
- CO18. (VB.Net) Students will understand .NET Framework and describe some of the major enhancements to the new version of Visual Basic. Students will describe the basic structure of a Visual Basic.NET project and use main features of the integrated development environment (IDE). Students will create applications using Microsoft Windows Forms . Students will create applications that use ADO. NET
- CO19. (a)(Management Information Systems) Student will be able to understand and apply the fundamental concepts of information systems. Develop the knowledge about management of information systems. (b) (System analysis) Student will be able to know the methods and tools for the design of information systems that support the activities of the organization, and features of its reorganization in case of changes. To be able to apply the tools and techniques of system analysis for organizational design in practice.
- CO20. (a)(Cost & Management Accounting) Student will be able to understand the significance of cost accounting in the modern economic environment. Demonstrate mastery of costing systems, cost management systems, budgeting systems and performance measurement systems. (b) (Corporate Accounting) Student will be able to understand the regulatory environment in which the companies are formed and operate. Have a comprehensive understanding of the advanced issues in accounting for assets, liabilities and owner's.
- CO21. (C#.Net) Student will be able to create and develop Windows Application. Can become a C#.NET developer/Programmer. Display proficiency in C# by building stand-alone applications in the .NET framework using C.
- CO22. (a)(Python) Student will be able to describe the core syntax and semantics of Python programming language. Develop Problem solving and programming capability. (b) (Ruby on Rail) Students will be able to write Program in Ruby. Understand the Rails Framework. Harness the speed and ease of developing a Rails application. Create and use XML in Rails applications.

- CO23. (a)(Entrepreneurship Development) Students will be able to develop idea generation, creative and innovative skills. Learn how to start an enterprise and design business plans those are suitable for funding by considering all dimensions of business.(b)(Company Law and Secretarial Practice) Students will be able to understanding the framework of Memorandum of Association and Article of Association and Prospectus. The concept of Share Capital and Shareholders, Members and Role of a Managing Director.
- CO24. (Project) The final year students of B.Com. (Comp.App.) consists of two semesters in which students are asked to prepare a module or software to show their learning throughout their academics.Students are asked for practical knowledge and come up with the best idea in this filed so project helps a lot for their industry requirement.Students would able to understand which programming language is handy for them and it will make their project easier.Live projects will allow students to gain valuable work experience during study.

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Programme outcomes of BBA

- PO1.** Domain knowledge: Students will possess a breadth and depth of disciplinary knowledge in the field of Business Administration and Management.
- PO2.** Scientific Judgment & Critical Thinking: Students will be able to analyse information objectively and make a reasoned judgment by observation, understanding and evaluation of sources, such as data, facts and research findings of the dynamic Business environment at national and international levels.
- PO3.** Problem solving & Analytical Skills: Students will be able to think rationally, analyse situations and provide solutions to problems in business or corporate sector related to Finance, HR, Marketing, etc. skilfully.
- PO4.** Environment and sustainability: Ability to understand the issues related to environmental contexts and sustainable development
- PO5.** Effective Communication: Students will be able to present ideas clearly and confidently with skills to negotiate with others. They will be able to evaluate primary literature, in oral and written form and subsequently articulate the information.
- PO6.** Leadership & Team work: Ability to work as a leader as well as in a team for group projects and group activities and participate actively, in a healthy spirit
- PO7.** Ethical & Moral values: Students will bear the core characters of honesty, integrity and commitment and imbibe qualities of empathy for fellow human beings.
- PO8.** Effective Citizenship and Social Interaction: Students will develop tolerance and harmony towards cultural, regional, linguistic, communal, socioeconomic and other diversities and respect for national symbols of pride.

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Programme Specific Outcomes for BBA

- PSO1. Recollection:** To remember the conceptual knowledge with an integrated approach to various functions of management. Acquire adequate knowledge through principles, theory and models of business management, Accounting, Marketing, Finance, IT, Operations and Human Resource.
- PSO2. Understanding:** Understand of the corporate world. Understand the dynamic and complex working environment of Business.
- PSO3. Application:** To apply the various concepts, theories and models in the area of HR, Marketing, Finance.
- PSO4. Analysis:** Analyse the theoretical knowledge with the practical aspects of Organizational setting and techniques or management.
- PSO5. Evaluation:** Evaluate the market condition and using formula plan, and financial tools. Identify, evaluate, analyse, interpret and apply information to address problems and make reasoned decisions in a business context.
- PSO6. Creation:** Demonstrate the understanding and ability to apply professional standards, theory, and research to address business problems within specific concentrations.
- PSO7.** Exploring the Entrepreneur Quality and Start New Business Venture With Innovative Ideas. Analyze and preparation of project report for the Functional areas of research. Understand the methods of collecting primary and secondary data.

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Subject wise Course Outcomes (CO)

BACHELOR OF BUSINESS ADMINISTRATION (BBA)

- CO1. (English) Relate to the various concepts and processes of managerial communication. Identify the gap between current level of communication skills and the expected industry standards.
- CO2. (Fundamentals of Business Management) Demonstrates comprehensive and accurate knowledge and understanding of various areas of management. Exhibit knowledge and skill required to administer the affairs of the management.
- CO3. (Computer Applications for Business) Helps understand about information system used in business. Provides knowledge of computers related to MS office, tally, DBMS required for everyday transactions of business.
- CO4. (Cost Accounting) Acquaint students with various cost concepts and importance of controlling overall cost which is a vital aspect to achieve the objectives of modern business. Enables students to understand various methods of material issues, labour remuneration, allocation and apportionment of overheads and also preparation of reconciliation statements.
- CO5. (Principles of Marketing Management) Enables students to understand the concept of marketing and the recent innovations in marketing.Helps identify the marketing dynamics and formulating marketing strategies and its implementation.
- CO6. (Financial & Management Accounting) To give an insight to various basic aspects of accounting. Enables them to understand accounting concepts, tools and techniques influencing business organizations.
- CO7. (Micro-Economic Fundamentals) Analyze economic problems and can correlate scarcity with the requirements. Evaluate demand and can analyze cost in order to optimize cost-production combination.
- CO8. (English) Students will be able to communicate their ideas through different modes and mediums. They will be able to make memorable presentations professionally.
- CO9. (Principles of Financial Management) It helps students understand the basic concepts of Financial Management in decision making related to business. Provides insight on time value of money and various managerial decisions such as financial, investment and dividend decisions and importance of working capital management

- CO10. (Basic Statistical Techniques) Appraise the need for data analysis and formulate the statistical problem and solve it. Interpret the results of statistical analysis for improved managerial decision making.
- CO11. (Evolution of Business & Commercial Geography) It helps students understand the development of business activities since the stage of human evolution. To understand the effects of world wars on commercial geography.
- CO12. (Environment Management) Provides basic awareness on environment and Environmental Protection Act, 1986 and its allied fields and also helps to motivate students to find out unique solutions for environmental problems and create awareness.
- CO13. (Principles of Human Resource Management) To make students understand the concepts of Personnel Management. Imparts knowledge on various aspects of Human Resource Management and its relevance in day-to-day business activities.
- CO14. (Money, Banking & Finance) To make students understand and analyze the workings of Indian Financial system, Market and its assets. Understand the role of money market in Indian Financial System and the importance of legal framework.
- CO15. (Introduction to Sociology & Psychology) Identify sociological terms, concepts, ideas and theories, relating them to social change over time and an individual's attachment to social structures within society identify psychological terms, concepts, ideas and theories, relating them to human behavior. Individual experiences apply basic sociological and psychological ideas, practices, processes and concepts and inquiry skills to investigate.
- CO16. (Business Legislations) Analyze contract and define the business transactions as valid contracts. Develop the idea of sale, distinguish sale and agreement to sell and can explain conditions and warranties.
- CO17. (Entrepreneurship Development) Enables students master their skills and ideas to establish a strong foundation of confidence required to become an entrepreneur. Prepares students to face the hindrances of entrepreneurship and preparation of business plan covering aspects like finance, marketing, sales etc. Examine the characteristics of an entrepreneur as well their role in the economic development of the country.
- CO18. (Principles of Operations Management) A complete understanding about various functions and disciplines of Operations Management. Incorporating various Japanese techniques in day to day working.

- CO19. (International Business Environment) Provides knowledge on International Business and also gives an insight on strategies related to entry, administration in international environment. Expose students to Modes of entry into International business, Globalization, International Marketing Intelligence and EXIM trade
- CO20. (Research Methodology) Gives an insight on the process of research, various tools and tools of research. Introduces the basics of business research and impact of research in business.
- CO21. Elective Paper – 1 (a) (Fundamentals of Business Finance) The students are able to analyze financial decision on the strategic direction. Students are equipped to assess investments and capital structure, dividend policies, working capital and dividend theories; (b) (Fundamentals of Human Resource Management) Demonstrate the understanding of theoretical concepts and framework required for effective Human Resource Management. Develop an overview on various functions and processes of human resource management; (c) (Fundamentals of Marketing Management) Explain the core concepts of marketing and the goals of the Marketing function. Analyze the environment and recommend appropriate Segmentation, Targeting and Positioning Strategy for a product and analyze the buying behavior of a given target market segment.
- CO22. Elective Paper -1; a) (Advanced Financial Management) To provide insight to students about FOREX Market. International financial markets and their needs and functions. To enable students understand FDI flows and risks associated with foreign exchange; (b) (Advanced Human Resource Management) To make students understand the concepts of Personnel Management. Imparts knowledge on various aspects of Human Resource Management and its relevance in day-to-day business activities; c) (Advanced Marketing Management) Able to understand and describe the concepts and processes of international marketing. Having the abilities to analyze the international marketing environment and choose the suitable international markets for their organization.
- CO23. (Project Work) The outcome of the Project Work is to help the student develop his/her ability to apply multi-disciplinary concepts, tools and techniques to solve organizational problems and/or to evolve new/innovative theoretical frame work.

Programme outcomes of B. Voc. Tourism

- PO1. Domain knowledge:** Students will possess a breadth and depth of disciplinary knowledge in the field of Tourism and the allied sectors
- PO2. Scientific Judgment & Critical Thinking:** Students will be able to analyze information objectively and make a reasoned judgment by observation, understanding and evaluation of sources, such as data, facts and research findings of the dynamic trends of the Tourism sector and the various environmental factors at national and international levels.
- PO3. Problem solving & Analytical Skills:** Students will be able to think rationally, analyze situations and provide solutions to problems in Tourism sector related to tourism products and services skillfully.
- PO4. Environment and sustainability:** Ability to understand the issues related to environmental contexts and sustainable development
- PO5. Effective Communication:** Students will be able to present ideas clearly and confidently with skills to negotiate with others. They will be able to evaluate primary literature, in oral and written form and subsequently articulate the information.
- PO6. Leadership & Team work:** Ability to work as a leader as well as in a team for group projects and group activities and participate actively, in a healthy spirit
- PO7. Ethical & Moral values:** Students will bear the core characters of honesty, integrity and commitment and imbibe qualities of empathy for fellow human beings.

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Programme Specific Outcomes for B. Voc. Tourism

- PSO1. Recollection:** Students will relate their previous knowledge and understand linkages of subjects with tourism. It shall orient the student with a basic understanding of tourism destinations, the culture, fairs & festivals, etc., which shall update his destination knowledge about the country and world.
- PSO2. Understanding:** Students will attain the basic and essential knowledge regarding various activities undertaken by the tourism industry. They will develop a global view of several multinational tourism business houses and their functions, i.e. how the products and services are offered.
- PSO3. Application:** Students will be equipped with the necessary knowledge and skill to work in the tourism industry and allied sectors. They develop new tourism products, map new tour plans and itineraries, and make services more efficient and effective.
- PSO4. Analysis:** Students will be familiar with the contemporary trends and will analyze advancements happening in the tourism industry and promote tourism ethically and sustainably.
- PSO5. Evaluation:** Students will inculcate practical knowledge and shall be able to evaluate tourism trends, practices and tourism services and also various components of tourism which are accessibility, accommodation, activities, amenities and attractions.
- PSO6. Creation:** students will be endowed with skills and qualities to develop and reconstruct destination branding, new product ideas and design, and develop an interest and attitude to set up tourism-related establishments or expand their business/ start-ups.
- PSO7.** Students will develop the necessary knowledge, personality, and communication skills to be a productive workforce in the tourism sector and become responsible citizens with greater awareness about Indian society and its culture.

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Subject wise Course Outcomes (CO)

BACHELOR OF VOCATION (B. Voc) Tourism

- CO1. (English and Communicative English –I) Students will learn the basics of English & communication skills in the form of grammar, letter writing, reading & communication techniques
- CO2. (Soft Skill Development –I) Students will get an insight into building a personality trait & developing their self-esteem & image.
- CO3. (Aptitude development –I) Students will learn to enhance the problem-solving skills & to improve the basic mathematical skills
- CO4. (Paper-I Principles and Practice Of Tourism) Students will understand fundamental concepts of tourism industry and linkages with allied sectors.
- CO5. (Paper-II Tour Guiding & Escorting) Will develop understanding about key skills required to be in Tour Guiding or escorting sector. This course will help the students to appreciate better, what the profession of tour guiding is all about by giving them a practical experience of how to practice guiding in real life situations
- CO6. (Field Work) Will develop knowledge about Tour management in India and abroad, Skills and competencies required to be a tour manager
- CO7. (English and Communicative English –II) The students will learn about the correct tenses, voice to be used in writing a sentence & the importance of listening skills
- CO8. (Aptitude development – II) Students will learn the concept of mental ability.
- CO9. (Soft Skill Development – II) The students will understand about the stress management & the techniques to overcome stress
- CO10. (Paper – I Event Management) Students will learn the event management" and become familiar with management techniques and strategies required for the successful planning, promotion, implementation and evaluation of special events.
- CO11. (Paper – II Tourism Products) Students will gain thorough knowledge about the various products offered in tourism. It shall orient the student with a basic understanding of India, its culture, fairs & festivals, etc., which shall update his destination knowledge about the country.
- CO12. (Soft Skill Development – II) The students will understand about the stress management & the techniques to overcome stress.

- CO13. (English and Communicative English –III) Students will learn the concept of vocabulary & the types and process of successful communication.
- CO14. (Soft Skill Development – III) Students will understand about time management, setting priorities & proper etiquettes.
- CO15. (Aptitude development – III) The students will develop a scientific aptitude and sense *reasoning* which will help them in their day-to-day activities.
- CO16. (Paper – I Transportation Management) Students will get to know about the significance and role of various modes of transportation in tourism industry. Knowledge shall also be accumulated on the issues and trends in transport management and working of different modes of transportation
- CO17. (Paper – II Travel Agency & Tour Operation Management) After completing this course the student should be able to understand the nature, structure and working of Tourism agency and Intermediaries involved, range of services provided by them and, highlights the intricacies involved in tourist services. (Field Work) Students will learn about growth and diversification in the tourism leisure and recreational packages.
- CO18. (English and Communicative English –IV) The students will learn about the functionality of writing in the form of developing story, paragraph writing etc. & also about the communication that media uses in the form of media literacy.
- CO19. (Soft Skill Development – IV) The students will understand the management organization through corporate culture, leadership, employee importance & basic management models.
- CO20. (Aptitude development – IV) The students will use mathematics to make decisions, analyzing evidence, reasoning carefully, understanding arguments, & questioning assumption
- CO21. (Paper – I Tour Packaging) Students will learn to prepare tour itinerary, design package tour independently and do the tour costing.
- CO22. (Paper – II Travel Geography) Students will be familiar with the global geography regarding tourism. The knowledge of geography shall give the students an extra edge in designing the travellers' itineraries, suggesting them various destinations to the clients for their travel, etc.

- CO23. (Field Work) Students shall become familiar with the "Tour Operation Techniques" and strategies required for successful selling tour package and handling of Tour Operation Business.
- CO24. (English and Communicative English –V) The students will gain knowledge on suffix, prefix & abbreviation & also on the ways of communication viz. E-communication, group communication, presentation strategies
- CO25. (Soft Skill Development – V) The students will learn the techniques of personnel marketing in the form of selling skill, call handling skill & CRM
- CO26. (Aptitude development – V) The student will learn the data sufficiency skill in analysing & understanding the data given in the chart form
- CO27. (Paper – I Airfares & Ticketing with GDS) Students will gain a basic understanding of airline routing, airfare construction and handling ticketing.
- CO28. (Paper – II Innovative Practices in Tourism) Students will gain knowledge about new trends and advancements in the tourism industry and the environment of the travel business.
- CO29. (Field Work) shall orient the student with the basic understanding of the typical functioning of various tourism sectors; like airlines/ cruise/ travel agencies
- CO30. (Applied Computer Skills- I) The students will understand the basics of computer in the form of MS word & MS PowerPoint
- CO31. (Applied Computer Skills- II) The students will gain an insight into MS Excel & MS access
- CO32. (Applied Computer Skills- III) The students will gain knowledge with the concept of Systems, MIS, SAD
- CO33. (Project Work) Students will understand customer services along with ground-level operations, financial and marketing aspects of the travel business.
- CO34. (Project Seminar) Students will learn to make presentations or documentaries of their work and would be able to showcase their communication and presentation skills required to meet industrial expectations

Programme outcomes of programmes in B.A.

- PO1. Domain knowledge:** Students will possess a breadth and depth of disciplinary knowledge in the field of Humanities .
- PO2. Critical Thinking:** Students will be able to identify and present their own perspective as well as identify and consider other perspectives; they will gain a broader outlook and be able to exercise discernment and judgment by evaluating arguments about issues.
- PO3. Problem solving & Analytical Skills:** Students will be able to identify and define the problem/ question at issue; identify and assess the key assumptions; analyze and process data to reach conclusions; identify and assess conclusions, implications and consequences.
- PO4. Environment and sustainability:** Students will be able to understand the issues related to environmental contexts and sustainable development
- PO5. Effective Communication:** Students will be able to present ideas clearly and confidently with skills to negotiate with others. They will be able to evaluate primary literature, in oral and written form and subsequently articulate the information.
- PO6. Leadership & Team work:** Students will be able to assume leadership roles and will be able to work productively in a team for group projects and group activities. Ability to work as a leader as well as in a team for group projects and group activities and participate actively, in a healthy spirit
- PO7. Ethical & Moral values:** Students will bear the core values of honesty, integrity and commitment and imbibe qualities of empathy for fellow human beings.
- PO8. Effective Citizenship and Social Interaction:** Students will develop tolerance and harmony towards cultural, regional, linguistic, communal, socioeconomic and other diversities and will respect the constitution and the national symbols of pride.

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Programme Specific outcomes – ECONOMICS

- PSO1. **RECOLLECTION:** Students will be able to define different ages of literature and recognize their social , cultural and historical contexts.
- PSO2. **UNDERSTANDING:** Students will be able to understand and classify the variety of the literature of different ages.
- PSO3. **APPLICATION:** Students will be able to apply the critical and theoretical approaches to the reading.
- PSO4. **ANALYSIS:** Students will be able to identify ,analyze and describe the critical ideas, themes and principles of the literary text.
- PSO5. **EVALUATION:** Students will be able to evaluate an argument in a text by identifying the evidence given to support the argument.
- PSO6. **CREATION:** Students will be able to design different ideas to defend the idea in a critical text.
- PSO7. Students will be able to analyze the role of the style of the text in achieving aesthetic literary effect.

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ECONOMICS

- CO1. Students will be able to demonstrate knowledge of the laws of supply and demand and equilibrium; and apply the supply and demand model to analyze responses of markets to external events.
- CO2. By the end of the course, students will be able to explain and calculate price elasticity of demand and other elasticity's also able to understand consumer behavior.
- CO3. By the end of the course, students will be able to compare and contrast common market structures, including perfect competition and monopoly.
- CO4. By the end of the course, students will be able to understand uses of factors of production .and also student will be able to use statistical tools.
- CO5. Students will be able to explain the circular flow of national income and use the concepts of aggregate demand and aggregate supply to analyze the response of the economy to disturbances
- CO6. Students will be able to explain the concepts of National product GDP; GNP; NNP, PI etc. and how they are measured. Students will be able to define fiscal and monetary policies and how these affect the economy. After completion this course student will be able to understand consumer behavior and investment function.
- CO7. Students will be able to describe the determinants of the demand for money, the supply of money and interest rates and the role of RBI and financial institutions in the economy. After completion this course
- CO8. student will be able to understand functions of Money Market and capital market.
- CO9. Students will be able to identify the causes of prosperity, growth, and economic change over time and explain the mechanisms through which these causes operate in the economy, also they are able to understand improvement in the the basic needs of human like education and health.
- CO10. On completion of the course students will be able to
- CO11. Develop ideas of the basic characteristics of Indian economy, its potential on natural resources. Understand the importance, causes and impact of population growth and its distribution.
- CO12. Understand agriculture and industrial sector as the foundation of economic growth and development, analysis the progress and changing nature of agricultural sector and

industrial sector and their contribution to the economy as a whole, they also able to understand the states of poverty and unemployment in the country

CO13. After completion of this course student will be able to

CO14. Understand the development concept and grasp the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government.

CO15. Understand the functions of public sector as well as international trade



Programme Specific outcomes – COMPULSORY ENGLISH

- PSO8. **RECOLLECTION:** Students will be able to recognize the basic English structures and remember the tenets of grammar and vocabulary at an intermediate level.
- PSO9. **UNDERSTANDING:** Students will be able to paraphrase and retell the main idea of the text and recall vocabulary at an intermediate level
- PSO10. APPLICATION:** Students will be able to apply the learnt structures of the language in their written and oral communication.
- PSO11. **ANALYSIS:** Students will be able to analyze the text and distinguish between the main idea and the supporting details and differentiate fact from opinion.
- PSO12. **EVALUATION:** Students will be able to evaluate the text and connect it with their values, personal thoughts and opinions.
- PSO13. **CREATION:** Students will be able to develop an idea in a text through guided creative articles or role
- PSO14. Students will be able to use the language in all forms of communication at an intermediate level.

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Subject wise Course Outcomes (CO)

BA COMPULSORY ENGLISH:

- CO1. Infer, through discussion, written responses, and summaries, basic and critical comprehension of college-level texts.
- CO2. Compose well-structured essays that show mastery of organization, focus, and development.
- CO3. Revise writing so that it uses correct English grammar, syntax, diction, and spelling.
- CO4. Develop multiple perspectives and approaches to a subject through reading and analysis.
- CO5. Use a variety of reading strategies to foster comprehension and the construction of personally meaningful and socially/culturally relevant connections to text.
- CO6. Revise writing so that it uses correct English grammar, syntax, diction, and spelling
- CO7. Identify and paraphrase the main idea of the text and effectively summarize a given text.
- CO8. Students will be able to exhibit their writing skills and showcase their improved communication skills.
- CO9. Identify and paraphrase the main idea of the text and effectively summarize a given text.
- CO10. Comprehend and analyze intermediate level text (prose and poetry) and be able to respond meaningfully to a given text by drawing connections between text and personal experiences as well as between text and knowledge of the world.
- CO11. Acquire the Learning analytical and problem-solving skills from the section of Personalities by scrutinizing the lives of famous personalities.
- CO12. Enhance the critical acumen of the students.

B.SC. COMPULSORY ENGLISH

- CO1. Comprehend and analyze intermediate level text (prose and poetry) and be able to respond meaningfully to a given text by drawing connections between text and personal experiences as well as between text and knowledge of the world.
- CO2. Identify and paraphrase the main idea of the text and effectively summarize a given

text.

- CO3. Read a variety of intermediate level texts with competence and be able to apply the rules of paragraph writing to produce cohesive and coherent paragraphs.
- CO4. Use the learnt vocabulary items appropriately and correctly and write effective CVs.

B.Com. COMPULSORY ENGLISH:

- CO1. Engage and Take Responsibility as Active Learners.
- CO2. Think Critically.
- CO3. Communicate Effectively.
- CO4. Acquire the Learning analytical and problem-solving skills from the section of Personalities by scrutinizing the lives of famous personalities.
- CO5. Enhance the critical acumen of the students.
- CO6. To develop decision making skills.
- CO7. Students will be able to read and demonstrate a good comprehension of text.
- CO8. To develop the skills of analyzing, evaluating problems and taking decisions.
- CO9. Students will be able to exhibit their writing skills and showcase their improved communication skills.
- CO10. Analyze and interpret texts written in English
- CO11. Articulate insightful and thoughtful questions based on the texts and thereby enhance the knowledge of the day to day life and activities.
- CO12. Overall development of personality.

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Programme Specific outcomes – SUPPLEMENTARY ENGLISH

- PSO1. **RECOLLECTION:** Students will be able to remember vocabulary, grammatical concepts, syntax at an advanced level.
- PSO2. **UNDERSTANDING:** Students will be able to comprehend and accurately paraphrase the main idea and the supporting details, both stated and inferred, in advanced level texts.
- PSO3. **APPLICATION:** Students will be able to apply their expanded knowledge of vocabulary, syntax, text structure, pragmatics to suit the context and purpose, in all forms of communication.
- PSO4. **ANALYSIS:** Students will be able to analyze a variety of texts: academic prose, literary texts, journalistic articles and draw connection between the text and their personal beliefs and experiences; the text and their background world knowledge; the text and other sources such as lectures, texts, films etc.
- PSO5. **EVALUATION:** Students will be able to evaluate the relevance of arguments used, the assumptions made, the point of view used, the counter point of view and be able to defend their arguments and refute false ones.
- PSO6. **CREATION:** Students will be able to produce academic and creative articles that are lucid, coherent, substantive and grammatically accurate.
- PSO7. Students will be able to use a wide range of reading comprehension strategies to suit their purpose and engage in sustained independent reading for a variety of purposes such as pleasure, research, knowledge and learning.

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Subject wise Course Outcomes (CO)

BA SUPPLEMENTARY ENGLISH

- CO1. Read a variety of texts critically and proficiently to demonstrate in writing or speech the comprehension, analysis, and interpretation of those texts;
- CO2. Write a literary or expository text using the conventions of standard English as stylistically appropriate, while showing a nuanced use of language
- CO3. Demonstrate knowledge and comprehension of major texts and traditions of language and literature written in English as well as their social, cultural, theoretical, and historical contexts;
- CO4. Analyze and interpret texts written in English, evaluating and assessing the results in written or oral arguments using appropriate support;
- CO5. Read with interpretive and analytical proficiency one or more creative literary form
- CO6. Practice the process-oriented approach to writing
- CO7. Demonstrate in written and oral form both the comprehension and the analysis of texts (literary, expository, fiction, non-fiction) in terms of their content, purpose, and form; and
- CO8. Speak clearly, effectively, and appropriately in a public forum for a variety of audiences and purposes.
- CO9. Demonstrate knowledge of literature written in English in their social, cultural and historical context;
- CO10. Demonstrate an understanding of the ethical and political responsibilities inherent in producing, receiving, and assessing written discourse;
- CO11. Document how people write differently across varied social situations (workplace, academy, home, and media)
- CO12. To engage learner to think and analyze independently with a set of soft skills which would make them job ready.

B.Sc. SUPPLEMENTARY ENGLISH

- CO1. Critically comprehend short stories and demonstrate the skills of inference and analysis as they show appreciation of character, setting, story and plot.

- CO2. Apply the knowledge of expanded vocabulary in their spoken and written communication.
- CO3. Analyze the underlying theme of the short stories; explore ideas, feelings and thoughts dealt with in the short stories and construct meaningful personal, social and culturally relevant connections.
- CO4. Demonstrate proficiency in drafting official communication, classified advertisements and producing guided creative articles.

B.Com. SUPPLEMENTARY ENGLISH

- CO1. Utilize Information Literacy Skills.
- CO2. Specific outcomes for its students — Grammar.
- CO3. To broaden their minds through poetry and short stories.
- CO4. Enable the learner to comprehend and respond personally and critically to the text.
- CO5. Explore thoughts, ideas, feelings and experience
- CO6. Acquaint them with nuanced use of language by studying the text using the conventions of Standard
- CO7. Read a variety of texts critically and proficiently to demonstrate in writing or speech the comprehension, analysis, and interpretation of those texts.
- CO8. Interact with academic content in reading, writing, listening and speaking.
- CO9. Demonstrate ability to think critically.
- CO10. The Course aims to enhance student's confidence and make them involved learners.
- CO11. Develop student's ability to apply acquired knowledge in real life for problem solving.
- CO12. The grammar and composition portion intends to develop the confidence of the students regarding understanding the proper use of tenses and English language.

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Programme Specific outcomes –ENGLISH LITERATURE

PSO1 **RECOLLECTION:** : Students will be able to define different ages of literature and recognize their social, cultural and historical contexts and the types of literature specific to that age.

PSO2 **UNDERSTANDING:** Students will be able to comprehend a variety of texts of different genres.

PSO3 **APPLICATION:** Students will be able to apply the critical and theoretical approaches to the reading and analysis of literary and cultural texts in multiple genres

PSO4 **ANALYSIS:** Students will be able to analyze, interpret and describe the critical ideas, themes and values in a literary text.

PSO5 **EVALUATION:** Students will be able to evaluate an argument in a literary text by identifying underlying assumptions and assessing the evidence given to support the argument.

PSO6. **CREATION:** Students will be able to formulate and develop ideas and present effective arguments to defend the thesis/ idea/ point in a critical essay.

PSO7 Students will be able to analyze the role of style, diction, tone, voice and genre in achieving a particular aesthetic and literary effect.

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Subject wise Course Outcomes (CO)

BA ENGLISH LITERATURE

- CO1. Selection of Literature from Elizabethan to Restoration Ages
- CO2. The students will develop an understanding of the age and become familiar with representative literary texts within their historical and cultural context.
- CO3. The students will be able to recognize literary forms, literary devices, stylistic and structural elements in texts and will be able to describe and illustrate them.
- CO4. The students will be able to interpret, infer, analyze and criticize the texts applying critical understanding of literary texts.
- CO5. The students will develop an understanding and appreciation of the cultural, economic and political conditions and developments of the late eighteenth and nineteenth century and will be able to read and analyze literature in context of the times.
- CO6. The students will be able to appreciate the shift in literary styles and approaches, understanding, appraising and critiquing the texts using creative and critical thinking.
- CO7. The students will be able to interpret, infer, analyze and criticize the texts applying critical understanding of literary texts
- CO8. The students will be able to recognize, understand and appreciate the creative and cultural variations that influence literature.
- CO9. The students will be able to recognize, understand and appreciate the creative and cultural variations that influence literature.
- CO10. They will develop a critical appreciation of the cultural, geographical and temporal dimensions of literature.
- CO11. They will be able to apply theoretical approaches to the reading literary texts discussing them creatively and analytically using language competencies.
- CO12. To engage learner to think and analyze independently with a set of soft skills which would make them job ready

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Programme Specific outcomes – COMMUNICATIVE ENGLISH

PSO1 **RECOLLECTION:** Students will be able to remember the basic phonological rules, identify phonetic symbols and understand how syntax, choice of vocabulary items, grammatical structures and language pattern can vary with context and purpose.

PSO2 **UNDERSTANDING:** Students will be able to comprehend, paraphrase and appreciate a reading text at an advanced level and read phonetic transcription.

PSO3 **APPLICATION:** Students will be able to apply the knowledge of segmental and supra-segmental aspects of phonetics to produce speech with appropriate pronunciation, intonation, rhythm and stress.

PSO4 **ANALYSIS:** Students will be able to analyze a text at an advanced level and can make sense out of information by classifying, sorting, ranking and by showing the causal relationship between facts.

PSO5 **EVALUATION:** Students will be able to evaluate an issue through high order questioning, journal writing and group processing.

PSO6. **CREATION:** Students will be able to create content and make content for specific purposes.

PSO7. Students will be able to transfer the soft skills learnt during the course to real life situations and can discern connections between what they learn in class and real life situations.

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Subject wise Course Outcomes (CO)

B.A. COMMUNICATIVE ENGLISH

- CO1. Utilize phonetic symbols to improve pronunciation
- CO2. recognize phonetic symbols
- CO3. apply techniques to set achievable goals
- CO4. read and interpret visual data
- CO5. handle stress caused by change better & apply principles of clarity and coherence to paragraph writing
- CO6. Identify syllables in a word & identify and apply word stress
- CO7. Use appropriate intonation while speaking & understand verbal and non-verbal communication
- CO8. Distinguish the qualities of a capable leader
- CO9. Better understand and respond to the needs of others
- CO10. Understand how positive thinking creates positive attitude & apply proper format for written business communication like reports and e mails Engage critically & constructively in oral exchanges of ideas
- CO11. Increase vocabulary through knowledge of new foreign words
- CO12. Use questioning and listening skills that support effective telephone skill & identify and analyze advertising target
- CO13. Use vocabulary and concepts related to job interviews in conversation with one another
- CO14. Describe what is included in an effective interview
- CO15. Analyze personal strengths and weaknesses as regards employment
- CO16. Demonstrate an understanding of skills employers look for
- CO17. Engage in editing & proofreading in the area of Subject verb agreement, punctuation & capitalization, effective use of voice, verb-tense consistency
- CO18. Develop competences in making oral presentation and in giving and receiving constructive criticism
- CO19. Apply a variety of reading strategies involved in reading official documents
- CO20. Engage critically and constructively in oral exchanges of ideas (oral presentations and group discussions)

Programme Specific outcomes –HISTORY

- PSO1. **RECOLLECTION:** Students will be able to remember the background of our historic past, religion, customs, institutions, administration and so on.
- PSO2. **UNDERSTANDING:** Students will be able to understand social, political, religious and economic conditions of the people of their own country as well as the others.
- PSO3. **APPLICATION:** Students will be able to apply knowledge acquired from the history of world to the present context.
- PSO4. **ANALYSIS:** Students will be able to analyze the relationship between the past and the present times and bring its contemporary relevance.
- PSO5. **EVALUATION:** Students will be able to evaluate the arguments presented in historical writing, discussion and interpretation.
- PSO6. **CREATION:** Students will be able to collaborate and develop projects to spread awareness about the heritage and cultural traditions of their own country as well as that of others.
- PSO7. Students will develop the knowledge and skills to crack various competitive examinations.

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Subject wise Course Outcomes (CO)

HISTORY

- CO1. Study the ancient Indian civilization and understand social, political and religious changes during the period.
- CO2. Acquire knowledge about ancient Indian dynasties as well as Sultanate dynasties and religious movement of medieval India.
- CO3. Understand rise and establishment of Mughal dynasty in India
- CO4. Know about the history of Marathas; understand the foundation of East India Company's rule in India.
- CO5. Analyze policies of Governor-Generals in India under East India Company's rule
- CO6. Study the socio-religious movements of modern India and analyze the causes of rise of Indian nationalism
- CO7. Understand the origin and establishment Indian National Congress
- CO8. Understand the various phases of Indian National Movement
- CO9. Acquire knowledge of landmark events in World history
- CO10. Understand policy of imperialism and changes in world political order
- CO11. Analyze causes for the rise of dictatorship in Europe and understand international crisis
- CO12. Understand world politics after Second World War and attempts to restore world

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Programme Specific outcomes – PHILOSOPHY

- PSO1. RECOLLECTION:** Students will be able to identify the basic concepts in both Western and Indian Philosophy especially in the area of Ethics, Logic, Epistemology, Metaphysics etc.
- PSO2. UNDERSTANDING:** Students will be able to understand the fundamental problems of philosophy to develop a strong knowledge base of philosophical enquiry and critique.
- PSO3. APPLICATION:** Students will be able to apply the philosophical concepts and values into day-to-day problems and develop analytical outlook, critical thinking and logical reasoning.
- PSO4. ANALYSIS:** Students will be able to analyze an issue objectively and rationally and defend their perspective and views on the basis of logical reasoning.
- PSO5. EVALUATION:** Students will be able to evaluate the issues in a holistic manner and also develop their own perspectives thereby ensuring original thinking.
- PSO6. CREATION:** Students will be able to develop new theories to understand the changing situations.
- PSO7.** Students will become complete human beings and responsible citizens which will contribute to building up a strong Nation.

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Subject wise Course Outcomes (CO)

PHILOSOPHY

- CO1. This course gives a detailed account of the historical and theoretical development of Indian Ethical/ moral values. It also gives a wide perspective on different religious ethical views thereby a comprehensive understanding of Indian ethical theories.
- CO2. This course will help the student to identify and reflective about their own ethical notions and develop themselves into a greater ethical being.
- CO3. This course gives a detailed account of the historical and theoretical development and the contemporary developments in Western Ethics. It demonstrates a clear idea of the basic ethical Concepts and different theories. It also gives a comprehensive idea of the theories of punishment prevailed in western tradition.
- CO4. This course helps the student make a comparative analysis of both western and Indian ethical values and to understand the richness of both the tradition.
- CO5. This course gives an account of the primary concepts and kinds of Inference/Anumana in both orthodox and heterodox systems like Nyaya, Buddhism and Jainism. It also gives the definitions and kinds of fallacy/Hetvabhasa by these philosophical systems.
- CO6. This course helps the student to understand the developments of Indian logical argumentation and their fallacies.
- CO7. This course gives a detailed account of the basic concepts of logic and the different logical argumentation including Deductive and Inductive arguments. It also gives a detailed analysis of the traditional/Aristotelian logic and the Modern/Symbolic logic; syllogistic arguments and fallacies.
- CO8. This course train our students to know the method of deduction and prove the validity of arguments.
- CO9. This course gives a detailed account of the definition, Scope and different sources of knowledge accepted by various Indian philosophical systems and different theories about the validity of knowledge. It also gives a detailed account of the metaphysical notions like substance, Ultimate reality, concept of God, soul and liberation etc.
- CO10. This course helps the student understand the historical trajectories of Indian Epistemological and metaphysical notions thereby understand the greatness of Indian philosophical systems.

CO11. This course concentrates on the fundamental epistemological and metaphysical notions of Western Philosophical tradition. It also gives a comprehensive understanding of the divergently opposed epistemological traditions of modern thought and different theory of causation by the traditional and contemporary thinkers of the Western thought.

CO12. This course helps the student to develop a strong knowledge base of philosophical enquiry and criticism.

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Programme Specific outcomes –POLITICAL SCIENCE

- PSO1. RECOLLECTION:** Students will be able to remember the background of our Political system and Indian Political administration institutions like Parliament Legislature, Executive, Judiciary and Indian administration and so on.
- PSO2. UNDERSTANDING:** Students will be able to understand working of political institutions. Political institutions like Parliament Legislature, Executive, Judiciary and Indian administration .
- PSO3. APPLICATION:** Students will be able to apply knowledge acquired from the political event of world with comparative approach.
- PSO4. ANALYSIS:** Students will be able to analyze the relationship between the past and the present times and brings its contemporary relevance.
- PSO5. EVALUATION:** Students will be able to evaluate the critical thinking of political thinkers among students.
- PSO6. CREATION:** Students will be able to collaborate and create and have role plays such as Mock Parliament to create awareness about the Constitution of their own country as well as the political procedures.
- PSO7.** Students will be ready for various competitive examinations.

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Subject wise Course Outcomes (CO)

POLITICAL SCIENCE

- CO1. Learn the concepts of Political Theory and understand Political system and Process.
- CO2. Develop understanding of concept of Liberty and Rights.
- CO3. Understand Indian and western political thinkers and their Ideologies.
- CO4. Gain the knowledge of western Ideologies of Justice and Ideal state.
- CO5. Aware & enhance knowledge about Indian Constitution and the actual
- CO6. Functioning of the Indian Political system.
- CO7. Gain knowledge of structure and work culture of Indian Executive, Legislature and Judiciary
- CO8. Understand the structure and work culture of State government and Panchayati raj.
- CO9. Differentiate between National, State & local Constitutional and Administrative structure of India in detail.
- CO10. Gain Knowledge of Political Culture and Political Parties of America and Britain.
- CO11. Differentiate between Political Process of USA & USSR in detail.
- CO12. Learn the concept of International Relations between different countries.
- CO13. Develop understanding of Global concept of Terrorism and human rights.

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Programme Specific outcomes –PSYCHOLOGY

- PSO1. RECOLLECTION:** Students will be able to remember and recall the learnt concepts of Psychology
- PSO2. UNDERSTANDING:** Students will be able to develop understanding of human behavior and in turn be able to understand self and others.
- PSO3. APPLICATION:** Students will be able to make use of basic psychological tests and experiments.
- PSO4. ANALYSIS:** Students will be able to examine, analyze and interpret the concepts learnt in Psychology
- PSO5. EVALUATION:** Students will be able to critically evaluate the theoretical principles and their application areas
- PSO6. CREATION:** Students will be able to come up with new ideas to apply the learnt matter and design survey questionnaires.
- PSO7.** Students will be ready to crack entrance examinations to gain admission in premier institutions for post graduation in Psychology.

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Subject wise Course Outcomes (CO)

PSYCHOLOGY

- CO1. Gain understanding of basic Psychological processes.
- CO2. Apply basic knowledge of Psychology in everyday life.
- CO3. Understand the basics of Social Psychology and the individual in the social world.
- CO4. Measure psycho-social traits with the help of simple tests.
- CO5. Differentiate between Normality and Abnormality and also understand the Classification System.
- CO6. Develop understanding of the various psychological disorders and their treatment.
- CO7. Understand basic statistical methods, psychological testing and qualitative methods and their uses.
- CO8. Use simple statistics and graphs to analyze and interpret data.
- CO9. Gain insight into basic concepts of Industrial and Organizational Psychology and to understand the application of Psychology at the workplace.
- CO10. Gain knowledge regarding Personnel Psychology
- CO11. Understand the basic concepts, processes and techniques of counseling
- CO12. Learn the concept of well-being and apply the same in day-to-day life

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Programme Specific outcomes –SANSKRIT

- PSO1. RECOLLECTION:** Students will be able to recognize the basic Sanskrit structure and remember concepts of grammar and vocabulary at an intermediate level.
- PSO2. UNDERSTANDING:** Students will be able to understand the basic principal thesis of the text and recall vocabulary at intermediate level.
- PSO3. APPLICATION:** Students will be able to apply the learnt structure of the language in their oral and written communication.
- PSO4. ANALYSIS:** Students will be able to analyze the text and distinguish between the main idea and differentiate fact from opinion.
- PSO5. EVALUATION:** Students will be able to examine the text and connect it with their values, personal thoughts and opinions.
- PSO6. CREATION:** Students will be able to write a paragraph developing an idea in a text with an alternative ending.
- PSO7.** Students will be able to reframe the language in all forms of communication.

Subject wise Course Outcomes (CO)

COMPULSORY SANSKRIT

- CO1. This course leads to get the students acquainted with the outline of Sanskrit literature i.e.Upanishad, Plays, Epics, Proses etc.
- CO2. This course leads to get the students acquainted with the Sanskrit poets and their compositions.
- CO3. This course gets the students to know about the principle thesis of Upanishadas and Bhgavadgeeta.
- CO4. This course acquaints the students with the classical Sanskrit Prose literature and Drama.

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Programme Specific outcomes –SANSKRIT LITERATURE

- PSO1.** RECOLLECTION: Students will be able to define different ages of literature and recognize their social, cultural and historical contexts.
- PSO2.** UNDERSTANDING: Students will be able to understand and classify the variety of the literature of different ages.
- PSO3.** APPLICATION: Students will be able to apply the critical and theoretical approaches to the reading.
- PSO4.** ANALYSIS: Students will be able to identify ,analyze and describe the critical ideas, themes and principles of the literary text.
- PSO5.** EVALUATION: Students will be able to evaluate an argument in a text by identifying the evidence given to support the argument.
- PSO6.** CREATION: Students will be able to design different ideas to defend the idea in a critical text.
- PSO7.** Students will be able to analyze the role of the style of the text in achieving aesthetic literary effect.

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Subject wise Course Outcomes (CO)

SANSKRIT LITERATURE

- CO1. This course aims to acquaint the students with two most famous dramas of Sanskrit Literature which not only reflect poetic excellence but also depict contemporary society and highlight human values.
- CO2. This course aims to get the students to know the basics of Sanskrit Grammar, Neeti Literature with the general introduction to Sanskrit Literature.
- CO3. This course leads to get the students acquainted with the classical Sanskrit poetry. It also intends to give the introduction to the Shastra of the poetry.
- CO4. This literary criticism course aims to get the students to know about the aims of essential resources and definition and principle types of poetry on the basis of Mammata's Kavyaprakasha.
- CO5. This course aims to get the students to know the basics of Sanskrit Grammar based on Laghusiddhantkaumudi a primer of Paninian Grammar. Besides, the students will be able to translate sentences and write short paragraphs in Sanskrit.

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Programme Specific outcomes –SOCIOLOGY

- PSO1.** RECOLLECTION: Students will be able to remember and explain various sociological concepts and develop an understanding of macro and micro perspectives in sociology.
- PSO2.** UNDERSTANDING: Students will be able to demonstrate and summarize sociological phenomena's and emerging biographies.
- PSO3.** APPLICATION: Students will be able to integrate and apply theoretical knowledge and research skills in examining social problems and real life situations.
- PSO4.** ANALYSIS: Students will be able to analyze social issues and challenges and making an attempt to provide solutions.
- PSO5.** EVALUATION: Students will be able to evaluate and understand changing institutions, processes, agents and interventions that bring about change in the Indian society.
- PSO6.** CREATION: Students will be able to develop research models and conduct field studies.
- PSO7.** Students will develop a sense of ethical and social responsibility and engage in critical thinking.

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SOCIOLOGY

- CO1. To engage the students to understand the nature of sociology and its relationship with other social sciences. To sensitize the students about the contemporary social issues, challenges and the measures to mitigate them.
- CO2. To make students understand the emerging concepts and trends in the domain of sociology. To develop an inter-disciplinary perspective among the students to gain knowledge in the subject.
- CO3. Students will gain an understanding of the discipline by introducing to them basics concepts, terms which are frequently used in sociology as it facilitates them to understand the social structure and various aspects of society in a broader perspective. This enables the student to think critically and engage constructively.
- CO4. Students will gain foundation about the different themes and perspectives involved in sociology and encourage them to understand broadly.
- CO5. Students will familiar with social, political, economic and intellectual contexts of different sociologist and understand their social thoughts.
- CO6. The students will develop an understanding of the major Indian sociological tradition which helps the students to develop their analytical abilities.
- CO7. Students are able to understand concepts and theories underlying various social problems in India and also think about the innovative methods to mitigate them.
- CO8. Students are able to understand the emerging contemporary social issues and also it enables them to get empowered to face social problems.

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Programme Specific outcomes - COMPULSORY MARATHI

- PSO1. अभ्यासक्रमाद्वारे सामाजिक जीवनमूल्य आणि नैतिकजिवनमुल्ये यांची जाणीव वृद्धि करणे
- PSO2. भाषेतील व्यवहारिक जानिवांचा विकास करणे.
- PSO3. भाषेद्वारे क्षेत्रीय जानिवांचा विकास करणे आणि क्षेत्रीय दून्यनाचा विस्तार करणे.
- PSO4. भाषेद्वारे मानवी स्मुहातिल सम्बन्ध दृढ करणे आणि भातृत्व भाव विकसित करणे.
- PSO5. वर्तमान कालातिल जिवनमुल्यांचा भुतकाल आणि भविष्यकालाशी संगद घालने.
- PSO6. मौखिक आणि लिखित स्वरूपात संवादव्यवहार स्थापित करणे.
- PSO7. वैयक्तिक विचारधारा किंवा मतप्रवाह विकसित करणे.

Subject wise Course Outcomes (CO)

COMPULSORY MARATHI

- CO1. Students are socially disciplined in their personal and social life.
- CO2. They understand human value and ethics.
- CO3. The art of tackling problems in life is taught.
- CO4. Their overall personality is developed.
- CO5. They become familiar with any type of administrative work.
- CO6. They are able to understand the history of their ancient society and rectify their present and future.
- CO7. They develop the thinking of solving their political, religious, economical and social problems.
- CO8. They are enabled to adapt a profession of a writer/editor/news reporter/proof reader/translator etc.

Programme Specific outcomes - MARATHI LITERATURE

- PSO1. साहित्याचे वेगवेगळे अंग परिभाषित करणे आणि त्यांच्या सामाजिक, सांस्कृतिक आणि ऐतिहासिक संधर्भांचे अनुभव व आकलन करणे.
- PSO2. विशिष्ट साहित्याच्या प्रकारांची ओळख करून देणे.
- PSO3. विशिष्ट सौंदर्याचा साहित्यिक प्रभाव साध्य करण्यासाठी शैली आणि शैलीच्या भूमिकेचे विश्लेषण करणे.
- PSO4. एखाद्या साहित्यिक मजकूरामधील गंभीर कल्पना, थीम आणि मूल्ये ओळखणे, विश्लेषण करणे, व्याख्या आणि वर्णन करणे.
- PSO5. विविध शैलीतील व विविध भाषेतील ग्रंथांची तुलना करणे.
- PSO6. भाषेद्वारे मानवी मुल्यांची जपणूक करणे व ही मुल्ये समाजात दृढ करणे.
- PSO7. वेगवेगल्या कालाशी संबंध स्थापित करण्यास मदत करणे

Subject wise Course Outcomes (CO)

MARATHI (MORDEN LITERATURE)

- CO1. They learn about their ancient literature.
- CO2. They learnt the types of literatures and its stages of developments.
- CO3. They come to know about their ancient poets and writers.
- CO4. Through the literature student correlates their faith, ethics, moral and human Values.
- CO5. Through comparative study of literature they learn various aspects of different literature.
They understand and speak the native language.

Programme Specific outcomes - HINDI LITERATURE

- PSO1.** Their writing skill is developed and their creativity is enhanced.
- PSO2.** They are enabled to adapt a profession of a writer/editor/news reporter/proof reader/translator etc.
- PSO3.** They are taught to respect human values and practice the same.
- PSO4.** They become nature loving and practice the moral values.
- PSO5.** They live and practice the natural life.

Subject wise Course Outcomes (CO)

HINDI (MORDEN LITERATURE)

- CO1.** Students come to know about their ancient literature.
- CO2.** They learnt the type s of literatures and its stages of developments.
- CO3.** They come to know about their ancient poets and writers.
- CO4.** Tough the literature student correlates their faith, ethics, moral and human values.
- CO5.** Their comparative study of literature is developed.
- CO6.** Their language is enhanced with phrase and grammatically.

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Outcomes of Postgraduate Programmes offered by the Institution

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Programme outcomes of M.Sc. in Life Sciences

The following Departments are included under Biological Sciences/Life Sciences:

- Botany
- Biotechnology
- Biochemistry
- Zoology

- PO1.** Courses offered in the Biological Sciences/ Life sciences give students a general understanding of the fundamental principles of life that extend from the tiniest microbes to plants, animals, and human beings.
- PO2.** Students can describe the structure and function of cellular components and explain how they interact in a living cell. They can also describe how cells interact to develop tissues and organs, and how these contribute to a functional organism.
- PO3.** Students can demonstrate an understanding of the mechanisms driving evolution, and can describe similarities and differences of the major taxonomic groups.
- PO4.** Students will become proficient in handling relevant scientific instruments and have a understanding of the principles of working.
- PO5.** Students can formally communicate the results of biological investigations using both oral and written communication skills.
- PO6.** Students also obtain the knowledge, skills, and motivation necessary to lifelong learning and problem solving attitude.
- PO7.** Specialized courses emphasizing teaching and research in various life science disciplines are also offered. Disciplines range from basic science to applied science.

Program Specific Outcomes (PSO) – M.Sc. Botany

- PSO1. Capable of demonstrating comprehensive knowledge and understanding of one or more branches of Botany (discipline) in detail and ability to think critical and clearly about the plant world.
- PSO2. Ability to analyse and critical thinking of the basic concepts of different morphological, anatomical, reproductive, cytological, physiological and molecular characters of the plants.
- PSO3. After successful completion of the projects ability is developed to undertake supervised research, identification of research questions, critical analysis of the literatures and enhance research related skills in laboratory practices, which are tested in all forms of assessment.
- PSO4. Develop the problem solving capacity to identify and define the problem, generating alternative solutions, evaluating and selecting the best alternative, and implementing the selected solution.
- PSO5. Professional skills such as identification and classification of all forms of plant kingdom, Gardening, Farming and other related career competencies that often are not taught (or acquired) as part of the subject.
- PSO6. Acquired the knowledge of biotic and abiotic factors, critical thinking of economics, aesthetic and biological importance of preserving local resources and reducing or eliminating the harmful impacts of manmade alterations and could take a step towards the conservation of nature and environmental awareness.
- PSO7. Ability to analyse the biological information by using different bio-informatics tools through ICT facilities and can compose the clear information through writing and other media on various digital platforms that can be assessed instantly.

Course Outcomes – M.Sc. Botany

Semester I

Core 1 (1T1)

Paper 1 : Microbiology, Algae and Fungi

- CO1. Ability to understand at the basic and advance levels of knowledge of general microbiology, bacteria, viruses and archebacteria.
- CO2. Capability to critically analyze the criteria for classification of algae, diversified habitats and its uses.
- CO3. Ability to study the classification and identification of Fungi with evolutionary trends.
- CO4. Knowledge of different classes of fungi and their pathological effects on plants.

Core 2 (1T2)

Paper 2 : Bryophytes and Pteridophytes

- CO1. Understand the distribution and monographic studies of Bryophytes.
- CO2. Ability to read and analyse the different classes of Bryophytes.
- CO3. Understand the general characters and different classes of Pteridophytes.
- CO4. Ability to understand the evolutionary trends of Pteridophyta.

Core 3 (1T3)

Paper 3 : Paleobotany and Gymnosperms

- CO1. Ability to think and understand fossils formation, history, preservation and geological time scale.
- CO2. Understand the origin of gymnosperm, evolution and classification.
- CO3. Ability to read type studies of gymnosperms and analyse relationship of various gymnosperms.
- CO4. Ability to classify the gymnosperm. Also get the knowledge about their economic importance.

Core 4 (1T4)

Paper 4 : Cytology and Genetics

- CO1. Capable of understanding comprehensive knowledge of major concepts, principles, theories and laws of inheritance and types of chromosomal inheritance patterns.
- CO2. Develop learning methods of cytoplasmic inheritance and chromatin organization.
- CO3. Knowledge of population genetics.
- CO4. Understand the concept of mutations and epigenetics.

Pract. Core 1 & 2 (1P1)

Practical 1 : Algae, fungi and bryophytes

- CO1. To develop the skill of identification of Algae, fungi, bacteria and bryophytes.
- CO2. Skill being developed to identify and classify the fungi into different classes.
- CO3. Capability to identify the disease caused by bacteria and fungi.
- CO4. Develop the ability to identify the bryophytes and to study its diversity.

Pract. Core 3 & 4 (1P2)

Practical 2 : Pteridophytes, gymnosperms, Paleobotany, cytology and genetics

- CO1. Acquire knowledge and skills of identification of pteridophytes.
- CO2. Develop abilities to identify and classify gymnosperms.
- CO3. Identification of various types of fossils and their reconstruction. Enhance the experimental skills in cytology and develop the capacity to solve the genetic problems systematically.

Seminar 1 (1S1)

Seminar 1

- S1. Develop the communication skills, increase the leading ability and acquainted with the thorough knowledge of the topic.

Semester II

Core 5 (2T1)

Paper 5 : Plant Physiology and Biochemistry

- CO1. Ability to understand the concept of photosynthesis and respiration and enhance experimental skills.
- CO2. Capability to critically analyze the plant hormones and sensory biology.
- CO3. Develop the abilities on the aspects of enzymatic activities of different components in plants.
- CO4. Acquire knowledge and skills of different metabolic components

Core 6 (2T2)

Paper 6 : Plant Development and Reproduction

- CO1. Understanding the basic growth kinetics and growth patterns in plants.
- CO2. Capable to know the developmental processes occur in different parts of the plants.
- CO3. Learn various steps of the plant reproduction process and barriers in detail.
- CO4. Understanding the fruit development, senescence and program cell death.

Core 7 (2T3)

Paper 7 : Cell and Molecular Biology – I

- CO1. Ability to understand the basic concept of cell wall and membrane architecture structure and their roles.
- CO2. Understanding of different cellular organelles and problem solving skills under various circumstances.
- CO3. Ability to know the structure of nucleus and the DNA and critically thinking of their importance in living cells.
- CO4. Understanding the concept of stress biology and ability to develop practical applications to overcome problems

Core 8 (2T4)

Paper 8 : Angiosperms – I and Ethnobotany

- CO1. Ability to learn and describe the basic structure of flowers, to identify and classify the plants based on their structure.
- CO2. Understanding and developing research related skills of angiosperm taxonomy.
- CO3. Ability to read and analyze the taxonomic evidences and different tools for identification.
- CO4. Acquired the knowledge of biosystematics and ethnobotany

Pract. Core 5 & 6 (2P1)

Practical 3 :cPlant physiology, Plant biochemistry, Plant Development and reproduction

- CO1. Ability to perform and test the enzymatic activities of different components.
- CO2. Develop the ability to isolate and analysis of different plant components.
- CO3. Ability to know the mechanism of the growth and differentiation of a plant parts.
Learn to use biomolecules for flower formation, seed setting and senescence effects and applying this knowledge in daily life.

Pract. Core 7 & 8 (2P2)

Practical 4 : Cell and Molecular Biology – I, Angiosperms – I

- CO1. Develop the skills to perform cell and molecular biology experiments.
- CO2. Develop the ability to apply the techniques of stress related problems in plants.
- CO3. Ability to identify and describe the morphological characters of the different categories of plants.
- CO4. Develop the capacity to distinguish the plants on the basis of various angiospermic features.

Seminar 2 (2S1)

Seminar 2

- S1. Create ability to manifest ideas and thoughts in writing and orally to communicate confidently their viewpoints.

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Semester III

Core 9 (3T1)

Paper 9 : Plant Ecology and Conservation Biology

- CO1. Understanding the concept of various types of vegetational organization, analysis of communities and their functions.
- CO2. Understanding the structure and function of ecosystem and ability analyse productivity of various ecosystems.
- CO3. Developing skills in environmental impact assessment, critical thinking of sustainable development of ecosystems, environmental.
- CO4. Use environmental resources with care and protect them from degradation.

Core 10 (3T2)

Paper 10 : Angiosperms—II

- CO1. Ability to read and analyse the different morphological characters for identification of plants at family level.
- CO2. Capability to critically analyze the characters for distinguishing the angiosperm plant groups.
- CO3. Study of ancestors of angiosperms and different IUCN categories of threat to bring awareness of their status in nature for conservation point of view.
- CO4. Understanding and analyzing the concept of plant biodiversity, its role, stability and its importance; to identify hotspots of plants.

Core Elective 1 (3T3)

Paper 11 Elective 1 : Molecular Biology and Plant Biotechnology – I

- CO1. Learning the mechanism of DNA replication, damage and repair at molecular level and factors responsible for damage.
- CO2. Understanding the recent techniques and tools of recombinant DNA technology and molecular probing.

CO3. Learn to know the concept of polymerase chain reaction and rDNA techniques and its applications .

CO4. Ability to use and analyse the concept of proteomics, genomics and various bioinformatics tools.

Foundation Course – 1 (3T4)

Paper 12 Foundation 1 : Aesthetic botany

CO1. Understanding the structure of male reproductive parts anther and its significance as experimental material.

CO2. Ability to read, understand and analyze different functional aspects of pollen fertility and sterility and factors which influence them.

CO3. Understanding the concept of megasporogenesis, types of embryo sac, and nutritional aspects for growth of embryo sac.

CO4. Learn to know the different types of pollination and pollen-pistil interactions, ability to overcome incompatibility problems in plants.

Pract. Core 9 & 10 (3P1)

Practical 5 : Plant Ecology and Conservation biology and Angiosperm – II

CO1. Develop the ability to perform ecological experiments and build up the skill of solving biostatistical problems systematically.

CO2. Ability to learn and apply the knowledge of conservation methods.

CO3. Capability to identify and classify plants properly by regular field visits.

CO4. Develop the ability to use floras and herbarium for plant identification

Pract. Core Elective – 1 (3P2) :

Practical 6 Elective : Molecular Biology and Plant Biotechnology – I

CO1. Ability to develop skills by perform the techniques of molecular biology experiments.

CO2. Ability to use the different bioinformatics tools for analysing the molecular biological data.

- CO3. Developing skills to perform the techniques of rDNA technology.
- CO4. Ability to develop plants in the laboratory by plant tissue culture techniques and commercial applications for micropropagation

Seminar 3 (3S1)

Seminar 3

- S1. Ability to improve language and subject communication skills effectively.

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Semester IV

Core 11 (4T1)

Paper 13 : Cell and Molecular Biology – II

- CO1. Ability to understand the concepts of transcription and translation in prokaryotes and eukaryotes at molecular level.
- CO2. Understanding and analyzing the different concepts of genes and regulation of gene expression.
- CO3. Ability to know the genome organization, genetic recombination and mapping in various organisms.
- CO4. Understanding the concept of signal transduction and different techniques in cell biology.

Core 12 (4T2)

Paper 14 : Plant Biotechnology and Plant Breeding

- CO1. Ability to analyse the concept of recombinant DNA technology and genetic engineering of plants.
- CO2. Understand the concept of genomics and proteomics.
- CO3. Learn to know the different aspects of Plant tissue culture techniques and transgenic production.
- CO4. Ability to analyse the different aspects of bioinformatics and methods of plant breeding.

Core Elective 2 (4T3)

Paper 15 Elective 2 : Molecular Biology and Plant Biotechnology – II

- CO1. Learn to know the production and applications of transgenic.
- CO2. Understanding transgenics and application transformation and molecular farming.
- CO3. Learn to know the advanced aspects and techniques of Plant tissue culture in details.
- CO4. Ability to analyse the concept of DNA fingerprinting, marker assisted breeding and cleaner biotechnology and its applications.

Foundation Course – 2 (4T4)

Paper 16 Foundation 2 : Applied Botany

- CO1. Learn new things which help in social change and other life-affirming endeavours.

- CO2. Ability to transfer such skills in other domains of one's life and work.
- CO3. Ability to retain and build on critical reading skills.
- CO4. Develop some entirely new skills in plant science that will help in some way to enhance life style.

Pract. Core 11, 12 & Elective 2 (4P1)

Practical 7 : Cell and Molecular Biology – II, Plant Biotechnology and Plant breeding

- CO1. Learn to develop skills in molecular biology experiments for protein and DNA isolation, separation, purification and applications.
- CO2. Ability to perform in vitro Transcription, Translation and Conjugation.
- CO3. Ability to study immunological techniques for diagnosis and disease identification.
- CO4. Ability to learn the techniques of chromatography for analysis of bio-molecules.

Project (4 PROJ 1)

Practical 8 : Project

- CO1. Capable of self-paced and self-directed learning aimed at improving practical knowledge and research skills and problem solving ability.
- CO2. Ability of intensive search, investigation, and critical analysis, usually in response to a specific research question or hypothesis.
- CO3. Research literature survey and other research tasks are expected to develop a degree of creativity, originality to students are encouraged.
- CO4. Enhance skills in research and analysis, which are tested in all forms of assessment.

Seminar 4 (4S1)

Seminar 4

Ability to speak and present data clearly in standard academic language form.

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Program Specific Outcomes (PSO) – M.Sc. Biochemistry

- PSO1: Students who graduate with a Master of Science in Biochemistry will demonstrate an understanding of structural and functional inter-relationship of macromolecules to derive applied technological, therapeutic, and industrial benefits.
- PSO2: They will have in-depth knowledge of fundamental processes and cellular mechanisms involved in the perpetuation of life.
- PSO3: The subject-specific elective will enable them to learn the concepts of toxicology or Nutritional biochemistry depending upon the choice of elective. Both the papers have immense commercial and social significance.
- PSO4: This course will provide a thorough knowledge of techniques applied in the fields of Molecular biology, Enzymology, Clinical Biochemistry, Toxicology, Immunology, and Biotechnology.
- PSO5: Students will learn to apply the scientific methods to the process of experimentation, Hypothesis testing, research investigations, and result interpretations.
- PSO6: Develop the ability to understand and practice the ethics surrounding Scientific Research.
- PSO7: Realize the importance of scientific research for societal benefits and national challenges.
- PSO8: This course will enable them to aspire for higher studies in the field of biological sciences, jobs in research and development units of the pharma sector, scientific and academic institutions.

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Course Outcomes

SEMESTER I

Protein Biochemistry

- CO1. Recollect fundamentals of protein biochemistry and understand protein structure, organization, conformation, and the interaction of proteins with other biomolecules at an advanced level.
- CO2. They will understand the biochemical concepts underlying the functional aspects of proteins. Students will have a detailed understanding of biosynthesis and protein targeting at the cellular level in a eukaryotic cell.
- CO3. Students will be to compare and contrast the protein biosynthesis in prokaryotic and eukaryotic cells. They will learn how proteins are sorted and compartmentalized inside a cell. The course will give a fundamental understanding of organelle-specific protein functions.
- CO4. The course will enable them to apply analytical skills of mass spectrometry to analyze protein structure and conformation. Students would be able to demonstrate competence in the interpretation of Mass Spectrograms.
- CO5. Students will learn the approaches to design and synthesize novel proteins. Specific examples of the designed novel proteins help them to understand and apply the concept of protein engineering. They will be gain knowledge about techniques to introduce changes in protein structure at the molecular level and analyze proteins with desired characteristics.
- CO6. Additional methods adopted during the content delivery will enable them to understand research publications on protein biochemistry in scientific journals.

Enzymology

- CO1. Students will recall the classification and nomenclature, understand the characteristics of enzymes at advanced levels. They will acquire an understanding of the principles of enzymology, mechanisms, and strategies for biological catalysis.

- CO2. Students can evaluate the kinetic properties of enzymes with parameters like V_{max} , K_m , V_o and define specific activity.
- CO3. Understand the different mechanisms of enzyme inhibition, type of inhibitors, effect on the rate of enzyme-catalyzed reactions and derive K_i of a reaction.
- CO4. Students would understand the sigmoidal kinetics of allosteric enzymes and the advantage of allosteric enzyme regulation activities and metabolic pathways.
- CO5. Develop intellectual capacity to relate principles of bioenergetics, laws of thermodynamics, free energy, and its connection to enzyme catalysis. Learn to analyze the role of coupled reactions in metabolism, the chemiosmotic hypothesis of ATP synthesis, and energy harnessing from biological equations.
- CO6. Learn to perform assay of a clinically important enzyme, factors affecting enzyme activity, and immobilization techniques.

Biochemical Research Techniques

- CO1. Students will be able to identify, discuss the role and importance of research, gain the theoretical concepts of the research process. identify and discuss the complex issues inherent in selecting a research problem
- CO2. Learn to frame the hypothesis, select suitable research design, techniques for implementation and discuss the concepts, procedures of sampling, data collection, analysis, and reporting.
- CO3. Learn the principles of statistical methods in biological research, samples and populations, basic statistical methods to determine the average, dispersion, coefficient of variation, confidence limits, probability distribution, normal, binomial, mean variants, standard deviations and standard error, correlation, and regression, the test of statistical significance, and analysis of variance and covariance.
- CO4. Enabled to search & retrieve databases using data retrieval tools and bioinformatic tools for in silico studies.

- CO5. Perform data Mining from biological databases, create accession numbers and submit results.
- CO6. Get trained in different aspects of report writing, types of reports, mechanics, and precautions to be taken during writing research reports for scientific journals, popular magazines, seminars/symposia, etc.
- CO7. Learn scientific data presentation in oral and written form in classrooms, scientific meets & public audience.

Plant biochemistry

- CO1. Recollect knowledge of plant cellular architecture, mechanism of photosynthetic systems to understand autotrophic food synthesis mechanism operative in plants.
- CO2. Understand the hormonal pathways involved in plant growth mechanisms, the role of hormones in vitro plant propagation, setup of PTC laboratory, organogenesis, and related plant tissue culture aspects and its applications.
- CO3. Students will be able to learn metabolic attributes and driving principles of plant growth through basic carbohydrate, lipid, and protein metabolism, the importance of nitrogen and sulfur metabolism in plants, and associated plant physiological alterations.
- CO4. Enabled to analyze physiochemical effects caused by biotic and abiotic stress factors on plant metabolism and growth. They can thus impinge upon the ways to tackle such stress physiological aspects to promote and resolve plant stresses.
- CO5. Practical exposure to biochemical analysis of plant physiological aspects would improve the students' application approach towards plant biochemistry as a tool to protect plant diversity.

Semester II

Immunology

- CO1. To recall the historical developments of immunology and remember basic concepts of Immunology. Learn the mechanisms involved in innate immunity, various types of barriers, and a detailed account of phagocytosis. Compare and

contrast the cellular players of innate and adaptive immunity and how they relate

- CO2. Understand the process of hematopoiesis, cells of the immune system, organs, and their role in the development of immunity. Gain knowledge about active-passive immunity, the role of surface receptors, PAMP -PRR interactions.
- CO3. Learn the structure, types, and development of Immunoglobulins, mechanism and pathways of humoral immunity and cell-mediated immunity.
- CO4. Understand the genetic basis for immunological diversity and the generation of adaptive immune responses
- CO5. Outline key events and cellular players in antigen presentation, and how the nature of the antigen will shape resulting effector responses, identify the mechanisms of inflammation
- CS06. Appreciate and assess the various immunological techniques used for medical diagnostics and public health. Applications of immunological techniques in public health and immunization

Clinical biochemistry

- CO1: Recollect the basic concepts and principles of Clinical Biochemistry, details on the various biological specimens including the process of collection, preservation, and storage.
- CO2: Understand the blood groups, blood banking and adverse reactions of blood transfusions. describe the blood clotting pathways and the blood clotting disorders, enumerate the different types of anemias based on etiology.
- CO3: Understand the pathophysiological processes responsible for common biochemical disorders such as jaundice, types of jaundice, Pancreatitis, Fatty liver, etc.
- CO4: Understand the Formation of urine and gain perception on the various renal function tests and renal disorders, need for Gastric function tests, Collection of

gastric contents, their examination. Understand the etiology, types, clinical manifestations, diagnosis and treatment of various amino acidurias.

- CO5: Appreciate the clinical application of enzymes and isozymes in diagnosis. Understand and analyze the enzyme profiles in case of certain organ-specific diseases.
- CO6: Understand the etiology, types, clinical manifestations and treatment of Diabetes mellitus and various disorders of carbohydrate metabolic pathways.
- CO7: Elaborate on the role of Serum lipids including triglycerides, cholesterol and phospholipids in diseases. Detail the clinical role of serum cholesterol and state the Clinical features of atherosclerosis.

Cell biochemistry

- CO1. Recall and remember the structure and functions of cells, subcellular organelles and their functions, cell division cycle and regulation of cell division.
- CO2. Understand ligand-receptor interaction and their role in signal transductions, the importance of signal cascades and their response specificity in signaling events.
- CO3. Learn the basics of cell communication and cell recognition, cell Adherence, cell senescence and death.
- CO4. Understand the molecular basis of Cancer – cancer cells, the difference between cancer and normal cells. and learn about Tumor markers. Describe the oncogene and proto-oncogene and their relation to cell proliferation
- CO5. Describe the role of tumor suppressor genes in protecting the normal cell from becoming a cancer cell and apply the knowledge to devise new methodologies in cancer treatment.

Molecular biology

- CS01. Remember and understand the fundamental concepts of Molecular Biology and the functions of genes and genome organization in a eukaryotic cell.
- CO2. Comprehend the concepts of DNA replication and recombination processes in eukaryotes. Learn the detailed mechanisms involved in the fundamental

processes. Relate the concepts of Molecular Biology with the development of Biochemical research techniques.

- CO3. Study transcription process in eukaryotes, types of RNA polymerases, their Transcription units and promoters.
- CO4. Appreciate the mechanisms and apply the knowledge gained in research.
- CO5. Perform various molecular techniques like DNA Plasmid isolation etc. and will be able to analyze and interpret the results of nucleic acid electrophoretograms.
- CO6. Study viruses and apply the knowledge about structure, classes and functions into the allied fields

SEMESTER III

Advanced Molecular Biology

- CO1. Recollect the mechanism of eukaryotic transcription and understand the concepts of eukaryotic transcription regulation mechanisms with details about promoter elements, silencers, enhancers and upstream control elements.
- CO2. Gain knowledge about different types of posttranscriptional modifications in messenger RNA and post-translational modifications needed for gene expression.
- CO3. Describe the role of regulatory RNAs in the process of regulation of gene expression.
- CO4. Appreciate and assess the effect of RNA interference as an essential molecular and genetic engineering tool.
- CO5. Appreciate epigenetic ways of gene expression regulation in eukaryotes.

Biotechnology

- CO1. Remember and Understand fundamental concepts of Genetic Engineering like DNA manipulation enzymes, restriction enzymes, plasmid vectors, cosmids and phagemids, expression vectors and learn about their applications in genetic engineering.

- CO2. Illustrate and compare different mechanisms of gene regulation available in prokaryotes and bacteriophage lambda.
- CO3. Understand the concepts of fermentation and bioreactors. Learn the basics of instrumentation and designing of bioreactors of different types.
- CO4. Study and apply concepts of genetic modification, use of mutants, microbial growth kinetics, fermentation process kinetics and control of environmental variables to develop protocols for, fermentation products.
- CO5. Learn about Bioinformatics resources and Biological Databases. Apply bioinformatics tools to analyze nucleotide sequences, protein structure, drug designing.
- CO6. Understand concepts of proteomics and create by applying experimental skills learned to Drug Designing and drug delivery.
- CO7. Appreciate technology involved in industrial products of Protein engineering and fermentation technology.

Toxicology (Biochemical & Environmental Toxicology)

- CO1. Understand key principles of toxicology, including various factors affecting toxicity and toxicity assessment
- CO2. Evaluate, analyze the disposition of toxicants and factors affecting the disposition of toxicants.
- CO3. Ability to understand biotransformation and toxicokinetics.
- CO4. Critically analyze and interpret organ and non-organ directed toxicity. Students would be able to assess the effect of environmental toxicity on human health.
- CO5. Develop the understanding of the genetic toxicology and effect of different classes of xenobiotics.
- CO6. Critically evaluate the relationship between toxicant exposure and the impact through experimental designs.

OR

Nutrition (Nutritional Biochemistry)

- CO1. Recall and recollect the biochemical techniques that are relevant for the investigation of nutrient metabolism.
- CO2. Understand key principles of energy expenditure, thermogenic effects, Energy requirements and role of dietary fibers in nutrition.
- CO3. Read, interpret and discuss protein-energy malnutrition, disorders of mineral metabolism for scientific research
- CO4. Develop an understanding of the observational and experimental parameters of nutritional biochemistry.
- CO5. Communicate the role of clinical nutrition and food allergies in scientific communication such as written reports and open discussion.
- CO6. Capably describe and perform the biochemical techniques that are relevant for the investigation of nutrient metabolism.

Bioresearch Techniques I

- CO1. Understand the key working principle of flow cytometry and apply it in the research and do data analysis.
- CO2. Learn animal tissue culture techniques, details of media composition, laboratory setups and applied uses in research and industry.
- CO3. Perform various advanced DNA and RNA techniques and appreciate the utility of these techniques in related fields.
- CO4. To develop practical laboratory skills in the field of DNA and RNA techniques.

SEMESTER IV

Advanced Clinical biochemistry

- CO1. Analyze, evaluate and generate information from a wide variety of sources regarding the key principles of aging and Neurological disorders.

- CO 2. Remember the theories of obesity and understand the effects of obesity on physiological functions, the basis of familial obesity, effects of neuropeptides, leptin in nutrient partitioning and therapeutic approaches for obesity management.
- CO3. Critically interpret molecular and metabolic diseases, and develop new knowledge domain about them.
- CO4. To develop effective, creative and innovative solutions to current research problems in Reproductive Disease and Reproductive Biochemistry.
- CO5. To develop practical laboratory skills for Assisted Reproductive Technology program

Advanced Immunology

- CO1. Remember the pathways of the complement system and its role in humoral mechanisms.
- CO2. Identify key events and cellular players governing mucosal immunity and explain the basis of allergy and allergic diseases
- CO3. Understand and explain the basis of immunological tolerance, autoimmunity and transplantation
- CO4. Understand and explain the immune responses to cancer; tumor immunology and principles of immunotherapy
- CO5. In-depth knowledge of the cellular and molecular basis for autoimmune disease and allergies. Understand the importance of gut microflora in the development of the immune system and responses.
- CO6. Basic knowledge of tumor immunology and the development of novel recombinant antibodies for the treatment of cancer and autoimmune disease.

Toxicology (Clinical Research)

- CO1. Know assessment and management of ethical clinical trial programs.
- CO2. Demonstrate competency in biopharmaceutical clinical trial research designs and regulatory affairs.

- CO3. Demonstrate competencies in evaluating clinical research data and communicating results. Manage innovative products through the discovery processes and into the clinical trial phases.
- CO4. Identify and classify different types of trial designs when reading a trial report; understand the essential of GLP, roles and responsibilities of stakeholders in clinical trials

OR

Nutrition (Applied Nutritional Biochemistry)

- CO1. Capable of describing biochemical pathways relevant to nutrient metabolism.
- CO2. Capable of using selected biochemical techniques relevant to nutritional biochemical research
- CO3. Critical reading of scientific articles in nutritional biochemistry
- CO4. Capable of discussing research questions relevant to nutritional biochemistry
- CO5. The ability to ask critical questions and discuss nutritional biochemical research.

Bioresearch Techniques II

- CO1. Learn, describe and build up knowledge domain regarding the latest and most advanced Bioresearch techniques available for biochemical research.
- CO2. Be aware, select appropriately, apply technology platforms and Perform techniques for analysis of DNA and protein expression.
- CO3. Evaluation of data and controls related to research techniques.
- CO4. Create thought-provoking questions related to the laboratory equipment.

PROJECT

- CO1. Plan and develop experimental design projects from concept through to professional prototypes.
- CO2. Apply theoretical knowledge, conceptual skills and techniques to the development of solutions for biochemical problems.
- CO3. Apply initiative and judgment in planning, problem-solving and decision-making in practice or future study.

- CO4. Design a research project and submit it in a form of a thesis, they will present the results of the thesis to an audience of peers and faculty, and be able to defend their results during the final evaluation

Program Specific Outcomes (PSO) – M.Sc. Biotechnology

- PSO1. Remember and Understand complex phenomenon in Life sciences and techniques in Biotechnology to appear and clear entrance examinations and interviews for admissions to Ph.D courses in India and abroad, and placements in the pharmaceutical, fermentation and environmental industries.
- PSO2. Develop the capacity of critical thinking and problem solving aptitude by virtue of taking research assignments in the field of Biotechnology and be capable of using ICT tools for collection, analysis, communication and presentation of data.
- PSO3. Investigate complex scientific problems and construct proposal for effective solution by extrapolating the knowledge gained in the field of Biotechnology during the program leading to self sustainability and employability.
- PSO4. Be able to identify an area of scientific research, design, and carry out suitable experiments and document the results in a scientific manner leading to patents and publications in the biotechnological field.
- PSO5. Be able to work as an individual, a team member or a team leader thereby building trust and coordination in the team facilitating a positive outcome in Biotechnology.
- PSO6. Practice ethical principles and bind to professional ethics and responsibilities related to IPR, copyright and plagiarism in the field of Biotechnology.
- PSO7. Be sensitive towards societal and environmental problems which can be solved by biotechnology and develop solutions for it.
- PSO8. Be able to interact effectively with socio-cultural and academic peer groups and work in collaboration towards common biotechnology oriented goals.

Course Outcomes (CO) –M.Sc. Biotechnology

Semester I

Paper – I (Code: 1T1) Cell Biology and Enzymology

- CO1 . Remember and understand the structure and function of cells, sub cellular organelles, Cellular communication and Cell cycle.
- CO2 . Remember and understand the Basic concepts of Enzymology and Enzyme Kinetics.
- CO3 . Understand the concepts of Enzyme Engineering and immobilization

Paper – II (Code: 1T2) Molecular Biology

- CO1 . Remember and understand the fundamental concepts of Molecular Biology like DNA replication, transcription, mRNA processing, and mutations and the experiments involved in it.
- CO2 . Understand the concepts of protein synthesis, post translational modification and apply them in the development of Biotechnological experiments.

Paper – III (Code: 1T3) Biomolecules

- CO1 . Remember and understand the biochemistry and diversity of Carbohydrates, Proteins, Lipids and Nucleic acids.
- CO2 . Recognize the importance of Biomolecules in Biotechnological processes

Paper – IV (Code: 1T4) Biophysical Techniques

- CO1 . Remember and comprehend techniques and instrumentation involved in studying basic biological phenomenon focusing on Spectrophotometry, Chromatography, Electrophoresis, Centrifugation viscosity and radioactivity.
- CO2 . Evaluate the application of each technique in providing solution to biotechnological problems.

LAB I (Code: 1P1) Cell Biology and Enzymology

CO1 . Perform major experiments in cell biology and enzymology

LAB II (Code: 1P2) Macromolecules & Analytical Techniques

CO1 . Perform basic techniques in understanding biomolecules and Biophysical techniques.

Semester II

Paper – I (Code: 2T1) Microbiology

CO1 . Remember and Understand basic concepts of Microbiology

CO2 . Appreciate the diversity of microorganisms and their application in biotechnology.

CO3 . Comprehend the concept of chemotherapy and understand and evaluate the Drug resistance in Microbes.

Paper – II (Code: 2T2) Immunology

CO1 . Remember and Understand basic concepts of Immunology and vaccinology.

CO2 . Appreciate and assess the various immunological techniques used for public health.

Paper – III (Code: 2T3) Fundamentals of Genetic Engineering

CO1 . Remember and Understand fundamental concepts of Genetic Engineering like cloning, DNA libraries and recombination.

CO2 . Illustrate and compare different techniques involved in Genetic Engineering

Paper – IV (Code: 2T4) Applied Molecular Biology

CO1 . Gain knowledge of Recombination and Genome Mapping and its application in Biotechnology

CO2 . Comprehend the concept of Antisense, Ribozymes and Epigenetics and their application

CO3 . Understand basic concepts of Cancer Biology and stem cells.

LAB I (Code: 2P1) Microbiology & Immunology

CO1 . Acquire basic Microbiology laboratory skills like bacterial pure culture isolation, microscopy and biochemical analysis of microbes

CO2 . Understand experiments in Immunology

LAB II (Code: 2P2) Genetic Engineering & Applied Molecular Biology

CO1 . Acquire laboratory skills involved in Genetic Engineering and Molecular Biology.

CO2 . Understand the handling of laboratory instruments and chemicals involved in Genetic Engineering.

Semester III

Paper – I (Code: 3T1) Genetic Engineering & its Applications

CO1 . Understand the concepts of Prokaryotic and Eukaryotic Transformation and PCR

CO2 . Describe the expression of heterologous genes and the vectors involved in it.

CO3 . Appreciate technology involved in industrial products of Protein engineering.

CO4 . Explain and illustrate techniques like Phage display and gene therapy

Paper – II (Code: 3T2) Plant Biotechnology

CO1 . Remember and understand the concept of Plant Biotechnology

CO2 . Differentiate between different plant tissue culture techniques.

CO3 . Comprehend different techniques to produce better crop via applying the principles of biotechnology

CO4 . Understand concepts of Plant Metabolic Engineering

Paper – III (Core Elective A) (Code: 3T3A) Industrial Biotechnology I

CO1 . Remember and understand the design and functioning of different types of Bioreactors and Downstream processing

CO2 . Evaluate the application of different types of Bioreactors including immobilization reactor system and its kinetics

Paper – III (Core Elective B) (Code: 3T3B) Environmental Biotechnology I

CO1 . Remember and understand the principles of Environmental Science & Bioresources like biofuels.

CO2 . Be able to formulate biofertilizers and biopesticides and use them for sustainable agricultural practices.

Paper – IV (Foundation Paper I) (Code: 3T4A) Introductory Biotechnology

This course is allowed for students of M.Sc. from subjects other than Biotechnology. Therefore the students in this course will be from field other than Biotechnology and will not have background of Biotechnology.

CO1 . Comprehend the structure and function of macromolecules such as Proteins and Nucleic Acid and their arrangement in Cell

CO2 . Understand the concept of genes and enzymes

Paper-IV: (Core Subject Centric I) (Code: 3T4B) Diagnostic Medical BiotechnologyMolecular and Nanomolecular Diagnostics

Students who are not opting for foundation course in any other subject (other than Biotechnology) can opt for this course.

CO1 . Understand the concept of genomics and host pathogen interaction in disease progression and clinical diagnosis

CO2 . Understand the importance of proteomics and biomarkers in medical Biotechnology and Molecular and Nanomolecular Diagnostics

LAB I (Code: 3P1) Genetic Engineering & Plant Biotechnology

CO1 . Skillfully perform basic experiments in Genetic engineering and plant Biotechnology

CO2 . Handle sophisticated laboratory equipment and reagents

LAB II (Core Elective A) (Code: 3P2) Industrial Biotechnology

CO1 . Understand the basic concepts of experiments in Industrial Biotechnology

LAB II (Core Elective B) (Code: 3P2) Environmental Biotechnology

CO1 . Understand the basic concepts of experiments in Environmental Biotechnology

Semester IV

Paper – I (Code: 4T1) Animal Biotechnology

CO1 . Explain the Fundamental Concepts of Animal Cell Culture techniques.

CO2 . Understand and envision the future Commercial aspects of Animal Cell culture

Paper – II (Code: 4T2) Biostatistics, Bioinformatics, Ethics & Patenting

CO1 . Understand the underlined concepts of Biostatics, Bioinformatics and their application in the field of Biotechnology

CO2 . Apply the knowledge of biosafety, bioethics and patenting for protecting rights I legal issues related to Biotechnology

Paper – III (Core Elective A) (Code: 4T3A) Industrial Biotechnology II

CO1 . Remember and understand the advanced concept like biosensor technology and process optimization in the field of Industrial Biotechnology

CO2 . Evaluate the production of Primary and Secondary Metabolites for industrial application.

Paper – III (Core Elective B) (Code: 4T3B) Environmental Biotechnology II Applied Environmental Biotechnology

- CO1 . Remember and Understand the advanced concepts of bioremediation, phytoremediation, bleaching and biotransformation in the field of Environmental Biotechnology
- CO2 . Evaluate the functioning of technology involved in Waste water treatment and xenobiotic degradation.

Paper – IV (Foundation Paper II) (Code: 4T4A) Basic rDNA Technology

This course is allowed for students of M.Sc. from subjects other than Biotechnology. Therefore the students in this course will be from field other than Biotechnology and will not have background of Biotechnology.

- CO1 . Comprehend the basic process and techniques of recombinant DNA Technology
- CO2 . Understand the concept of gene cloning and its application

Paper-IV: (Core Subject Centric II) (Code: 4T4B) Therapeutic Medical Biotechnology Molecular Therapeutics and Drug Discovery

Students who are not opting for foundation course in any other subject (other than Biotechnology) can opt for this course.

- CO1 . Understand and evaluate the fundamentals of Therapeutic Medical Biotechnology
- CO2 . Illustrate the process of Drug Discovery and Clinical research

LAB I (Code: 4P1) Animal Biotechnology, Biostatistics, Bioinformatics, Ethics & Patenting And Industrial Biotechnology II or Environmental Biotechnology

- CO1 . Skillfully perform the experiments involving the fundamentals of Biostatistics, Bioinformatics, Animal Cell culture techniques and experiments related to the elective paper opted by them

Project (Code: 4PROJ1)

Every student is required to carry out a project work in semester IV. The project can be of following types. A) Experimental Project Work; OR B) Field Based Project Work; OR C) Review writing based Project Work.

- CO1 . Develop the critical thinking ability and communication skills.
- CO2 . Understand and apply the scientific method.
- CO3 . Develop the aptitude to work on a scientific problem and look for alternative solution.
- CO4 . Write their finding in a form of a thesis and defend it by presenting it in front of their teachers and examiners.
- CO5 . Experience and embrace the habit of ethical practice in performing experiments and communicating them

Seminar (Code: 1S1, 2S1, 3S1 and 4S1)

Class seminars are conducted every semester to develop communication skills of students. Students will be able to comprehend the current research and should be able to put forward major ideas in front of their colleagues and teachers. Students will be evaluated on the basis of their presentation and questions and answer session.

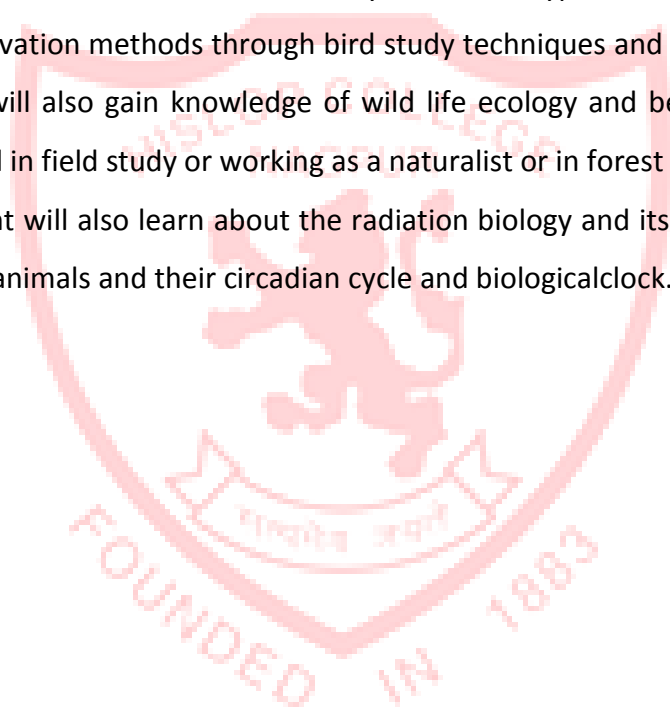
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Program Specific Outcomes (PSO) – M.Sc. Zoology

- PSO1. Students will be able to develop aptitude and skill in the field of zoology and life science and conduct basic scientific research and provide inputs for societal benefits.
- PSO2. They will be able to comprehend the importance of biodiversity around them. Based on this knowledge candidates will be able to choose careers related to teaching in Zoology, especially in schools and colleges, they can opt for higher studies (NET, SET, GRE, Government exams like IFS, Biodiversity Boards etc) and can seize better opportunity as a scientist, conservationist, taxonomist in Forest and agricultural/pest control government (ZSI) and non-government organisations.
- PSO3. The students will be able to develop theoretical knowledge and practical skill in handling the animals and using them as model organism for scientific research. They will gain knowledge about research methodologies, effective communication, skills of problem-solving methods and also train in searching and discovering new species and also evaluate their evolutionary significance in the given biotope. This study will also help them to evaluate and upgrade the local fauna.
- PSO4. The knowledge acquired from the subjects such as embryonic development in mammals, Ageing, Recombinant DNA technology, Bio-techniques and detailed study of the cell at molecular level, will not only facilitate them to work in the field of research, genetic counselling and lab technician but also medicine to prevent disease amongst both animals and human beings and in various agricultural, veterinary and related organisations.
- PSO5. The student will develop deeper understanding of physiology, endocrinology and reproductive biology which will help them to correlate the regulation of different systems of different organisms so that they are eligible to work under endocrinologist and pathologist.

- PSO6. With the basic knowledge of immunology and toxicology the students can join the laboratories which provides job trainings or workshops which ultimately enhance their career opportunities and employability in this field.
- PSO7. Student will be able to develop thorough knowledge of insect fauna, their morphology and physiology, insect vectors, agriculture pests, identify and classify various insect orders that will help them to pursue their career in various research related organization (IARI, ICMR, Zoological Survey of India, NEERI and other insect related research organisations).
- PSO8. Students will be able to identify different types of birds and learn their conservation methods through bird study techniques and their breeding biology. They will also gain knowledge of wild life ecology and behaviour which will be helpful in field study or working as a naturalist or in forest department.
- PSO9. Student will also learn about the radiation biology and its impact on human and other animals and their circadian cycle and biological clock.

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SEMESTER I

Structure and function of Invertebrates

- CO1. Students will be able to understand the modern scheme of animal classification and classical and molecular taxonomic parameters.
- CO2. Conceptualization of ultrastructure of protozoans and its modes of locomotion.
- CO3. In-depth study about the poriferans and their canal system.
- CO4. This study will help to distinguish between zooids in the Coelenterate colonies.
- CO5. The study will help them to understand the origin, extinction, and causes of differential rates of diversification in metazoa.
- CO6. They will acquire knowledge about the reproductive systems in Platyhelminthes and Aschelminths.
- CO7. Student will understand the role of coelom, symmetry and metamerism in animal classification.
- CO8. Detailed study of evolution of nephridial system will help to conceptualize the mechanism of excretion in annelids.
- CO9. They will learn about feeding behaviour in Porifera, Annelida and Echinodermata.
- CO10. Student will learn about comparative study of respiratory systems in Arthropoda and Mollusca.
- CO11. The theory of taxonomic position of Peripatus and Neopilina will help the student to understand the connecting link between the Annelida and Mollusca.
- CO12. Neuroanatomical study in selected group of molluscs will help to understand then evolution of nervous system of Mollusca.
- CO13. Student will be studying the locomotion and feeding behaviour in Echinodermata through the unique water vascular system.
- CO14. Students will be able to gain knowledge on phylogenetic relationship between minor and major phyla.

General Physiology

- CO1. Students will be able to learn enzymology i.e., the classification, mechanism of action of enzymes, and regulation of enzyme activity.
- CO2. The students will be able to get an insight about pigments, their types and distribution in the respiratory mechanism of animals at cellular level.
- CO3. Students will be able to gain knowledge about the chemical nature, biosynthesis and mechanism or action of neurotransmitters.
- CO4. Understanding the concept of regulation of heart-beat and blood pressure.
- CO5. Detailed study of mechanism of bioluminescence and light producing organs in invertebrates and vertebrates
- CO6. Perception of Osmoregulation, concept of thermoregulation, Heat balance in animals, Adaptations to temperature extremes, torpor, aestivation and hibernation, counter current heat exchangers.
- CO7. Understanding the concept of colour change mechanism in different groups of animals.
- CO8. Study about classification and metabolism of biological macromolecules i.e., carbohydrate, lipid and protein and their metabolic pathways.
- CO9. To understand the physiology of hydromineral metabolism.
- CO10. Learn and understand the chemistry and function of cerebrospinal fluid.
- CO11. Study of reflex action and reflex arc will give an insight to the basic concept of unconscious and involuntary response.
- CO12. Understanding of adaptations to stress and strain- basic concept of environmental stress and strain, acclimatization, avoidance and tolerance, stress and hormones.

Cell Biology and Genetics

- CO1. Description of transport across the plasma membrane. Understanding transepithelial transport, maintenance of cellular pH, cell excitation, bulk

- transport, receptor mediated endocytosis, protein sorting and targeting to organelles.
- CO2. To understand and study morphology and functional characteristics, of cell organelles.
 - CO3. Conceptualization of cell signaling and signal transduction pathways to get knowledge about their role behind all the processes.
 - CO4. Description of cellular shape, motility and energetics- cytoskeletal elements in cell shape and motility, structure and dynamics, role in cell locomotion and mitosis.
 - CO5. A detailed study of intercellular communication, extracellular matrix, cell-cell and cell-matrix adhesion, gap junctions, cellular energetics, oxidation of glucose and fatty acids, the proton motive force, FOF1 ATP synthase, mechanism and regulation of ATP synthesis.
 - CO6. Understanding of Mendel's principle, its extension and chromosomal basis.
 - CO7. Gain the knowledge about of types, causes and detections of mutations.
 - CO8. Student will able to understand the structural and numerical alteration of chromosomes and the extra chromosomal inheritance.
 - CO9. A study of Microbial genetics in detailed to know the reproduction in bacteria.
 - CO10. Human genetics, developing skills in human genetics with capability for karyotyping and nomenclature of metaphase chromosome bands.

Advanced Reproductive Biology

- CO1. To study the various methods of asexual and sexual reproduction in Protozoa.
- CO2. Familiarity with the process of regeneration in Hydra, Dugesia and Annelid worms
- CO3. Learn the process of metamorphosis and vitellogenesis in insects
- CO4. Understanding with the process of spermatogenesis, oogenesis, fertilization, with an account of different events involved in it.

- CO5. To understand about the basic concepts of developmental biology i.e., cleavage, blastulation, gastrulation and embryonic induction.
- CO6. To study the structure and function of male accessory sex glands.
- CO7. Elucidation of morphology and biochemistry of sperm and abnormalities related to it.
- CO8. Detailed study the molecular mechanism of sperm capacitation and decapacitation.
- CO9. To understand the function of pheromones and their role in sexual behavior of mammals.
- CO10. To gain knowledge on the neuro-hormonal control of fish reproduction and mechanism of vitellogenesis in fishes.
- CO11. Gain knowledge on the mechanism of morphogenetic gradient and organizer concept.
- CO12. Illustration of the mechanism of cryopreservation of gametes, embryo and test tube baby
- CO13. To study about the mechanism of in-vitro fertilization and its significance.

SEMESTER II

Structure and Function of Vertebrates

- CO1. Description of origin of chordates.
- CO2. Students will be able to understand general characters and affinities of Cephalochordate.
- CO3. Detailed study of characteristic features of Agnatha and development of Amocoetus larva.
- CO4. Student will be able to study the general characters and affinities of Dipnoi.
- CO5. Students will be able to understand organs and mechanism of aquatic and terrestrial respiration invertebrates.
- CO6. Descriptive study of vertebrate integument and its derivatives.

- CO7. Detailed study about different types of jaws in vertebrates.
- CO8. Student will learn about urinogenital system in amniotes and anamniotes.
- CO9. Descriptive study of origin of birds and their migration.
- CO10. A detailed insight of autonomous nervous system in vertebrates and evolution of circulatory system
- CO11. Description of sensing the environment through Echolocation, Electroreception & Lateral line system.
- CO12. Illustration of Human origin and evolution.

Comparative Endocrinology

- CO1. To understand the hormones and functions in Coelenterate Helminths.
- CO2. Detailed study of anatomical and structural organization of neuroendocrine organs and nervous system in invertebrates.
- CO3. To study in detail the neuroendocrine system in crustacean.
- CO4. To understand the concept of endocrine control of metamorphosis, reproduction and colour change mechanisms in crustacea.
- CO5. Detailed study of cephalic neuroendocrine system in insects: structure and hormones.
- CO6. To learn and understand the endocrine control of metamorphosis and reproduction in insects.
- CO7. A detailed study of hormones, structure and functions of Pineal organ, Pituitary, Parathyroid ultimobranchial glands, thyroid gland structure, Adrenal gland, Hypothalamohypophysial system, Gastro-entero-pancreatic endocrine system and Gonadal hormones in vertebrates.

Molecular Biology and Biotechnology

- CO1. To understand the C-value paradox and Cot $\frac{1}{2}$ value., Repetitive DNA. Structure of chromosome. Organization of chromatin fiber, forms of DNA. mitochondrial DNA.

- CO2. To understand the molecular mechanisms of replication and its regulation in prokaryotes and eukaryotes.
- CO3. Imparting knowledge regarding gene mutation, types of gene mutations, DNA damage and repair.
- CO4. Conceptualization of about mobile DNA elements, transposable elements in bacteria, composite transposons, bacteriophage Mu transposition, Tn 10 transposition, SINES and LINES, Retroviruses and retrotransposons.
- CO5. Developing concept of regulation of gene activity in prokaryotes and eukaryotes at transcriptional and posttranscriptional level.
- CO6. Describing structural and functional organization of a typical eukaryotic gene, transcription factors, enhancers and silencers, and non-coding genes.
- CO7. Description of siRNA and miRNA basics, regulation of transcription and translation of proteins by miRNA.
- CO8. To understand the prokaryotic and eukaryotic translation, genetic code, altered code in elongation, termination factors, fidelity of translation, post translational modifications.
- CO9. Imparting knowledge of basic recombinant DNA techniques, preparation of restriction maps and mapping techniques.
- CO10. Understanding of method and applications of nucleic acid probes, blotting techniques,
- CO11. DNA fingerprinting and polymerase chain reaction.
- CO12. Developing skill to understand biology of cloning and expression vectors.
- CO13. Description of gene cloning strategies by transformation of E. coli and other cells with rDNA; methods of selection and screening of transformed cells.
- CO14. Exposure to principles of DNA sequencing, automated sequencing methods; synthesis of oligonucleotides, primer design.
- CO15. Conceptualizing the Micro-arrays techniques along with its application.

Advanced Developmental Biology

- CO1. Understanding different types of placenta and foetal membranes in mammals.
- CO2. To study in detail about the types of eggs and cleavage patterns: concepts in pattern formation, animal-vegetative axis, gradients, origin and specification of germ layers.
- CO3. To learn and understand the concept of placental types, structure, functions and hormones of placenta.
- CO4. Detailed study on the metamorphosis in Amphibia.
- CO5. Understanding of process of regeneration in vertebrates.
- CO6. Detailed view of cell death.
- CO7. Concept of aging genes involved in alteration in timing of senescence.
- CO8. Students will understand the concept of polymorphism in insect
- CO9. Explanation of embryonic stem cells and their applications.
- CO10. Acquaint with various techniques and tools of embryology
- CO11. To learn about basic contraception techniques.
- CO12. Familiarize with concept of anti-androgen and spermiogenic compounds.
- CO13. Student will learn about role of mutants and transgenics in human welfare.

SEMESTER III

Parasitology and Immunology

- CO1. Student will learn and understand about the life cycle, mode of transmission, infection and treatment of diseases caused by parasite like *Vibrio cholera*, *Clostridium titani*, *Yersinia pestis*, Influenza virus, H1N1 viruses.
- CO2. Student will learn and understand about the life cycle, mode of transmission, infection and treatment of diseases like Covid 19, Dengue and Hepatitis.
- CO3. Overview of toxins and antitoxins.

- CO4. Understanding the mode of infection of parasites and detailed understanding of their management.
- CO5. An overview of the immune system, principles of innate and adaptive immunity. Evolution of innate and adaptive immune system.
- CO6. Understanding of antigen recognition by immune cells, role of TLRs.
- CO7. Conceptualization of generation of diversity in immunoglobulins and T- cell receptor gene rearrangement.
- CO8. Illustration of antigen processing and presentation to T lymphocytes by antigen presenting cells and understanding the role of MHC complex.
- CO9. An overview of development and survival of lymphocytes, humoral immune response, production of effector T- cells and effector mechanisms.
- CO10. Conceptualization of regulation of immune response, mucosal immunity, immunological memory, cytokines and chemokines. T- cell mediated regulation of immune response.
- CO11. Illustration of allergy and hypersensitivity diseases, autoimmunity, transplant rejection and responses to alloantigens.

Special Group-Entomology-I

Insect Morphology and Physiology

- CO1. Insect are the most perfect group of animals on this earth. Each and every organ/ system is effectively modified to sustain in its environment. Therefore, it is of vital importance to study the morphology of head, thorax, abdomen, antennae, legs and genitalia.
- CO2. Insect are the most perfect fliers and have the most perfect flight mechanism, therefore knowledge of wing structure and flight mechanism is necessary to evaluate and to use this principal for our use.
- CO3. Insects feed on almost all organic matter on this earth-dried up leather to newspaper and dung. The mouth is accordingly modified into various patterns

for efficient feeding. The digestive system also varies depending upon their feeding behavior.

- CO4. Insect are the only animal on earth in which the respiratory system is completely separated from circulatory system. It is the only animal without respiratory pigment in their blood. The evolutionary significance and modification of these systems is important for basic studies.
- CO5. Insect thrive in various environmental systems and conditions and need tremendous modification to extract oxygen for respiration.
- CO6. The endocrine system in insect can be compared to the human because of its complicated mechanism and its functional similarity. Since the endocrine system has developed from the nervous system, the brain of insect is highly evolved to perform complex evaluation. Each cell of the nervous system performs differently in different condition.
- CO7. Sense and pheromones use for communication in insects can be manipulated for pest control and therefore need thorough investigation.
- CO8. The success of insect is because of its fecundity and short life cycle with many generations per year. The efficiency of its reproductive system and the use of specialized reproductive mechanism: viviparity, polyembryony, paedogenesis and parthenogenesis and study of embryonic development and metamorphosis is necessary to control insect population for the benefit of human.

Special Group-Entomology-II

Classification and Industrial Insects

- CO1. Since 75% of world animal fauna is composed of insect study of their classification for their categorization and evaluation is important.
- CO2. Starting with the very primitive orders i.e., Thysanura and Collembola which were the first stock of insects on this earth, they diverted to specialised organism feeding and living on birds and mammals as ectoparasite (Mallophaga

and Siphunculata, Siphonaptera) to plant feeding and swarm forming (Orthoptera); specialized insect with sucking mouth parts feeding on blood and plant sap (Hemiptera) to the most beautiful and fascinating creation- butterflies (Lepidoptera) and the most populated group of insect of this earth- Beetles (Coleoptera). The study of these groups is of immense significance in entomology.

- CO3. Industrial entomology is a much-needed branch which helps to financially substantiated framers and other marginalized people (Tribals/ Forest dwellers).
- CO4. Detailed studies of economically important insects i.e., honey bee and silkworm.
- CO5. Student will perceive about the bacterial and viral diseases in silkworm.
- CO6. Detailed study of Lac insect-biology, lac cultivation and economic importance.
- CO7. Detailed study of Eri sericulture includes life cycle, host plantrearing and silk production.
- CO8. To know types of honey bee, life cycle, colony formation and apiary products.

Core (Subject Centric)- I

Wild Life and Avian Biology

- CO1. A descriptive study of the nature of ecosystem, production, food webs, energy flow, biogeochemical cycles, the resilience of the ecosystem, and ecosystem management.
- CO2. Illustration of prey-predatory relationship, predator dynamics, optimal foraging theory and predatory dynamics.
- CO3. The student will be able to understand the importance of various international conservation bodies like IUCN, UNDP, FAO, WWF, Red data book (of rare and endangered animals).
- CO4. An overview of the avian systematic- their classification and sub-grouping based on morphology and other parameters.

- CO5. Understanding the diversity and breeding biology of birds.
- CO6. Description of biodiversity assessment and conservation of birds.
- CO7. The student will study about bird study equipment, area of study, field data recording, bird photography etc, to make them interested in Bird-watching.
- CO8. The student will be able to study different types of nests, nest building, nest defense and modes of parental care.

SEMESTER IV

Biotechniques, Biostatistics, Ethology, Toxicology and Bioinformatics

- CO1. Description of mean, median, mode and SD, Student 't' test and probability z-test, Chi square test.
- CO2. Understanding the requirements for cell culture; aseptic technique; primary culture; cell lines.
- CO3. Detailed study of toxicants related to Environment.
- CO4. Familiarizing with various Applications of Bioinformatics.
- CO5. To get an insight into the advancement in computerized biology information, introduction to genomics and proteomics databases.
- CO6. Construction of phylogenetic trees using molecular data,
- CO7. Illustration of protein data bases.
- CO8. An introduction to Genbank, UCSC, ENSEMBL, EMBL, DDBJ, protein sequence databases: Swissprot, PDB, BLAST, PSI- BLAST (steps involved in use and interpretation of results).
- CO9. An overview of databank search- data mining, data management and interpretation, multiple sequence alignment, genes, phylogenetic analysis.
- CO10. Developing compassion towards other animals through animal ethics.

Special Group-Entomology-I

Sense organs, social life and Agriculture pests

- CO1. Learning and understanding of different sense organs.
- CO2. To understand social life and social behaviour of insects.
- CO3. Importance and control measures of Agriculture pests.
- CO4. Identifying pests of agricultural crops by analyzing ecology, pest status, features responsible for evolutionary success of insect species along with factors responsible for achieving the status of a pest.
- CO5. An overview of identification, seasonal history, biology, nature of damage and control measures of pests, of cereals, pulse crops, cotton, vegetables, oil seeds, fruit crops, sugarcane and stored grains.
- CO6. To understand the structure and functions of simple and compound eyes.
- CO7. To understand the mechanism of light production and sound production in insects.
- CO8. To study the senses organs of insects (mechanical and chemical) and their detailed structure this modifies from species to species.
- CO9. To study the mechanism of immunity in insects so as to help in pest control management.
- CO10. The household harmful insects- termites and ants studied with respect to their social life, polymorphism, nest building and social behaviour.
- CO11. Parasitic Hymenoptera are used as biological control agents in agricultural fields. Its biology and its host specificity is studied to understand the mechanism of attack and damage.
- CO12. Locust swarms are a major international hazard. Therefore, study of its migration is important
- CO13. Rice, cotton and sugarcane, are major crops of central India. Pests of these cash crops are studied with respect to their identification, life history, damage and control measures.

Special Group-Entomology-II

Pest control measures and Insects vectors

- CO1. To get thorough knowledge about the pest control measures i.e., from biological to the chemical.
- CO2. Chemicals are used for insect control in agricultural fields, they belong to different groups (Inorganic, Chlorinated Hydrocarbons, Organophosphates). It is of vital importance to study their properties, mode of action and method of application and also evaluate their toxicity level with respect to human and domestic animal.
- CO3. Various natural organic compound extracted from plants can be used to control insect pests and therefore it is necessary to study their properties, mode of action and method of application.
- CO4. Biological control method is the safest method to control insect pest. Biological control agents (parasitoid, pathogen and predators) present in nature can be effectively and safely used for pest control.
- CO5. The study on the uses of these biological control agents along with their life cycle and relationship with pest is the basic need to document its evaluation in a biological control program.
- CO6. Microorganisms are effective pathogens infecting insects. The various types of viruses and bacteria in nature need to be categorized, evaluated, mass produce and released in fields for various control measures.
- CO7. The student also studies the use of all the above methods and also radiation, chemosterilants, hormones and pheromones in a systemic manner for IPM which is sustainable with little damaged to the environment.
- CO8. Insects directly and indirectly (by acting as vectors of various diseases) cause major diseases in human and domestic animals. It is necessary to study these insects (Mosquito, flies, lice and fleas) with respect to their life cycle, nature of damage and control measures.

Core (Subject Centric)- II

Radiation and Chronobiology

- CO1. Student will study general classification of radiation, ionizing radiation, linear energy transfer, radiation dose and units.
- CO2. To develop understanding of principles of radiation dosimetry, direct and indirect effects.
- CO3. To study radiation sensitizers and protectors.
- CO4. Learning and understanding Health consequences after total body irradiation from radiation accidents.
- CO5. Detailed study of long-term radiation risks from low radiations doses.
- CO6. Study in detailed about radiation induced cancer.
- CO7. Descriptive study of radiation effects in the developing embryo and fetus, radiation induced heritable diseases.
- CO8. Description of milestones in clock research, biological rhythms, advancement in Chronobiology.
- CO9. Learning and understanding of entrainment, masking and zeitgeber cycles, organization of circadian system in multicellular animals.
- CO10. Understanding the central and peripheral clock system, circadian pacemaker system in invertebrates and vertebrates.
- CO11. To develop understanding of diversity and complexity of the clock system, molecular Biology of the circadian pacemaker system.
- CO12. Illustration of the relevance of biological clocks for human welfare - Clock function (dysfunction).
- CO13. Human health and diseases - Chronopharmacology, chronomedicine, chronotherapy.

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Programme outcomes of M.Sc. in Physical Sciences

The following Departments are included under Physical Sciences/ Pure Sciences

- Chemistry
- Mathematics
- Physics

- PO1.** Courses offered in the Physical Sciences/ Pure Sciences give students a capacity of demonstrating comprehensive knowledge and general understanding of the fundamental principles of the physical and chemical processes around them.
- PO2.** Students will demonstrate an understanding of the analytical methods required to interpret and analyze results and draw conclusions as supported by their data.
- PO3.** Students will demonstrate proficiency in the acquisition of data using a variety of laboratory instruments and in the analysis and interpretation of such data
- PO4.** Students will become proficient in handling relevant scientific instruments and have a understanding of the principles of working.
- PO5.** Students can formally communicate the results of investigations using both oral and written communication skills.
- PO6.** Students also obtain the knowledge, skills, and motivation necessary to lifelong learning and problem solving attitude.

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Program Specific Outcomes (PSO) – M.Sc. Mathematics

- PSO1.** On the successful completion of the M.Sc. Mathematics a student will have the sound understanding of basic and advanced areas of pure/applied mathematics.
- PSO2.** Student will be able to develop the mathematical skills of analyzing and solving problems.
- PSO3.** Student will have the knowledge of computational techniques required for employment in industries.
- PSO4.** Student will be able to pursue research in different areas of pure/applied mathematics.
- PSO5.** Student will be able to explore new methods and techniques to solve mathematical problems.
- PSO6.** Student will be able to identify the importance of information provided in theorems, axioms and problems for further justification and application.
- PSO7.** Student will be able to effectively communicate mathematical ideas for propagation of knowledge in society.
- PSO8.** Student will have the ability to think logically to understand theorems and solutions of mathematical problems.

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Course Outcomes

SEMESTER I

1T1 Paper-I : Algebra-I

At the end of the course students will be able to

- CO1. recognize different types of Groups.
- CO2. solve various examples based on Groups.
- CO3. understand Sylow theorems and its application in solving problems.
- CO4. define ideal of a ring and modules.

1T2 Paper-II :Real Analysis-I

At the end of the course students will be able to

- CO1. :understand the relationship of Uniform convergence with continuity and differentiation.
- CO2. :apply Inverse and Implicit function theorems in solving problems.
- CO3. :understand manifold and its examples.
- CO4. :solve examples of Lie groups.

1T3 Paper-III :Topology-I

At the end of the course students will be able to

- CO1. :acquire the knowledge of Topological Spaces.
- CO2. :define open sets, derived set, interior set and basis for a Topological Space.
- CO3. : understand the application of connectedness and compactness to continuous functions and homeomorphism.
- CO4. :apply axioms of countability, separability in understanding theorems of regular and normal spaces.

1T4 Paper-IV :Ordinary Differential Equations

At the end of the course students will be able to

- CO1. :acquire the knowledge of linear equations with variable coefficients.
- CO2. :solve differential equations about regular singular points.
- CO3. :apply Lipschitz condition in solving initial value problems.
- CO4. :verify existence and uniqueness of solutions to the system of first order ordinary differential equations.

1T5 Paper-V :Integral Equations

At the end of the course students will be able to

- CO1. :solve problems to convert ordinary differential equations into integral equations.
- CO2. : verify various kernels like Green's function type.
- CO3. : recognize types of Volterra equations and solve non-linear Volterra equations.
- CO4. : understand the applications of Hilbert transform and finite Hilbert transform.

Semester-II

2T1 Paper-VI : Algebra-II

At the end of the course students will be able to

- CO1. : understand Unique factorization and Euclidean domains.
- CO2. :apply the knowledge of extension fields in proving relevant theorems.
- CO3. : acquire the knowledge of Galois theory and apply it in solving problems.
- CO4. :recognize Cyclotomic polynomials, polynomials solvable by radicals.

2T2 Paper-VII :Real Analysis-II

At the end of the course students will be able to

- CO1. :analyze whether a set/function is measurable or non-measurable.
- CO2. : recognize the importance of Riemann and Lebesgue integral of a bounded function.
- CO3. : acquire the knowledge of L_p spaces and bounded linear functionals on L_p spaces.
- CO4. :recognize the types of Compact metric spaces.

2T3 Paper-VIII :Topology-II

At the end of the course students will be able to

- CO1. : acquire the knowledge of product topology, metric topology.
- CO2. : analyze various theorems and results of Connected spaces.
- CO3. :understand the generalization of compactness and its results.
- CO4. : apply the Urysohn metrization theorem, the Tietze extension theorem to study the results of regular and normal spaces.

2T4 Paper-IX :Differential Geometry

At the end of the course students will be able to

- CO1. :understand the concepts of families of curves and their properties.
- CO2. :acquire knowledge of geodesics and parallel transport on oriented surfaces.
- CO3. :learn about the equations and properties of surfaces.
- CO4. :recognize the importance of compact surfaces, Hilbert's lemma and solve the problems of metrization.

2T5 Paper-X :Classical Mechanics

At the end of the course students will be able to

- CO1. : Understand the concepts of Variational Principle, Lagrange's equation and derive Lagrange's equations from Hamilton's principle.
- CO2. : apply the concepts of action of principle to formulate problems.
- CO3. :solve problems of Canonical transformations.

CO4. : formulate and evaluate solutions of transformation equations.

Semester-III

3T1 Paper-XI :Complex Analysis

At the end of the course students will be able to

- CO1. :learn the elementary properties and solve examples of analytic functions.
- CO2. :recognize analytic functions as mappings, Mobius transformation and find zeros of analytic functions.
- CO3. :apply the Cauchy integral theorem and Residue theorem to solve complex integrations and obtain singularity, residues of complex functions.
- CO4. : understand the theory of maximum principle, convex function, Hadamards three circle theorem and Lindelof theorem.

3T2 Paper-XII :Functional Analysis

At the end of the course students will be able to

- CO1. :learn the properties and results of Normed spaces and Banach Spaces.
- CO2. :understand the idea of linear functionals and the theory of Dual spaces, Inner product spaces and Hilbert spaces.
- CO3. : acquire the knowledge of theory of Hilbert spaces, complex vector spaces and reflexive spaces.
- CO4. : apply Category theorem, Uniform boundedness theorem, Open mapping theorem and Closed graph theorem to understand various results and problems.

3T3 Paper-XIII :Mathematical Methods

At the end of the course students will be able to

- CO1. :apply the concepts of Fourier Integrals and Fourier transform to solve problems and partial differential equations.
- CO2. :acquire the knowledge of Laplace transform, their properties and inverse Laplace transform to obtain the solution of ordinary differential equation.
- CO3. :understand concepts of finite Fourier transform, finite Sturm-Liouville transform and generalized finite Fourier transform.
- CO4. : solve problems using Finite Hankel transform, Finite Legendre transform and finite Mellin transform.

3T4 Paper-XIV :Number Theory

At the end of the course students will be able to

- CO1. :acquire the knowledge of the Mobius functions, Euler totient functions, Mangoldt functions, Multiplicative functions, Liouville's functions and the divisor functions.
- CO2. :learn the concept of average order of various functions.
- CO3. :understand Prime number theorem, Shapiro's Tauberian theorem and its application in solving problems
- CO4. :recognize types of congruences and apply Chinese remainder theorem in solving problems.

3T5 Paper-XV :Elementary Mathematics-I

At the end of the course students will be able to

- CO1. :obtain derivatives of various functions.
- CO2. :learn different methods of integration of functions.
- CO3. :acquire the knowledge of different types of matrices and their determinants.

- CO4. :understand basic concepts and operations on complex numbers and solve quadratic equations in complex number system.

Semester-IV

4T1 Paper-XVI :Dynamical Systems

At the end of the course students will be able to

- CO1. :acquire the knowledge of different types of dynamical systems.
- CO2. :understand the theory and concepts of field of stability of an equilibrium points of dynamical system.
- CO3. :analyze the application of Poincare theorem.
- CO4. :apply the concepts of asymptotic stability of closed orbits, discrete dynamical system and structural stability in solving problems.

4T2 Paper-XVII :Partial Differential Equations

At the end of the course students will be able to

- CO1. :classify partial differential equations and solve linear first order partial differential equations.
- CO2. :solve non-linear first order partial differential equations.
- CO3. : obtain the solution of second order partial differential equations.
- CO4. : solve boundary value problems for Laplace's equation, heat equation, wave equation by separation of variables in Cartesian, polar, spherical and cylindrical coordinates.

4T3 Paper-XVIII :Advance Numerical Methods

At the end of the course students will be able to

- CO1. :analyze the error present in a numerical approximation and apply different numerical methods to solve non-linear equations.
- CO2. :solve various interpolation problems.
- CO3. : apply the concepts of Weierstrass theorem and Taylor's theorem to obtain the solution of approximation problems.
- CO4. : solve various integration problems using the Trapezoidal rule and Simpson's rule, Newton-Cotes integration formulae.

4T4 Paper-XIX :Cryptography

At the end of the course students will be able to

- CO1. :learn the concepts of time estimates for doing arithmetic, quadratic residues and reciprocity, Fermat's little theorem and its application to factoring.
- CO2. :recognize the types of cryptosystems and apply Pollard's P-1 method, Rho method in solving problems.
- CO3. : solve the discrete logarithm problem using various algorithms.
- CO4. : understand elliptic curve cryptosystems, elliptic curve primarily test and elliptic curve factorization.

4T5 Paper-XX :Elementary Discrete Mathematics-II

At the end of the course students will be able to

- CO1. :understand propositions, algebra of propositions and formulate a statement to formal logic truth table.
- CO2. :construct various types of Lattices.
- CO3. :acquire the knowledge of Boolean algebra and logic circuits.
- CO4. :classify the types of graph and apply the concepts of graph theory in solving real life problems.

Program Specific Outcomes (PSO) – M.Sc. Physics

After completion of course, the student will be to:

- PSO1. Get exposure to the fundamental concepts of Physics for with exposure to advanced concepts in various topics in Physics
- PSO2. Get acclimatized to the latest developments in the specific areas of Physics.
- PSO3. Develop new experiments, analysing the data to make reports for presentation.
- PSO4. Using numerical techniques to assess errors in experiments and refining the experimental data.
- PSO5. On completion of M.Sc. (Physics) programme, the students will have a scope to join as Project Associate in any Major Research Project and progress in Research and Development. He/She can also pursue a doctoral programme, Ph. D. Students can pursue work as Data Scientist.
- PSO6. Pursue a career in Computer Programmer and Software development using the knowledge acquired in studying various subjects.

Course Outcomes – M.Sc. Physics

Semester - I

1. Mathematical Physics

- CO1. This course initiates a students for development of Mathematical Concepts introducing him/her to Curvilinear co-ordinate Systems, and ideas about gradient
- CO2. The course introduces a student to solution of differential equations, Vector spaces.
- CO3. The students learn about the mathematical concepts related to different functions as used for the linear differential equations.
- CO4. Students learn about various vector spaces, Hermite Polynomials, Bessel's Functions, Lagurre Polynomials and Integral & Differential forms.

2. Complex Analysis and Numerical Methods

- CO1. Solve complex algebra, Analytical functions, roots of non linear functions.
- CO2. Calculus of Residues, solving all types of equations by numerical computation using computers.
- CO3. Students learn about Singularities- Poles, Branch Points, Calculus of Residues-Residues Theorem, Cauchy, Principle value, Pole Expansion of Meromorphic Functions.

- CO4. Roots of nonlinear equations
- CO5. Bisection method, false position method, iteration method, Newton- Raphson method, secant method and Finite differences.
- CO6. Numerical integration, trapezoid rule, Simpson's 1/3 rule, Simpson's 3/8th rule, Linear least squares.

3. Electronics:

- CO1. Students will learn about Basic and conceptual knowledge of Semiconductor discrete devices, Bipola devices (JFET, MOSFET, SCR, (UJT).
- CO2. Students will learn about Opto-electronic devices like Photodiode, solar cell, LED, LCD and Photo transistor.
- CO3. Students will learn about introduction to knowledge of transistor as a switch OR, AND and NOT and Gates, Multivibrators, counters and convertors and semiconductor memories.

4. Electrodynamics – I

- CO1. Students will learn about electric and magnetic fields; electric current, electric density.
- CO2. Students will learn about Electromagnetic phenomena, matrix representation of electromagnetic phenomena, concept of magnetic field and its theoretical representation.
- CO3. Students will learn about Coloumb's law, Electric field, Charge distribution, Dirac delta function, Field lines, Gauss's law and applications.
- CO4. Students will learn about Differential form of Gauss's law, Electric potential, Poisson and Laplace's equations, Electrostatic potential energy.

Semester – II

1. Quantum Mechanics – I

- CO1. Students will learn about time dependent and time-independent Schrodinger equation, continuity equation, wavepacket, admissible wave functions, stationary states. Ehrenfest's theorem, momentum eigen functions in the coordinate representation, box normalization and Dirac delta function.
- CO2. The students will learn about linear vector spaces, inner or scalar product, Schwarz inequality, state vectors, general formalism of operator mechanics vector, operator algebra, commutation relations, eigen values and eigen vectors, hermitian operators degeneracy,

orthogonality eigenvectors of Hermitian operators, noncommutativity of two operators and uncertainty in the simultaneous measurements of the corresponding dynamical variables.

CO3. Solution of Schrodinger equation for simple problems, 1-D Square well, step and barrier potentials, 1-D harmonic oscillator, zero point energy. harmonic oscillator problem by operator method.

CO4. Clebsch Gordon Equations, addition of Angular Momenta.

2. Statistical Physics

CO1. Students will learn about Fundamentals of classical statistical mechanics, microstate and macrostate, distribution function, Liouville's theorem, Gibbs Paradox, ensembles (micro-canonical, canonical and grand-canonical).

CO2. Students will learn about Fundamentals of quantum statistical mechanics, BE and FD Statistics, Symmetry of wave functions, Boltzmann limit of Bosons and Fermions, Ideal Bose system: Bose-Einstein condensation.

CO3. Students will learn about Weak and strong degeneracy, Fermi function, Fermi energy, Behaviour of ideal Fermi gas at absolute zero and below Fermi temperature, Fermionic Condensation, Free electrons in metals as fermions, Electronic specific heat.

CO4. Students will learn about Phase transition: Phase transition of first and second order, Landau theory of phase transition, Ising model, Order parameter, Critical exponents, Scaling hypothesis, Random walk, Brownian motion.

3. Classical Mechanics

CO1. Students will learn about survey of elementary principles of mechanics of a particle, Dynamical systems, Phase space dynamics, stability analysis, constraints & their classifications,

CO2. Students will learn about Conservation theorems and symmetry properties, Hamiltonian formalism, Hamiltons equations, Routh's procedure for cyclic coordinates, conservation laws

CO3. Students will learn about Central force motion, reduction to one body problem, equations of motions and first integrals, classification of orbits for inverse square central forces. Two body collisions, Rutherford scattering in laboratory and centre-of-mass frames;

CO4. Students will learn about rigid body dynamics, Euler's angles, Euler's theorem, moment of inertia tensor, eigen values and principal axis transformation, non-inertial frames and Pseudo forces, Periodic motion.

4. Electrodynamics - II

- CO1. Students will learn about Scalar waves : Plane waves, spherical waves, phase and group velocities and wave packets Vector waves : Electromagnetic plane waves, harmonic plane waves, elliptic linear and circular polarization,
- CO2. Students will learn about Symmetries of Maxwell equations : Lorentz transformations, Covariance of electrodynamics, Lorentz gauge condition
- CO3. Students will learn about Motion of a charge in EM fields: Lorentz force, motion in uniform, static, electric and magnetic fields and combined static EM fields.
- CO4. Students will learn about Wave guides: fields on the surface and within a hollow metallic conductor, TE, TM, TEM modes in a rectangular and cylindrical wave guide, Resonant Cavities, Dielectric waveguides.

Semester - III

1. Quantum Mechanics-II

- CO1. This course initiates a student for development of knowledge in Time independent perturbation theory, first order perturbation theory applied to non-degenerate states, second order perturbation extension to degenerate state.
- CO2. This course initiates a students for development of knowledge in Time dependent perturbation theory, transition rate, Fermi Golden rule, constant perturbation harmonic in time, radiative transitions, absorption and induced emission, Atomic radiation, dipole approximation, Einstein's atomic radiation, Einstein's A and b coefficients and their calculations.
- CO3. Students will be able to learn about system of identical particles, exchange and transposition operators, totally symmetric and antisymmetric wave function and their expressions
- CO4. Students will learn about Scattering theory, scattering cross-section in laboratory and centre of mass system, Scattering by a central potential,
- CO5. This topic gives information to the students in the field of the Klein- Gordon equation and initial difficulties in interpreting its solutions, Dirac's relativistic equation, Dirac's matrices, explanation of the spin of the electron, equation for an electron in an electromagnetic Field.

2. Solid State Physics and Spectroscopy

- CO1. This course initiates students for development of knowledge Order in Solids-Crystal classes and system, 2d and 3d lattices, Space groups, Concept of point group, bonding of common crystal structure; reciprocal lattice, diffraction and structure factor, Miller and Bravais indices etc.
- CO2. This course initiates students for development of knowledge of Bonding, diffraction and structure factor in solids, short and long range order in liquids and solids, liquid crystals, quasicrystals and glasses.
- CO3. This course initiates students for development of knowledge in Crystal Vacancies, Point defects, line defects and stacking faults, Burgers vector And Burger circuit, presence of dislocation, dislocation motion, perfect and imperfect dislocations, slip planes and slip directions, dislocation reactions.
- CO4. Quantum states of an electron in an atom. Electron spin. Spectrum of helium and alkali atom. Some features of one-electron and two electron atoms, Relativistic corrections for energy levels of hydrogen atom.
- CO5. Types of molecules, Electronic, rotational, vibrational and Raman spectra of diatomic molecules, selection rules. Morse potential energy curve, Molecules as vibrating rotator.

3. Materials Science – I (Core Elective)

- CO1. This course initiates students for development of knowledge in Equilibrium and kinetics: Stability and metastability, Basic thermo dynamic functions, Statistical nature of entropy, Kinetics of thermally activated process.
- CO2. Phase diagrams: The phase rule, free energy composition diagram, correlation between free energy and phase diagram, calculation of phase boundaries, thermodynamics of solutions, single component system (water), two component system containing two phases and three phases, Binary phase diagrams having intermediate phases, Binary phase diagrams with eutectic system.
- CO3. Students will learn the details of Phase transformations: Time scale for phase changes, peritectic reaction, eutectoid and eutectic transformations, order disorder transformation, transformation diagrams, dendritic structure in alloys,

- CO4. Students learn the phenomena of Diffusion in solids: Fick's laws and their solutions, the Kirkendall effect, mechanism of diffusion, temperature dependence of diffusion co-efficient, self diffusion, interstitial diffusion, the Snoek effect in diffusion, diffusion in ionic crystals, diffusion path other than the crystal lattice.
- CO5. Students will be able to learn details about Solid state energy devices: Fundamental of Solar cells, Primary and secondary solid state cells, advantages of lithium batteries, ion intercalation compounds for secondary cell,

4. Nano Science and Nano Technology (Subject Centric Course- Elective)

- CO1. This course initiates students for development of knowledge in : Introduction to Nanoscience: Introduction to quantum physics, electron as waves, wave mechanics, Schrödinger equation and particle in a box, Free electron theory (qualitative idea) and its features, Idea of band structure, Density of states for zero, one, two and three dimensional materials, Quantum confinement, Quantum wells, wires, dots etc.
- CO2. This topic initiates students for development of knowledge in: Nanomaterials Synthesis: Physical methods: High energy ball milling, Physical vapour deposition, Various methods in deposition of nano materials. Synthesis of metal & semiconductor nanoparticles by colloidal route, Langmuir-Blodgett method, Microemulsions, Sol-gel method, Chemical bath deposition, Wet chemical method.
- CO3. X-ray diffraction, UV-VIS spectroscopy, Photoluminescence spectroscopy, Raman spectroscopy, Transmission Electron Microscopy, Scanning Electron Microscopy,
- CO4. Students will learn advanced techniques like Scanning Tunnelling Microscopy, Atomic Force Microscopy, Vibration Sample Magnetometer.
- CO5. Students will learn about special Nanomaterials and their Properties: Special Nanomaterials: Carbon nanotubes, Porous silicon, Aerogels, Core shell structures. Self assembled nanomaterials. Properties of nanomaterials: Mechanical, Thermal, Electrical, Optical, Magnetic, Structural properties.

Semester - IV

1. Nuclear Physics & Particle Physics (Core Course):

- CO1. Students will be able to learn about Basic nuclear properties; size, radii, shape, and charge distribution, spin, parity, mass, binding energy, semi-empirical mass formula, liquid drop model, nuclear stability, laws of radioactive decay and various scattering phenomena.
- CO2. Students will learn Nature of nuclear force, elements of deuteron problem, n-n scattering, charge independence and charge symmetry of nuclear forces. Elementary properties of alpha-, beta-, and gamma-, decay of nuclei, their classification, characteristics and selection rules. Elementary theories of alpha-, beta-, and gamma-, decay. Nuclear reactions- conservation laws, mechanism, and cross section.
- CO3. Interaction of charged particles and electromagnetic radiation with matter. Principles of nuclear radiation detectors: G-M counter, proportional counter, Na(Tl) scintillation detector, semiconductor detectors.
- CO4. Classification of elementary particles, strong, weak and electromagnetic interaction. Gellmann-Nishijima formula Properties of hadrons, baryons, mesons, leptons, and quarks- their quantum numbers, charge, mass, spin, parity, iso-spin, strangeness etc.

2. Solid State Physics (Core Course):

- CO1. Students will be able to learn about Bloch theorem, the Kronig- Penney model, construction of Brillouin zones, extended and reduced zone schemes, effective mass of an electron, tight binding approximation. Fermi surface.
- CO2. Students will be able to learn about Energy of atomic motions, adiabatic principle, harmonic approximation, cyclic boundary condition. Lattice vibrations of linear monoatomic and diatomic chains. Dispersion relations, acoustic and optical phonons.
- CO3. Student will be able to learn about electrons moving in one and three dimensional potential wells, quantum state and degeneracy, density of states, electrical and thermal conductivity of metals, relaxation time and mean free path, the electrical resistivity of metals, thermionic emission. effect, thermoelectric power.

- CO4. Superconductivity, Type I and II super conductors, Meissner effect, isotope effect, London equation, coherence length, elements of B. C. S. theory, tunnelling DC and AC Josephson effect, Ginzberg-Landau Theory macroscopic quantum interference.

3. Materials Science II (Core Elective):

- CO1. Students will be able to learn about Elasticity, model of elastic response, inelasticity, viscoelasticity, stress-strain curves, concept of various mechanical properties such as hardness, yield strength, toughness, ductility, yield toughness, ductility, brittleness, stiffness etc.
- CO2. Students can explore advanced concepts in Spin glass, magnetic bubbles, domain walls, magnetic multi-layers, magnetites, GMR and CMR, DMS materials. Photonic band gap materials.
- CO3. Students will learn about Concept of equilibrium and non-equilibrium processing and their importance in materials science.
- CO4. Physical method – Bottom up: cluster beam evaporation, Ion beam deposition, Gas evaporation, Chemical method – Hydrothermal, combustion, bath deposition with capping techniques and top down.
- CO5. Students will learn Processing of materials: Metallic and non metallic, Ceramics and other materials. Only basic elements of powder technologies, compaction, sintering calcination, vitrification reactions, with different example, phenomenon of particle coalescence, porosity. Quenching: concept, glass formation.

4. Experimental Techniques in Physics (Subject Centric Course):

- CO1. Students will be able to learn about Different types of radiations (X-rays, UV-VIS, IR, microwaves and nuclear) and their sources Detectors: gamma-rays, X-rays, UV-VIS, IR, microwaves and nuclear detectors.
- CO2. X-ray Diffraction – Production of X-rays, Types (continuous and characteristics), Bragg's diffraction condition, principle, instrumentation (with filters) and working, Techniques used for XRD – Laue's method, Rotating crystal method, Powder (Debye-Scherrer) method etc.

- CO3. Students will learn about Derivation of Scherrer formula for size determination
Neutron Diffraction: Principle, Instrumentation and Working Thermal analysis:
Principle, Instrumentation and Working.
- CO4. Students will learn new facts about Optical Microscopy: Principle, Instrumentation
and Working of optical microscope. Electron Microscopy: Principle, Instrumentation
and Working of Scanning Electron Microscope (SEM), Field Emission Scanning
Electron Microscope (FESEM).
- CO5. Students will be able to learn Spectroscopic characterization (principle,
instrumentation and working): Infra-Red (IR), Fourier Transform Infra- Red (FTIR),
Ultraviolet-Visible (UV-VIS), Diffused Reflectance Spectroscopy (DRS), X-ray
Absorption (XPS), Electron Spin Resonance

PROJECT

- CO1. Plan and develop experimental project work from basics to advance version.
- CO2. Use of concepts in Physics to practical understanding of the problems.
- CO3. Use the advanced techniques to explore different phenomena in materials in the
different phases and structures.
- CO4. Students will submit a project report at the end of the 4th semester which has a
comprehensive study, factual information about the data acquired various visits to
advanced laboratories for experimental analysis and scope for further research.
- CO5. Students will write a research paper based on their experimental finding for
presentation in different conferences.

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Program Specific Outcomes (PSO) – M.Sc. Chemistry

- PSO1. To have sound knowledge about the fundamentals and applications of knowledge associated with the profession of chemistry, including specialized areas of inorganic chemistry, organic chemistry, physical chemistry, analytical chemistry, and elective subject of polymer chemistry.
- PSO2. Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions. Find, analyze, evaluate and apply information systematically and to make defensible decisions. Learn, select, and apply appropriate methods and procedures resources, and modern chemistry-related to computing tools with an understanding of the limitations. Interpret analytical data for structure elucidation using NMR, IR, UV and Mass spectroscopy.
- PSO3. Understand the impact of the professional Chemistry solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development. Develop an understanding of eco-friendly chemical processes and impact of chemistry on health and environment.
- PSO4. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-access and use feedback effectively from others to identify learning needs and to satisfy these needs ongoing basis.
- PSO5. Practices analytical skills such as synthesizing, separating, characterizing chemical compounds using laboratory and instrumentation techniques.
- PSO6. Grow research skills through dissertation/Project work in diverse fields of chemistry such as organic, nanoscience, analytical, physical etc. Review scientific literature and findings in methodical manner and dealing out of information obtained to comprehend scope for originality.
- PSO7. Obtain cutting-edge level of familiarity in natural products as well as various biological systems from the Chemical biology aspects.
- PSO8.** Develop responsiveness in academic and research ethics, scientific misconduct, misrepresentation and manipulation of data. Coherent communication skills

through seminars and the accumulating of information in the form of assignments. Create potential to participate for the available employment opportunities or work independently in research, industries and other analytical based fields.

Course Outcome (CO): M.Sc. Chemistry

Semester I

Inorganic Chemistry (CH-1T1)

- CO5. Be able to predict the geometry of individual molecules or complexes and to understand the complex formation equilibria in solution and to know unusual methods to the study of reaction rates.
- CO6. Be informed with boron hydrides, or polyboranes which are the original cluster compounds as well as the first known family of electron-deficient compounds and to study of clustering of metal atoms.

Organic Chemistry (CH-1T2)

- CO1. Be able to understand the applicability of concepts like delocalized bonding, conjugation, cross conjugation, resonance, in various carbon containing compounds and understanding of the reactive intermediates. To understand mechanisms of various substitution nucleophilic and NGP reactions.
- CO2. Be able to study optical activity in compounds without chirality and analyze stereo chemical aspects involved in various compounds and the corresponding chemical reactions. Also, be able to understand mechanisms of various Aromatic nucleophilic, electrophilic substitution reactions and quantification protocols of reactions.

Physical Chemistry (CH-IT3)

- CO1. Get acquainted with various laws of thermodynamics, its application and understand partial molar quantities, its determination and reduced phase rule in various component systems.
- CO2. Be able to recapitulation of terms of surface tension and different adsorption isotherms and be able to validate the newly developed analytical method as well as reported methods.

Analytical Chemistry (CH-1T4)

- CO1. Get acquainted with various terminology and fundamentals of analytical Chemistry including classical and instrumental methods
- CO2. Recapitulate the separation techniques like chromatography

Practical Inorganic Chemistry (CH-1P1)

- CO1. Be able to understand the basic principles involved in separation and estimation of acidic and basic radicals and be able to apply the knowledge in real sample analysis for quantitative estimation as well as qualitative detection and also be able to assign a numerical value to variables by the quantitative analysts is to reflect reality mathematically.

Physical Chemistry (CH-1P2)

- CO1. Be able to understand the basic principles of Physical Chemistry and interpret them through small experimental performances

Seminar (1S1)

- CO1. On completion of seminar, the student will be in a position to present the topic in front of subject audience that will enhance confidence level and lead to personality development

Inorganic Chemistry (CH-2T1)

- CO1. Will be able to understand the origin of colors in complexes and their magnetic behavior.
- CO2. Develop ability to understand various reactions of transition metal complexes

Organic Chemistry (CH-2T2)

- CO1. Be able to acquire knowledge and understand applicability of carbon-carbon multiple bond and carbon-hetero atom multiple bond addition reaction and develop understanding of reaction mechanism in metal hydride reduction
- CO2. Be able to analyze various mechanism of molecular rearrangement and concept of elimination reactions.

Physical Chemistry (CH-2T3)

- CO1. Be able to understand the eigen value and eigen function and application Schrödinger wave function to various systems
- CO2. Be able to determine the activity coefficients and ionic strength

Analytical Chemistry (CH-2T4)

- CO1. Be able to understand the working principles and techniques involved in methods of analysis
- CO2. Be able to explain the advances of modern methods over the classical ones

Practical Organic Chemistry (CH-2PI)

- CO1. Be able to perform the qualitative analysis of organic binary mixtures to get hands on training for the synthesis of commercially important organic compounds (Multistep synthesis)

Practical Analytical Chemistry (CH-2P2)

- CO1. Get expertise in titrimetric analysis based on neutralization, redox, precipitation and complexometric analysis, gravimetric estimation of barium and calcium,

separation technique of paper chromatography and electro analytical techniques as potentiometry, conductometry and optical methods like colorimetry

Seminar (2S1)

- CO1. On completion of seminar, the student will have an improved knowledge about the subject and will be in position to present the topic more confidently

M.Sc. Chemistry Semester III

Organic Chemistry Special paper-I (CH-3T1)

- CO1. Be able to explain what happens when organic molecules are excited by irradiation and be capable to discuss the photochemistry in nature and in various photochemical reactions.
- CO2. Pericyclic reactions are used in a vast way in nature and also by organic chemist. This course gives the student the theoretical basis of this kind of reaction and also helps them to find a way to carry out these types of reaction

Organic Chemistry Special paper-II (CH-3T2)

- CO1. Be able to acquire knowledge about terpenoids and porphyrins, the stereochemistry involved along with the structure determination and synthesis of some representative molecules. Get knowledge about carbohydrates with the properties of amino acids, and structural features of polypeptide.
- CO2. Be able to build a learning about alkaloids, the stereochemistry involved along with the structure determination and acquire brief idea about prostaglandins, steroids chemistry and plant pigments

Polymer Chemistry Elective paper (CH-3T3)

- CO1. Be able to understand different types of polymers and capable of understanding of different techniques used for molecular mass determination
- CO2. Get knowledge about morphology and order in crystalline polymers.

Spectroscopy-I (core subject centric) paper (CH-3T4)

- CO1. Learn the mass spectrometry technique and will be able to identify the molecule on the basis of the fragmentation pattern in mass spectrum and learn application of radioactive molecules in Mossbauer Spectroscopy
- CO2. Be able to understand energy changes at very lower level and capable of predicting the satellite patterns of geographical areas. ESR techniques are used to determine the presence of unpaired electron especially on complexes. Elucidate the structure determination of organic molecules by IR spectroscopy.

Practical Organic Chemistry Special (CH-3PI)

- CO1. Be able to isolate natural products using fractional distillations, column chromatography and extraction methods, get hands on the technique involved for the qualitative analysis of a mixture of these organic compounds and be able to understand application of volumetric analysis in the estimation of organic analyte from given solutions.

Practical Polymer Chemistry Elective (CH-3P2)

- CO1. Be able to synthesize various polymers and get knowledge about characterization of polymers.

Seminar (3S1)

- CO1. On completion of seminar, the student will be able to consolidate idea about the subject and thereby develop knowledge about the subject which will boost their confidence.

Semester IV

Organic Chemistry Special paper-I (CH-4TI)

- CO1. Be able to quantify the applicability of carbanion intermediate in organic synthesis and to understand modern methods of organic synthesis using transition metals and organ metallic reagents.
- CO2. Be able to be well familiar with the advanced terminologies, rules and concepts involved in stereochemistry and will have a deeper knowledge about the applicability of stereo chemical and the protection deprotection concepts. The students will be able to apply logic behind organic synthesis using retro synthetic approach.

Organic Chemistry Special paper-II (CH-4T2)

- CO1. Get acquainted with basic terminology involved in enzyme chemistry which is important to understand several life processes. Students will Come to know importance of heterocyclic compounds as a part of many natural products as well as pharmaceutical drug
- CO2. Be able to analyze structure of nucleic acids, lipids and vitamins which are important building blocks of living systems and to understand the terminologies and concepts involved in drug, dyes and polymer chemistry.

Polymer Chemistry Elective paper (CH-4T3)

- CO1. Get knowledge about various types of polymerizations with different technique of polymerization methods
- CO2. Be able to understand methods to study characterization of polymers and get knowledge of synthesis and application of biomedical, inorganic and coordination polymers.

Spectroscopy-II (core subject centric) paper (CH-4T4)

- CO1. Be able to understand theoretical aspects of UV, NMR and electron spectroscopies and to identify various molecular excitations and calculations of wavelengths of absorptions.
- CO2. Be able to elucidate the structure of molecule based on NMR spectra and comprehend the XRD data for crystal structure determination.

Practical Organic Chemistry Special (CH-4PI)

- CO1. Be able to carry out elemental analysis of organic compounds, get expertise in the estimation of biomolecules and some organic drug molecules. The students will get hands on training of multi-step preparation of small organic molecules and will develop ability to identify various unknown organic molecules using NMR, IR, Mass and UV spectroscopy.

Project (CH-4P2)

- CO1. Learn how to carry out literature survey in a specific area of research, work on a small idea to develop their own observations, analyze the results obtained from the experiments carried out, validate the methods developed by him/her and develop an overall research attitude so that he can become a good researcher in future.

Seminar (4SI)

- CO1. After successful completion these four seminars assigned to them; they will be in a position to explain the concepts they learned from the dais in front of any number of audiences. This will lead to overall personality development of the student for entering into teaching profession.

Programme outcomes of M.Com.

- PO1. Disciplinary Knowledge:** The students will attain wide and extensive theoretical knowledge and practical exposure in the field of Commerce.
- PO2. Critical and Analytical Thinking:** The students will be able to think critically, evaluate the reliability and relevance of evidence, identify logical flaws in arguments, analyze data, draw valid conclusions and support them with evidence and examples.
- PO3. Communication Skills:** The students will develop effective communication skills enabling them to present their ideas clearly and confidently at various forums.
- PO4. Leadership and Team work:** The students will be capable of working competently as a leader and a team member under diverse working conditions.
- PO5. Research related Skills:** The students will be able to identify problem statements, formulate research questions, and consult relevant sources to find appropriate solutions.
- PO6. Self directed lifelong learning:** The students will be able to recognize and use learning opportunities lifelong, creating an environment for continuous development and improvement of skills needed for personal and professional growth.
- PO7. Environment Awareness:** The students will develop sensitivity towards environment and learn to use the resources cautiously, contributing to sustainable development.
- PO8. Responsible Citizenship and Community Engagement:** The students will grow into responsible citizens, develop tolerance and harmony towards cultural and social diversities, and support in building a collective vision for the benefit of society.

Course Outcomes

Semester-I

Advanced Financial Accounting

- CO1. The student shall be able to identify and describe different accounting standards.
- CO2. The student shall be able to prepare consolidated financial statements based on relevant accounting standards.
- CO3. The student shall be able to read and analyze consolidated financial statements including accounting policies and other information disclosures.
- CO4. The student shall be able to demonstrate the usage and application of computer software accounting.
- CO5. The Student shall be able to carry out fire insurance calculations and claims settlement process.

Indian Financial System

- CO1. The student shall be able to identify the role, importance and functioning of the financial markets, financial system, financial instruments, and financial institutions.
- CO2. The student shall be able to evaluate the banking system in India and its operational formalities.
- CO3. The Student shall be able to critically analyze the functioning of life and non-life insurance in India and its policies.
- CO4. The student shall develop the capacity to extrapolate the functions of important intermediaries and regulatory bodies like stock exchanges, rating agencies, SEBI, RBI, etc. in financial system.
- CO5. The student shall be able to classify the different financial markets and instruments.

Managerial Economics

- CO1. The student shall be able to understand economies and diseconomies of scales, economies of scope, and cost functions and how each affects the cost of production, the four basic market models and price and quantity determination in each market model.

- CO2. The Student shall be able to calculate various types of elasticity of demand and will also be able to use demand forecasting and its various methods, measurement of GDP and learn about different phases of business cycles.
- CO3. The students shall be able to measure the responsiveness of consumers demand to changes in the price of goods and services
- CO4. The student shall be able to derive the equilibrium conditions for cost minimization and profit maximization.
- CO5. The student shall learn to determine how prices work in markets, how market participants benefit in the form of consumer surplus and producer surplus.

Marketing Management

- CO1. The student shall be able to formulate a marketing plan including marketing objectives, marketing mix, strategies, budgetary considerations and evaluation criteria
- CO2. The student shall be able to analyze pricing strategies taking into account perceived value, competitive pressures and corporate objectives and formulate strategies for efficient distribution of products and services.
- CO3. The student will be competent for choosing the best distribution channel keeping in mind the suitability for the company.
- CO4. The student will be capable of using digital technology for designing the promotion mix (advertising, sales promotion, public relations, personal selling, and direct marketing etc.) for the product.
- CO5. The student will learn the basic marketing skills. The subject will help them in making the appropriate subject choice for further specializations.

Sem-II

Research Methodology

- CO1. The student will develop the ability to select problem, formulate research questions, identify and consult relevant sources to find solutions.

- CO2. The student shall be able to understand various kinds of research, objectives of doing research, research process, research designs and sampling.
- CO3. The student shall acquire basic knowledge of qualitative and quantitative research techniques.
- CO4. The student shall have knowledge of measurement and scaling techniques.
- CO5. The student shall understand the logical connection between basics of data analysis, hypothesis testing procedures and thereby develop the skill of writing research report.

Advanced Cost Accounting

- CO1. The student shall be able to understand basic conceptual framework of cost, the student will be able to identify/ classify different elements/classification of cost and will be able to prepare cost sheet and prepare quotations for various business proposals.
- CO2. The student shall be able to develop time management for specific product so as to ascertain cost, volume and profit with the help of Break-even point, Margin of safety, profit volume ratio, desired profit/desired sales as well as evaluate the decision making proposals.
- CO3. The student shall be able to classify expenses on the basis of their nature and estimate cost of operating a service.
- CO4. The student shall be able to read and analyze expenses and income, receipt and payment, projected sales. The student shall also be able to prepare relevant functional level budget for an organization.
- CO5. The student shall be able to identify the standard and actual performance with the help of direct material and labour variances.

Cooperation

- CO1. The student shall be able to understand the principles and importance of cooperation and cooperative movement in India.
- CO2. The student shall be able to demonstrate the functions and working of cooperative credit institutions in India.
- CO3. The student shall learn new things which help in bringing about social change

- CO4. The student shall be able to justify the role of cooperation in rural economy.
- CO5. The student shall be able to understand and distinguish between globalization and cooperation.

Human Resource Management

- CO1. The student will be able to understand the development, implementation and evaluation of employee recruitment, selection, orientation, training and retention plans and processes.
- CO2. The student will learn evaluation of the performance management program. Effective coordination between employees and labour relations in both non union and union environments.
- CO3. The student shall be capable of communicating the organization's compensation plan, public safety measures, legal compliances, health and safety practices etc.
- CO4. The student shall be able to analyze situations, develop implement and evaluate organizational development strategies aimed at promoting organizational effectiveness, in order to support the human resources functions.
- CO5. The student shall be able to communicate the human resources component of the organization's business plan. The student shall also be equipped to conduct research, produce reports and recommend changes in human resource practices.

Sem-III

Advanced Management Accounting

- CO1. The students shall be able to demonstrate functions and importance of management accounting from the financial statements by performing Ratio Analysis and comment on the performance of the firm.
- CO2. The students shall be able to understand managerial accounting terminologies, principles, and practices. Recognize managerial accounting issues and how they differ from financial accounting issues. Analyze decision situations to determine appropriate information needs.
- CO3. The students shall be able to apply problem solving skills for product cost using a variety of costing methods or by classifying costs.

- CO4. The students shall be able to determine the effect on profit by evaluating possible courses of action and reviewing the results.
- CO5. The students shall be able to formulate, read and create budgets, managerial cost reports and variance analysis. Understand and articulate the assumptions and implications inherent with information in different managerial accounting reports.

Statistical Techniques

- CO1. The students shall be able to apply and calculate measures of location and measures of dispersion under grouped and ungrouped data cases.
- CO2. the students shall be able to build discrete and continuous probability distributions for various business problems.
- CO3. The students shall be able to learn non-parametric tests such as the Chi square test for independence as well as goodness of fit.
- CO4. The students shall be able to perform test of Hypothesis as well as calculate confidence interval for population parameter for single sample and two sample cases. Understand the concept of P- Values.
- CO5. The students shall be able to analyze and interpret the results of Bivariate and Multivariate Regression, Correlation Analysis for forecasting and also perform ANOVA and F- Test.

Direct Tax

- CO1. The students shall be able to understand the provisions and procedures for computation of income from profession.
- CO2. The student shall be able to compute capital gains.
- CO3. The student shall be able to understand the provisions and procedures of Chapter VI A deduction, clubbing of income, set-off and carry forward of losses.
- CO4. The student shall be able to evaluate the provisions and procedures of computation of tax liability for individuals and companies.
- CO5. The student shall be able to understand the changes in tax structure.

Computer Application In Commerce

- CO1. The student shall be able to observe and understand the main activities of internet services and applications.
- CO2. The student shall be able to demonstrate the working of word processing.
- CO3. The student shall be able to make spread sheets and use it for business applications.
- CO4. The student shall be capable of using computerized accounting with Tally.
- CO5. The student shall be able to enhance research related skills for future references.

Entrepreneurship Development

- CO1. The student shall be able to understand different methods to assess the attractiveness of business opportunities.
- CO2. The student shall be able to develop Entrepreneurial skills for commercial application of innovations and convert it into business ideas.
- CO3. The student shall be able to identify key risk factors and the most effective processes in bringing different types of products and services to market.
- CO4. The student shall be able to enhance personal attributes that enable best use of entrepreneurial leadership and management style.
- CO5. The student shall have enhanced understanding of the world and provide better opportunities of employment.

Service Sector Management

- CO1. The student shall be able to understand the importance of service sector like Aviation Industry, Transportation Industry, Hospital Management, Housing and Construction, Hospitality, BPO, KPO Industry.
- CO2. The students will be able to analyze concepts, functions and techniques of marketing services and will also be able to identify critical issues in service design and delivery.

- CO3. The students will be able to understand IT industry and its trends, role and importance of ITES.
- CO4. The student shall be able to develop service quality management in service sector.
- CO5. The student shall be able to manage service delivery challenges of distribution channels and planning in services.

Sem-IV

International Business Environment

- CO1. Students shall be able to perceive various concepts involved in International Business Environment and various concepts like international liquidity and SDR.
- CO2. Students shall be able to evaluate the global business environment in terms of economic, social and legal aspects and strategies adopted by firms to expand globally.
- CO3. Students shall be able to examine risks involved in formal trade and ways to manage the risks.
- CO4. Students shall be able to understand management of short term finance in multinational corporations and international financing decisions including funding and borrowing decisions.
- CO5. Students shall be able to understand and elaborate structure of international banking, various concepts involved in export documentation, export procedures and contracts.

Current Trends in Digital Commerce

- CO1. Students shall acquire knowledge of e-commerce, both technical and business aspects.
- CO2. Students shall be able to understand the principles and practices of e-commerce and its related technologies.
- CO3. Students shall be able to design and implement a basic e-commerce application.
- CO4. Students shall be able to study trends of e-commerce; build up on team work, presentation and technical writing skills.
- CO5. Students shall learn to operate digital devices and their applications in business.

Indirect Taxes

- CO1. Students shall be able to understand the purpose of GST, need of GST and registration procedure, amendments, cancellation and revocation of registration.
- CO2. Students shall acquire the basic knowledge of input tax credit , meaning of Reverse Charge Mechanism (RCM), returns and challan, there due dates under GST and computation of GST.
- CO3. Students shall be able to understand basic concepts of custom duty, classification of goods, valuation of goods, levy and exemption of custom duty and problems relating to custom duty.
- CO4. Students shall be able to describe the transaction types which are related to VAT, indicate VAT application, differentiation of application and VAT compliance and attendance also computation of VAT liability.
- CO5. Students shall be able to learn how to calculate input tax credit, output tax and custom duty.

Operations Research

- CO1. The student shall be able to identify and develop operational research models from the verbal description of the real system.
- CO2. The student shall be able to understand the mathematical tools that are needed to solve optimization problems.
- CO3. The student shall be able to develop mathematical software to solve the proposed models.
- CO4. The student shall be able to prepare report that describes the model and solving technique, analyze the results and propose recommendations which help in decision-making processes.
- CO5. The student shall be able to understand time and cost management.

E-Commerce

- CO1. The student shall be able to understand the concept of electronic commerce and the trade cycle.

- CO2. The student shall be able to understand the provisions and procedures of IT Act 2000 and Cyber Crimes.
- CO3. The student shall be able to operate the E- Payment system.
- CO4. The student shall be able to do the E-Commerce applications in various industries.
- CO5. The students will know the utility of various platforms under Ecommerce

Company Law

- CO1. The student shall be able to make use of various important provisions of company law in trade and commerce.
- CO2. The student shall be able to apply and interpret the provisions of capital, share-types and issue management as per companies act.
- CO3. The student shall be able to interpret the provisions and procedural aspects of conducting corporate statutory and non- statutory meetings-Annual general Meetings and Board Meetings.
- CO4. The student shall be able to Interpret the provisions of appointment, resignation and removal of Auditor, Directors, Managing Directors, and Key Managerial Personnel.
- CO5. The student shall learn corporate management and understand government regulations for corporate business and the procedure for winding up of companies.

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Programme outcomes of MCM

- PO1.** To attain suitable scientific knowledge and technical skills to realize, calibrate and develop innovative processes / skills for creation of inventive products which are beneficial to society.
- PO2** To implement discipline, professionalism, team spirit, communication skills, social and ethical commitment in the post graduates in order to embellish leadership roles expediting perfection in different sector with a categorical professional distinctiveness, business savvy, international recognition and imperishable expansion.
- PO3** To provoke entrepreneurship among the students along with strong ethics and communication skills.
- PO4** An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution. To identify and sharpen their IT/ programming skills
- PO5** Students will exhibit critical thinking skills to address diverse business challenges and opportunities.
- PO6** To develop appropriate skills in the students so as to make them competent and provide themselves self-employment.
- PO7** To make the unemployed as employed and entrepreneurs by providing the necessary skills and knowledge of business and administration

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Programme Specific Outcomes for MCM

- PSO1** An ability to apply knowledge of computer application, management technology in practice
- PSO2** An ability to devise and conduct experiments, interpret data and provide well informed conclusions
- PSO3** An ability to understand the impact of system solutions in a contemporary, global, economic, environmental, and societal context for sustainable development
- PSO4** An ability to function professionally with ethical responsibility as an individual as well as in multidisciplinary teams with positive attitude
- PSO5** Understand, analyze and develop Computer Programs in the areas related to algorithms, process and solutions for specific application development using appropriate data modelling concepts.
- PSO6** Design, develop, test and maintain desktop, web, mobile and cross-platform software applications using latest tools, technologies and skills and computing models and thereby enhance the ability to carry out research, experiment, contemporary issues to solve industrial problems.
- PSO7** Develop skill set to communicate one's ideas effectively and to demonstrate team, work as a member/leader to solve complex computing problems and design appropriate techniques to enhance ability for life-long learning.
- PSO8** The all-inclusive outlook of the course offers a number of value-based and job- oriented courses ensuring that students are trained into up-to-date. In computer management courses beyond the introductory level, affective development will also progress to the valuing and organization levels.

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Course Outcomes of MCM

Semester – I

- CO1. (Fundamental of Information Technology) Demonstrate a deep understanding of the IT methodologies and frameworks used to solve complex computing problems related to at least one IT Body-of-Knowledge. Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
- CO2. (Programming in C & OOPs Concept) To impart adequate knowledge on the need of programming languages and problem-solving techniques. To develop an in-depth understanding of functional and logical concepts of C Programming. To provide exposure to problem-solving through C programming. To familiarize the basic syntax and semantics of C Language
- CO3. (Introduction to Operating Systems) Students will gain knowledge of basic operating system concepts. To have an in-depth understanding of process concepts, deadlock and memory management. To provide an exposure to scheduling algorithms, devices and information management. Students will familiarize on the general structure of an operating system and se study is also provided.
- CO4. (Computerized Accounting (Tally ERP 9)) Understand the applications of accounting with Tally. Prepare accounting vouchers, ledger and various reports. Get exposed in maintenance of inventory features.

Semester - II

- CO5. (Management Information Systems) Describe the role of information technology and information systems in business. Interpret how to use information technology to solve business problems. Reproduce a working knowledge of concepts and terminology related to information technology.
- CO6. (Core Java) Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc. Understand the fundamentals of object-oriented programming in Java, including managing classes, objects, invoking methods etc and exception handling mechanisms. Concepts of inheritance, packages, interfaces and multithreading are introduced.
- CO7. (Quantity Techniques & Operation Research) Enable the students to generate mathematical models of business scenarios. The student should have the ability to analyze the business situations. The students will become able to use different mathematical models and the solution procedures.

CO8. (E-Commerce and Web Designing) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems. An ability to effectively integrate IT-based solutions into the user environment. An ability to use current techniques, skills, and tools necessary for computing practice.

Semester – III

CO9. (Advance Database Management System) To grasp the different issues involved in the design of a database system. To study the physical and logical database designs and database modeling like relational, hierarchical, and network models. To understand essential ADBMS concepts such as: database security, integrity and normalization. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling and designing an ADBMS.

CO10. (Principles & Techniques of Management) Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, and have same basic knowledge on international aspect of management. To understand the planning process in the organization.

CO11. Elective

(a). (PHP & MySQL)To learn the basic programming techniques using JavaScript and PHP. To gain an insight of creating classes and using functions in PHP. To learn the process of developing a PHP application and to work with files and directories.

(b). (VB.Net)Understand .NET framework and can realize some of the major enhancements in the new version of VB. Understand the basic structure of VB.Net and features of IDE . Develop programs using primitives and constructs in VB .NET

(c). (C#.Net) Understand code solutions and compile C# projects within the .NET framework. Design and develop professional console and window based .NET application. Demonstrate knowledge of object-oriented concepts Design user experience and functional requirements C#.NET application.

CO12. (Research Methodology) Acquire basic concepts on sampling theory and reliability which are required for research. Understand the literature survey and how to publish the Publications. Realize the thesis writing procedures. Apply the research tools for solving their problems.

Semester – IV

CO13. (ASP.Net) Understand the Microsoft .NET Framework and ASP.NET page structure. Design web application with variety of controls. Access the data using inbuilt data access tools.

- CO14. Elective a)(Advance Java)Students will design and implement programs in the Java programming language that make strong use of classes and objects. Students will develop sophisticated, interactive user interfaces using the Java Swing class and appropriate layout managers.
- (b). (Android Programming) Gain knowledge of frameworks such as Spring Architecture, JSF and Hibernate Architecture, Distinguish JDBC and Hibernate. (Knowledge, Comprehension). Gain the knowledge of Server-Side programming by implementing Servlet and JSP. Understand and write the deployment descriptor and enterprise application deployment. (Knowledge, Application).
- (c). (Python) To learn and understand Python programming basics and paradigm. Students should be made familiar with the concepts of GUI controls and designing GUI applications.
- CO15. Elective Foundation:
- (a). (Big Data &Hadoop)Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications. Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration. Ability to solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues.
- (b). (Software Engineering) Work as an individual and as part of a multidisciplinary team to develop and deliver quality software. Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle.
- (c). (Strategic Management) Students will be able to describe major theories, background work, concepts and research output in the field of strategic management. Students will demonstrate a clear understanding of the concepts, tools & techniques used by executives in developing and executing strategies and will appreciate its integrative and interdisciplinary nature.
- CO16. (Project) To progress their career productively in software industry, academia, research, entrepreneurial pursuit, government, consulting firms and other Information Technology enabled services. To achieve peer-recognition; as an individual or in a team; by adopting ethics and professionalism and communicate effectively to excel well in cross culture and inter-disciplinary teams. To continue a lifelong professional development in computing that contributes in self and societal growth.

Programme outcomes of MA English

- PSO1. The students will be able to think critically about various social, political, historical, religious and cultural issues from different perspectives.
- PSO2. The students will be able to appreciate the nuances of language and different genres of literature.
- PSO3. The students will be able to develop scholarly approaches to reading texts and would be able employ various methods for literary analysis.
- PSO4. The students will be equipped with tools and methodologies to pursue research in Literature/ Culture Studies/English Language Teaching and will be able to produce clear, coherent and structured research papers and articles.
- PSO5. The students will be able to develop various employability skills such as content writing, making presentations, editing etc for a range of professions such as teaching, journalism and mass communication, advertising and public relations, travel and tourism, administration etc
- PSO6. The students will be able to employ various reading strategies according to the purpose of reading such as summarizing, scanning for information, drawing inferences, analyzing texts, questioning, organizing information, visualizing etc.
- PSO7. The students will gain a broader outlook and be able to exercise discernment and judgment by evaluating arguments about issues.
- PSO8. The students will develop a moral compass and cultivate enduring values such as compassion, empathy, open mindedness and integrity.

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Course Outcomes (CO) –M.A. English

IT1 (Core) English Poetry from Chaucer to Milton

Paper 1 (Compulsory)

Learning Outcomes:

Students will be able to understand

- CO1. The changes that took place taking English Literature on the path of modernization
- CO2. Different forms of poetry
- CO3. The reasons behind the undercurrents of upheavals and disturbances prevalent in working classes leading to the generation of a progressive spirit.

IT2 (Core) English Renaissance Drama

Paper II (Compulsory)

- CO1. The students will come to know about the beginning of English drama and also know what role was played by the initial contributors to give this well-developed English theatre.
- CO2. The students will acquire knowledge about the different genres of drama during this period.
- CO3. The learners will be able to critically examine the form of drama adopted by the predecessors who provided a solid foundation to great Shakespearean drama and the dramatists who followed in the Jacobean period.

1T3 (A) – Indian Writing in English (A)

- CO1. Students will find that romanticism of Indian poets was fraught with nationalism, spirituality and mysticism and so was different from English nationalism.

- CO2. Students will learn about the contribution of pre-independence Indian English writers who would plumb the depth of humble life and reveal the dignity or majesty of middle class and underprivileged characters through their novels reflecting the social problems.

IT4 (C) Cultural Studies I

- CO1. Students will discover the contours of Culture Studies as a field of inquiry, situating their learning within explorations of the disciplinary and historical contexts of the field.
- CO2. Students will learn to use interdisciplinary critical perspectives to examine the diverse and sometimes contested meanings of cultural objects and processes, establishing a basic knowledge of the theoretical paradigms of Cultural Studies.

M.A. Part I English Second Semester

2T1 Restoration and Eighteenth Century English Literature

Paper I (Compulsory)

- CO1. Students will learn about the politics that brought turmoil in the 17th century England.
- CO2. Students will learn how Pope's use of mock epic form is intricate and exhaustive.
- CO3. Students will be able to compare and contrast Restoration, Neo-classical and Romantic revival literature.

2T2 Modern English Drama

Paper II (Compulsory)

- CO1. Students will learn about moral and social order in contemporary life through bold criticism in problem plays.
- CO2. Students will learn about dramatists who vociferously protested prevalent social institutions.

- CO3. Students will come to know about dramatists who were the shaping force of Poetic Drama in the literature of twentieth century.
- CO4. CO4) Students will understand how the theatre of absurd envisaged a radical departure from all kinds of conventional drama.

2T3 (A) Indian Writing in English II

- CO1. Students will interpret how the modern or experimental Indian English poetry is part of the process of modernization in which an independent culture emerges.
- CO2. Students will understand how the post-independence shift in the attitude towards women has led to their improved status in society.
- CO3. Students will come across the postcolonial world plagued by neocolonial catastrophe like economic disorder, social malaise, governmental corruption and state repression as shown in the fiction of modern Indian novelists.
- CO4. CO4) Students will find that the contemporary Indian drama, deviating from classical and European models, is experimental and innovative in terms of thematic and technical qualities.

2T4 (C) Cultural Studies II

- CO1. Students will learn strategies to connect cultural knowledge to everyday life and practices, gaining a preliminary understanding of the relationship of methodology (paradigm for study) to inquiry in Cultural Studies.
- CO2. Students will learn to develop their analysis of culture through oral and written modes of communication, with an emphasis on the skills of critical analysis and close reading, building a foundation for further study of Cultural Studies theory and praxis.

MA Part II (English) Third Semester

3T1 Romantic and Victorian Poetry

- CO1. Students will be able to establish relationship between humanity and nature, literature and social life.
- CO2. Students will develop an understanding of poetic genius through identification of different forms of poetry like ode, lyric, sonnet, dramatic monologue and elegy.
- CO3. The students will be able to analyze the underlying meaning of romantic poetry by relating it to real life.
- CO4. CO4) Students will be able to trace rationality and reality in Victorian poetry.

3T2 Literary Criticism and Theory I

- CO1. The students will be able to understand the concept of tragedy and the structure of play propounded by the great thinkers.
- CO2. The students will be able to understand the ideas of critical theories established by the Romantics.
- CO3. The students will be able to understand how the vision of life changed after World-Wars in the western part of the world.
- CO4. The students will understand the relationship between the text, author and the reader.

3T3 (C) Pandemic Studies and Literature

- CO1. To understand that men of letters can embroider their stories to make the final result more interesting and dramatic.
- CO2. To appreciate the preventive measures through the classic literary description of the plague.
- CO3. To recognize the social implication of the pandemic through vivid description in the text.
- CO4. To cultivate deeper level of understanding of the characters who survived and rebuilt, physically and emotionally

3T4 (C) Research Writing and Presentation Skills in English Studies- I

- CO1. To write clear, coherent and structured research-based essays, assignments and papers in a lucid style.
- CO2. To make effective presentations in academic seminars and conferences.
- CO3. To plan, design and write effective research proposals.

M.A. (English) Part II Fourth Semester

4T1 (Compulsory): Twentieth Century Poetry

- CO1. Students will come across an astounding variety of themes in Modern English Poetry
- CO2. The students will be inculcated with a humanitarian and democratic feeling as the modern poetry is marked with this theme.
- CO3. Students will better comprehend the realities that exist in the modern world after reading modern poetry.

4T2 (B) (Compulsory) Literary Criticism and Theory

- CO1. The students will be able to understand Deconstruction theory.
- CO2. The students will be able to understand Marxism and its impact on literature.
- CO3. The students will be able to understand the concept of "Orientalism".

4T3 (D) Film Studies

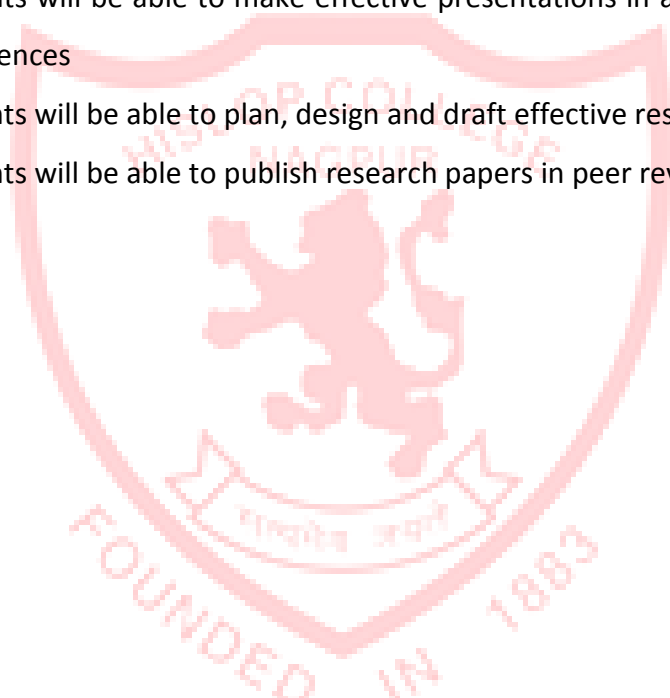
- CO1. Students will be familiarized with a few landmark Indian and Western Directors.
- CO2. Students will be able to establish the relationship between literary texts and adaptations.

- CO3. Students will understand the formation of genres like Melodrama, Family and Gender.
- CO4. Students will have a brief overview of film theory and semiotics.

4T4 (C) Research Writing and Presentation Skills in English Studies II

- CO1. Students will be able to write clear, coherent and structured research-based assignments and papers in a lucid style.
- CO2. Students will be able to make effective presentations in academic seminars and conferences
- CO3. Students will be able to plan, design and draft effective research proposals.
- CO4. Students will be able to publish research papers in peer reviewed journals.

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Programme outcomes of MA Hindi

- PO1. विद्यार्थियोंमेंविषयकोगहराईसेअध्ययनकरनेतथासाहित्यकेक्रमिकविकासकेचिंतन -
मननकीसमझविकसितहोगी।
- PO2. प्रयोजनमूलकहिंदीकेअध्ययनसेविभिन्नव्यवसायएवंरोजगारकरनेमेंसहायतामिलेगी।
- PO3. जीवनमेंनैतिकमूल्यतथासमाजकेप्रतिउत्तरदायित्वकीभावनाकाविकासहोगा।
- PO4. साहित्यएवंसमाजपरशोधवृत्तिकाविकासहोगा।
- PO5. साहित्यकेअध्ययनसेविभिन्नसमस्याओंकेप्रतिसकारात्मकरवैयाविकसितहोंगेजिससेबेह
तरजीवनजीनेमेंमददमिलेगी।
- PO6. तार्किकक्षमताविकसितहोगीजिससेरूढ़िवादीमान्यताओंएवंअवधारणाओंकेप्रतिअपनेआलो
चनात्मकपक्षकोरखनेपाएगा।
- PO7. नेतृत्वकरनेकीक्षमता,सहयोगीभावनाएवंसामूहिकभावनाकाविकासहोगा।
- PO8. संप्रेषणक्षमताकेविकाससेअपनेविचारोंकोप्रभावीढंगसेरखनेकेसाथ-
साथसामाजिक,सांस्कृतिकबहुलताकोसमझनेमेंआसानीहोगी।

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Course Outcomes (CO) –M.A. हिन्दी

सेमेस्टर I

1st पेपर हिंदी साहित्य का इतिहास (आदिकाल से रीतिकाल तक)

- CO1. विद्यार्थी हिंदी साहित्य के क्रमिक विकास को गहराई से समझने पायेंगे।
- CO2. साहित्य के विभिन्न कालों की प्रवृत्तियों को जानकर विश्लेषित कर सकेंगे।
- CO3. समाज में व्याप्त कुरीतियों के उत्थान के लिए कवियों के द्वारा किए गए प्रयासों से परिचित होने पायेंगे।
- CO4. साहित्य, समाज और राजनीतिक परस्पर संबंधों की पहचान करने पायेंगे।

2nd पेपर भारतीय काव्यशास्त्र

- CO1. भारतीय साहित्य के विभिन्न सिद्धांतों, अवधारणाओं को विस्तार से जानने पायेंगे।
- CO2. विद्यार्थियों में शोध प्रवृत्ति का विकास होगा।
- CO3. साहित्य के सिद्धांतों के मापदंड से विश्लेषण एवं आलोचनात्मक दृष्टिकोण विकसित होगा।
- CO4. उनमें साहित्य चिंतन एवं दृष्टिका विकास होगा।

3rd पेपर मध्यकालीन काव्य

- CO1. प्रख्यात लेखक के जीवन दर्शन को लेकर दूरदर्शिता को समझने पायेंगे।
- CO2. विद्यार्थी समाज और संस्कृतिके प्रतिचेतना प्राप्त करेंगे।
- CO3. विद्यार्थी काव्यभाषा के विविध रूपों से परिचित होने पायेंगे।
- CO4. भारत के मध्यकालीन समाज को विस्तार से जानने पायेंगे।

4th पेपर जीवनी और आत्मकथा

- CO1. विद्यार्थियों को विषय का समग्र ज्ञान अर्जित होगा।
- CO2. उनमें मानवीय मूल्यों की समझ विकसित होगी।

- CO3. विद्यार्थीरचनात्मकपरिवेशकोजाननेपायेंगे।
CO4. उनमेंविचारोंकोसमझने,समझानेएवंविश्लेषणकरनेकाबोधविकसितहोगा।

सेमेस्टर II

1stपेपरहिंदीसाहित्यकाइतिहास (आधुनिककाल)

- CO1. विद्यार्थीआधुनिकयुगकीप्रवृत्तियोंसेपरिचितहोंगे।
CO2. आधुनिकयुगकेसमाजकोदेखनेकाविवेचनात्मकदृष्टिकोणविकसितहोगा।
CO3. भाषाकीसमझएवंप्रयोगमेंदक्षताप्राप्तहोगी।
CO4. उनमेंसमस्याओंकोपरखनेएवंसुलझानेकीक्षमताकाविकासहोगा।

2ndपेपरहिंदीआलोचनादृष्टिएवंप्रवृत्तियां

- CO1. विद्यार्थियोंमेंआलोचनात्मकदृष्टिकोणविकसितहोगा।
CO2. उनकीतार्किकक्षमताकाविकासहोगा।
CO3. उनमेंमानवीयमूल्य,बुराइयों,कमियों,खूबियोंकेप्रतिसंतुलनकीदृष्टिकाविकासहोगा।
CO4. विषयकोसमझकरप्रभावीढंगसेव्याख्यायितकरनेपायेंगे।

3rdपेपरआधुनिककाव्य

- CO1. विद्यार्थियोंकोविषयकीव्यापकजानकारीहोगी।
CO2. हिंदीसाहित्यकीकाव्यविधाकीभाषात्मकविशेषताओंसेपरिचितहोंगे।
CO3. विद्यार्थियोंमेंसर्जनात्मकएवंरचनात्मकशैलीकाविकासहोगा।
CO4. जीवनकेप्रतिनैतिकएवंसामाजिकजागरूकताकाविकासहोगा।

4thपेपरप्रेमचंद

- CO1. उपन्याससम्राटकेजीवनएवंउनकेद्वारालिखेसाहित्यकाविस्तारसेअध्ययनकरनेपायेंगे।
- CO2. समाजमेंव्याप्तसमस्याओंएवंउसकेसमाधानकादृष्टिकोणसीखनेपायेंगे।
- CO3. भाषिकसंप्रेषणीयताकाविकासहोगा।
- CO4. नैतिकऔरसामाजिकमूल्योंकोसीखनेपायेंगे।

सेमेस्टर III

1st पेपर हिंदी भाषा

- CO1. विद्यार्थी हिंदी भाषा के इतिहास का गहन अध्ययन करने पायेंगे।
- CO2. हिंदी भाषा की विभिन्न उपभाषाओं एवं बोलियों को चिन्हित करने पायेंगे।
- CO3. हिंदी व्याकरण को सीखने पायेंगे।
- CO4. विद्यार्थियों में भाषिक दक्षता का विकास होगा।

2nd पेपर पाश्चात्य काव्यशास्त्र

- CO1. पश्चिमी विचार को के सिद्धांतों का गहन अध्ययन करेंगे।
- CO2. विद्यार्थियों में तार्किक क्षमता एवं शोध प्रवृत्ति का विकास होगा।
- CO3. विद्यार्थियों में विश्वस्तरीय सामुदायिक सोच का निर्माण होगा।
- CO4. भारतीय एवं पश्चिमी काव्यशास्त्र में साम्य एवं वैषम्य को चिन्हित करने पायेंगे।

3rd पेपर प्रयोजन मूलक हिंदी

- CO1. हिंदी भाषा के प्रयोजन मूलक पक्ष का विस्तार से अध्ययन करने पायेंगे।
- CO2. भविष्य में रोजगार एवं व्यवसाय के लिए काफी उपयोगी सिद्ध होगा।
- CO3. हिंदी पत्रकारिता के विविध आयामों से परिचित हो सकेंगे।
- CO4. पारिभाषिक शब्दावली, संगणकीय तथा तकनीकी दक्षता विकसित होगी।

4th पेपरहिंदीकहानी

- CO1. समाजऔरसंस्कृतिकाबोधहोगाजिससेसामाजिकमूल्योंकीसमझविकसितहोगी।
- CO2. विद्यार्थियोंमेंसामाजिकस्थितियों,मान्यताओंकेप्रतिआलोचनात्मकदृष्टिकाविकासहोगा।
- CO3. सामाजिकसमन्वयकीप्रवृत्तिविकसितहोगी।
- CO4. उनमेंरचनात्मकएवंनेतृत्वकारीक्षमताविकसितहोगी।

सेमेस्टर IV

1stपेपरभाषाविज्ञान

- CO1. विद्यार्थियोंकोविषयकासम्यकबोधहोगा।
- CO2. भाषाकेविविधपक्षोंकेअध्ययनसेभाषापरदक्षताहासिलहोगी।
- CO3. उनमेंसंप्रेषणकौशलविकसितहोगा।
- CO4. शोधवृत्तिकाविकासहोगा।

2ndपेपरआधुनिकहिंदीकथासाहित्य

- CO1. विद्यार्थियोंमेंआलोचनात्मकदृष्टिकोणतथासमस्याओंकेसमाधानकेप्रतितार्किकदृष्टिकाविकासहोगा।
- CO2. सामाजिकएवंसांस्कृतिकजागरूकताआएगी।
- CO3. मानवीयमूल्योंकीसमझविकसितहोगी।
- CO4. जीवनमेंसमस्याओंकेप्रतिसकारात्मकएवंसमाधानकारकसोचविकसितहोगी।

3rdपेपरअनुसंधानप्रक्रियाऔरप्रविधि

- CO1. विद्यार्थीशोधकीदिशाओंमेंकईमहत्वपूर्णजानकारियोंसेअवगतहोंगे।
- CO2. विद्यार्थियोंमेंसिद्धांतोंऔरअवधारणाओंकोविश्लेषणकरनेकीसमझविकसितहोगी।

CO3. उनमेंतार्किकतथाआलोचनात्मकदृष्टिकोणविकसितहोगा।

CO4. शोधकेविषयएवंप्रस्तुतिकौशलकाविकासहोगा।

4th पेपरपारिस्थितिकीअध्ययन

CO1. विद्यार्थीपर्यावरणएवंसाहित्यकेअंतर्संबंधकोसमझनेपायेंगे।

CO2. पर्यावरणकेप्रतिजागरुकताआएगी।

CO3. प्रकृतिकेसंरक्षणकेमहत्वकोजाननेपायेंगे।

CO4. पर्यावरणएवंमनुष्यजीवनकेपारस्परिकसंबंधकोपहचानेंगे।

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Programme outcomes of MA Psychology

- PSO1.** Equip students with understanding of application of psychological principles to solve human problems.
- PSO2.** Develop a thorough knowledge of theories, concepts, and research methods in the field and apply them in research design and data analysis
- PSO3.** Create a strong research oriented theoretical foundation in consonance with recent advances in the discipline of Psychology
- PSO4.** Familiarize students with some of the major theoretical perspectives in Social Psychology
- PSO5.** Provide an in-depth understanding of some of the cognitive processes in terms of current theories, models and applications
- PSO6.** Analyse the cases, apply psychological tests in various settings and do report writing
- PSO7.** Develop in-depth understanding of various psychological therapies and their applications
- PSO8.** Develop the ability to use critical, analytical, and reflective thinking and reasoning

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Course Outcomes

Semester I

Course Name: Cognitive Psychology

- CO1. Develop disciplinary knowledge of cognitive psychology for lifelong learning
- CO2. Disciplinary knowledge of basic tenets of the Cognitive structure, style, mapping and consistency
- CO3. Introduction to compound and complex functioning tools in cognition
- CO4. Develop critical thinking and analytical reasoning for lifelong learning through thinking, problem solving and decision-making

Course Name: Research Methods, Statistics and Psychological Testing

- CO1. Basic knowledge, research related skills, critical thinking and self-directed learning for lifelong acquisition and learning through scientific and common sense thinking
- CO2. Develop critical and analytical research skills for conduction of experimental and other research
- CO3. Introduction of testing tools aiding students for critical thinking, analytical reasoning and scientific reasoning in development of tools
- CO4. Introduction of statistical tools to equip students with problem-solving, scientific reasoning and self directed learning

Course Name: Personality Theories— I

- CO1. Introduction to the disciplinary knowledge and major concepts and theories underlying Personality Psychology
- CO2. Describe in detail the concepts and ideas propounded by the psychodynamic approach to personality

- CO3. Explain the thoughts of the ego psychologists in relation to personality
- CO4. Elucidate the major aspects of the trait and type approach to personality

Course Name: Advanced Social Psychology

- CO1. Provide a conceptual framework to understand social psychology and related factors - attitude, behaviour, aggression and sustainability
- CO2. Understand the dynamics of attitudes, behaviour and persuasion
- CO3. Elucidate the relationship of social psychology and aspects of sustainable future such as global crisis, materialism and wealth
- CO4. Explain the causes, perspectives and prevention of human aggression

Course Name: Psychology Practicum (Semester- I)

- CO1. Observe and identify the current situation that might be transformed into a healthier and/or more curative and correct way through a mini field study
- CO2. Learn to prepare questionnaires and collect primary data
- CO3. Synthesise the collected data into information to be used for scientific reasoning with the help of statistical tools
- CO4. Conduct experiments, write reports and understand their application in real life situations

Semester II

Course Name: Advanced General Psychology

- CO1. Explain the basics of how intelligence and creativity function and their relationship
- CO2. Discuss the functions and major theories of memory, emotion and motivation

- CO3. Describe in detail altered states of consciousness and introduce the scope and applications of forensic psychology
- CO4. Elucidate the major theories of development in relation to Childhood, Adolescence, Adulthood and Aging

Course Name: Research Designs

- CO1. Learn scientific reasoning models of research and the types of designs used in the field of psychology
- CO2. Employ research designs based on the nature of the problem construct, the variables, and the desired dimension of outcome and formulation of hypothesis
- CO3. State the dynamics of qualitative research methods
- CO4. Clarify the methods and analysis of qualitative data with examples and write a research report

Course Name: Personality Theories— II

- CO1. Describe the behavioural approach to personality and the views of prominent behaviourists
- CO2. State the cognitive, existential and humanistic approaches to personality and the views of their proponents
- CO3. Explain the Indian approaches to personality particularly the views of Aurobindo, Buddha and the Guna theory
- CO4. Elucidate the relational approach to personality and the ideal personality according to various personality theories

Course Name: Issues in Social Behaviour

- CO1. Discuss issues related to poverty, gender, population, conflict, unemployment and its psychosocial implications
- CO2. Understand the dynamics of prejudice and discriminations, its consequences and the techniques to counter and combat them.
- CO3. Explain the concept of group dynamics, group polarization, decision making and minority influence to understand the nuances of the society in terms of their behavioural and thinking patterns.
- CO4. State the dynamics of prosocial behaviour, gratitude, empathy and altruism

Course Name: Psychology Practicum

- CO1. Conduct Practical to bridge the gap between virtual and abstract concepts, and get hands-on exposure to a counselling set up, learn a protocol and understand it by writing reports that equip them with the soft skill required during the career span
- CO2. Administer tests on self and the subjects to get insights about administration, analysis, items, classifications and the inference to be drawn from them
- CO3. Learn to write as per the prescribed norms of report writing in the field of psychology
- CO4. Evaluate a test of their choice giving them a judgmental opportunity to check the test on their validity, reliability, standardisation and limitations thereby developing scientific reasoning and critical thinking

Semester III

Stream A: Clinical Psychology

Course Name: Abnormal Psychology

- CO1. Explain the major perspectives related to abnormality, its history and meaning

- CO2. Describe the causes and consequences of stress and coping, its management and related disorders
- CO3. Understand the symptoms, causes and treatment of personality disorders, mental retardation and other disorders diagnosed in infancy, childhood and adolescence and be able to diagnose them
- CO4. Express the dynamics of other conditions like physical abuse, relationship issues etc. requiring clinical attention and their treatment

Course Name: Psychodiagnosis and Psychotherapy

- CO1. Understand the concept of diagnosis, DSM and ICD revisions and the dynamics of the client therapist relationship
- CO2. Describe the various approaches to counselling and therapy particularly Psychoanalytic and Humanistic approaches
- CO3. State the processes involved in logo therapy, reality therapy, brief psychotherapy and Gestalt therapy
- CO4. Learn the techniques used in play therapy, couple counselling, workplace counselling and transactional analysis

Elective —I- b

Course Name: Psychological Assessment and Specific Testing

- CO1. Able to conduct informal assessment and acquire knowledge of perceptions, sensitivity, empathy and errors.
- CO2. Critically analyse, interpret and synthesise assessment findings
- CO3. Learn to conduct/administer psychological assessment and develop skills of writing psychological report
- CO4. Acquire knowledge and skills of conducting different intelligence testing

Course Name: Positive Psychology—I

- CO1. Aid the students to identify behaviours and approaches scientifically in attempt to induce happiness, well-being and sociability.
- CO2. Develop fundamental insight into various states of positive emotions which may result towards a person's psyche in trajectory.
- CO3. Acquire fundamental knowledge and description of the positive cognitive states in detail and use them as a standard guidelines to assess a person's current cognitive state and guide them
- CO4. Learn the positive behavioural aspects of human beings and various types of mechanisms that bring mindfulness

Course Name: Clinical Psychology Practicum

- CO1. Evaluate research articles and learn about the APA format in research writing
- CO2. Conduct mental status examination and take case histories of clients thereby developing an in-depth understanding of clinical cases
- CO3. Administer psychological test and report the test results of two psychological tests

Semester IV

Stream A: Clinical Psychology

Course Name: Psychopathology

- CO1. Gain information about the symptomatology of anxiety and impulse control disorders and their management
- CO2. Understand the causes and symptoms of mood disorders, suicide and interventions

- CO3. Describe the various forms of schizophrenia and organic mental disorders
- CO4. Elucidate important aspects of dissociative disorders, somatoform and sexual disorders

Course Name: Therapeutic Intervention Strategies

- CO1. Gain knowledge of various biological approaches of therapy like ECT, brain wave, biofeedback, NLP, etc.
- CO2. Learn about and understand the functioning and effectiveness of behavioural techniques, REBT, CBT
- CO3. Learn the details of group psychotherapy, family therapy and other related therapies
- CO4. Distinguish between the traditional and recent forms of psychotherapy

Course Name: Elective – II- b

Psychological Testing in Clinical Psychology

- CO1. Understand the concept and purpose of testing, adjustment and health inventories, attitude and value tests
- CO2. Understand the projective and objective tests of personality with examples
- CO3. Explain in detail the clinical scales for anxiety and depression
- CO4. Demonstrate understanding of the neuropsychological batteries, assessment of brain damage, physical handicaps and learning disability

Course Name: Positive Psychology- II

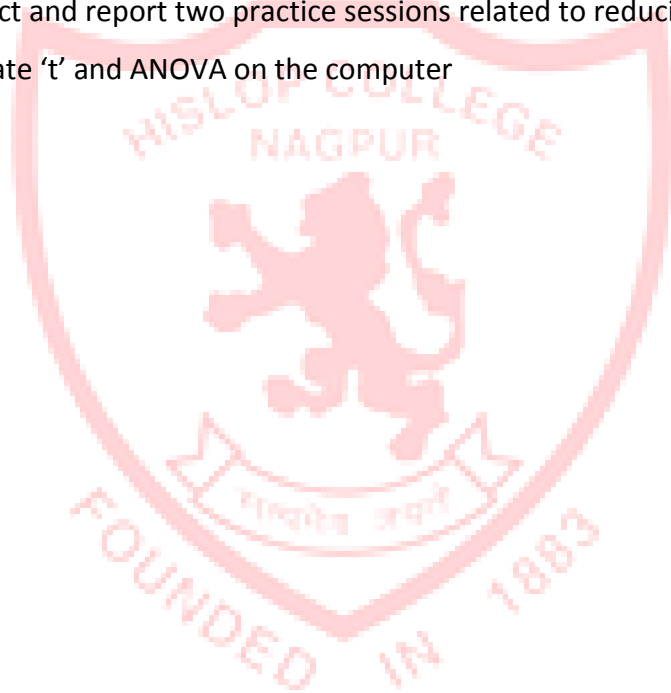
- CO1. Explain the importance of positive behaviour and its enhancement
- CO2. Describe aspects of positive environment including schooling and employment
- CO3. State techniques to assess problem solving, locus of control, creativity, self esteem, emotional intelligence and sense of humour

- CO4. Elucidate the various aspects of community orientation towards positive behaviour by focusing on resources, sports; physical activities, empowerment, person centred rehabilitation

Course Name: Clinical Psychology Practicum

- CO1. Understand cases and plan intervention from a psychological perspective
- CO2. Identify a research problem, formulate hypothesis, do review of literature, collect data, analyse it with statistics and report the findings
- CO3. Conduct and report two practice sessions related to reducing stress
- CO4. Calculate 't' and ANOVA on the computer

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Programme outcomes of MA Sociology

- PO1.** The student would develop aptitude and extensive knowledge in the field of Sociology
- PO2.** The student would be able to identify his position and relate to his community while studying Sociology with reference to society, religion, caste, region, gender and polity.
- PO3.** Student would develop the critical thinking to understand society and to conduct his research in the field of sociology.
- PO4.** Student would also be able to integrate his own values as well as become conscious about the values of his own community, organization and society.

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Course Outcomes for MA Sociology

Semester I

Paper- I Classical Sociological Theory

- CO1. Student understand the basic development of Sociology as a Science
- CO2. Student become aware of the major work of founding fathers of Sociology
- CO3. It gives exposure to student about the methodological perspective to study reality in more critical manner

Paper- II Qualitative Methods in Social Research

- CO1. It develops the ability to conduct the qualitative research in the field.
- CO2. It enhance their orientation capacity to understand the sociological methods
- CO3. Student are able to differentiate between methods and methodology

Paper- III Sociology of Social Movement

- CO1. Student creates the ability to understand the dynamics of social movement
- CO2. It assist them to correlate the social issues and theory of social movements
- CO3. Student develops the understanding about what is to be called social movement and what is not.

Paper- IV Social Problems in contemporary India

- CO1. Students gets the orientation regarding the origin, genesis and development of social problems
- CO2. It helps to resolve the social problems facing by the society through different strategies and measure.
- CO3. It gives them theoretically insight to understand social problem critically.

Semester-II

Paper- I Classical Theoretical Foundation

- CO1. Students get acquainted with early background of sociological theories.
- CO2. By knowing the various issues of the society, student can reflected through theoretical systems
- CO3. Students develop the capability to methodological perspective.

Paper- II Qualitative Methods in Social Research

- CO1. Students are able to differentiate between qualitative and quantitative research to understand its utility.
- CO2. Students could focus on the qualitative analysis and interpret of data in social research.
- CO3. It encourages the students to see how qualitative research method could be applied to study the society.

Paper-III Social Movement in India

- CO1. It helps the student to understand the emergence of social movement from structural perspective.
- CO2. It could help the students to see the problems of social movement and how they could address the issues related to social movement in sociological manner.
- CO3. Students could catch the background of Indian social movements and engage them critically to see the society with reference to it.

Paper-IV Industry and Society

- CO1. Students would be benefited with role of industrial aspects in the society.
- CO2. Students would able to understand the impact of industry on family, religion and caste
- CO3. Student learn the art and skills of operating industry with ease.

Semester-III

Paper-I Orientation in Sociological Theory

- CO1. Students capable to utilize sociological theory to problematize the social life of society.
- CO2. It also helps the students to use the theory effectively in social research.

CO3. It would give perspective and vision about the advance methodological issues.

Paper-II Sociology of Change and Development

CO1. It would foresee the how the students foresee the impact of change in society on the health and sustainable social life.

CO2. It helps the students to know the development models and approaches in the context of social structure and culture aspects.

CO3. Students like to understand the causes and effects of change and development in society.

Paper-III Sociology of Education

CO1. Students develops the capability to understand the importance of education in social change

CO2. It helps the students to know the market conditions in the sphere of employment, poverty, cultural of poverty.

CO3. It gives comprehensive view about the role of informal and formal education in society.

Paper-IV Rural Society in India

CO1. It assists the students to know the rural institution in rural society.

CO2. It enables the students to understand the complexities of agrarian and socio cultural life in rural society.

CO3. It made to understand the impact of development policies and programme related to rural society.

MA Sem IV

Paper- I Recent trends in Sociological Theory

CO1. It makes them capable to understand the methodological foundation of post-modern and post structural theories of sociology

- CO2. Student learns the gaps exist in modern sociological theories and advanced sociological theories and grapple to link between these two approaches to study the complex realities of society.
- CO3. It helps to know the further missing linkages out the sociological preview like language, new technological approaches and its relation with post capitalist society.

Paper- II Perspectives on Indian Thinkers

- CO1. It helps the students to understand the Indian society in more comprehensive manner with reference to Indian sociological theories
- CO2. It provides the analytical paradigm to understand the Indian sociologist and its methodological perspective about the Indian society.
- CO3. It also gives picture about the applicability of western and Indian theories while studying the Indian social reality.

Paper- III Education and Society in India

- CO1. Students come know the history of Indian education system.
- CO2. Students get the holistic idea about the relationship between the Indian education system and caste, class and gender.
- CO3. It provides causes and effects of privatization of education and impact on the marginalized, poor section of society.

Paper- IV Rural Society in India: Issues and Problems

- CO1. It would help the students to know the problems and issues related to agrarian society.
- CO2. Students would understand the causes of poverty and unemployment in rural society
- CO3. Students would understand the impact of policies and programme on the rural society with reference to caste

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Programme outcomes of PGDCCA

- PO1** To attain suitable scientific knowledge and technical skills to realize, calibrate and develop innovative processes / skills for creation of inventive products which are beneficial to society.
- PO2** To implement discipline, professionalism, team spirit, communication skills, social and ethical commitment in the post graduates in order to embellish leadership roles expediting perfection in different sector with a categorical professional distinctiveness, business savvy, international recognition and imperishable expansion.
- PO3** To provoke entrepreneurship among the students along with strong ethics and communication skills.
- PO4** An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution. To identify and sharpen their IT/ programming skills
- PO5** Students will exhibit critical thinking skills to address diverse business challenges and opportunities.
- PO6** To develop appropriate skills in the students so as to make them competent and provide themselves self-employment.
- PO7** To make the unemployed as employed and entrepreneurs by providing the necessary skills and knowledge of business and administration

Programme Specific Outcomes for PGDCCA

- PSO1** An ability to apply knowledge of computer application , management technology in practice
- PSO2** An ability to devise and conduct experiments, interpret data and provide well informed conclusions
- PSO3** An ability to understand the impact of system solutions in a contemporary, global, economic, environmental, and societal context for sustainable development
- PSO4** An ability to function professionally with ethical responsibility as an individual as well as in multidisciplinary teams with positive attitude
- PSO5** Understand, analyze and develop Computer Programs in the areas related to algorithms, process and solutions for specific application development using appropriate data modelling concepts.
- PSO6** Design, develop, test and maintain desktop, web, mobile and cross-platform software applications using latest tools, technologies and skills and computing models and thereby enhance the ability to carry out research, experiment, contemporary issues to solve industrial problems.
- PSO7** Develop skill set to communicate one's ideas effectively and to demonstrate team, work as a member/leader to solve complex computing problems and design appropriate techniques to enhance ability for life-long learning.
- PSO8** The all-inclusive outlook of the course offers a number of value-based and job-oriented courses ensuring that students are trained into up-to-date. In computer management courses beyond the introductory level, affective development will also progress to the valuing and organization levels.

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Course Outcomes of PG Diploma in Computer Commercial Application (PGDCCA)

Semester – I

- CO1. (Fundamental of Information Technology) Demonstrate a deep understanding of the IT methodologies and frameworks used to solve complex computing problems related to at least one IT Body-of-Knowledge. Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
- CO2. (Programming in C & OOPs Concept) To impart adequate knowledge on the need of programming languages and problem-solving techniques. To develop an in-depth understanding of functional and logical concepts of C Programming. To provide exposure to problem-solving through C programming. To familiarize the basic syntax and semantics of C Language
- CO3. (Introduction to Operating Systems) Students will gain knowledge of basic operating system concepts. To have an in-depth understanding of process concepts, deadlock and memory management. To provide an exposure to scheduling algorithms, devices and information management. Students will familiarize on the general structure of an operating system and se study is also provided.
- CO4. (Computerized Accounting (Tally ERP 9))Understand the applications of accounting with Tally. Prepare accounting vouchers, ledger and various reports. Get exposed in maintenance of inventory features.

Semester - II

- CO5. (Management Information Systems) Describe the role of information technology and information systems in business. Interpret how to use information technology to solve business problems. Reproduce a working knowledge of concepts and terminology related to information technology.
- CO6. (Core Java) Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc. Understand the fundamentals of object-oriented programming in Java, including managing classes, objects, invoking methods etc and exception handling mechanisms. Concepts of inheritance, packages, interfaces and multithreading are introduced.

- CO7. (Quantity Techniques & Operation Research) Enable the students to generate mathematical models of business scenarios. The student should have the ability to analyze the business situations. The students will become able to use different mathematical models and the solution procedures.
- CO8. (E-Commerce and Web Designing) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems. An ability to effectively integrate IT-based solutions into the user environment. An ability to use current techniques, skills, and tools necessary for computing practice.
- CO9. (Project)To progress their career productively in software industry, academia, research, entrepreneurial pursuit, government, consulting firms and other Information Technology enabled services. To achieve peer-recognition; as an individual or in a team; by adopting ethics and professionalism and communicate effectively to excel well in cross culture and inter-disciplinary teams. To continue a lifelong professional development in computing that contributes in self and societal growth.

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