

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

SUBJECT: BOTANY	
PROGRAMME OUTCOME	<p>Botany is the broad discipline encompassing various subjects involved with the study of plants. Present trend has been shifted to frontier areas of plant sciences at the cost of traditional botany. There is need to maintain a balance of the traditional botany and modern science and applied approach. It enables the learners to prepare them for future employment in various fields including academics as well as competitive exams.</p> <p>PO1: Diversity of plants and microbes their habitat, morphology, and reproduction.</p> <p>PO2: Genetics and molecular biology of plants</p> <p>PO3: Fungi and disease causing microbes and fungi</p> <p>PO4: Economic value of plants and their use in Biotechnology</p>
PROGRAMME SPECIFIC OUT COME For Botany Honors	<p>PSO1: Understanding of plant classification systematics, evolution, ecology, developmental biology, physiology, biochemistry, plant interactions with microbes and insects, morphology, anatomy, reproduction, genetics and molecular biology of various life-forms.</p> <p>PSO2: Understanding of various analytical techniques of plant sciences, use of plants as industrial resources or as human livelihood support system and is well versed with the use of transgenic technologies for basic and applied research in plants.</p> <p>PSO3: Understanding of various life forms of plants, morphology, anatomy, reproduction, genetics, microbiology, molecular biology, recombinant DNA technology, transgenic technology and use of bioinformatics tools and databases and the application of statistics to biological data.</p>
COURSE OUTCOME FOR I YEAR	
Semester I	
CC-I Microbiology and Phycology	<p>CO1: Students would have understanding of the classification, characteristic features, cell structure and growth and reproduction in viruses, bacteria, and various groups of marine and fresh water algae and their ecological and economic importance.</p>

CC-II Biomolecules and Cell Biology	<p>CO1: The relationship between the properties of macromolecules, their cellular activities and biological responses</p> <p>CO2: Understanding of Cell metabolism, chemical composition, physiochemical and functional organization of organelle</p> <p>CO3: Contemporary approaches in modern cell and molecular biology.</p>
Semester II	
CC-III Mycology and Phytopathology	<p>CO1: Understand the world of fungi, lichens and pathogens of plants</p> <p>CO2: Understand characteristics the ecological and economic significance of the fungi and lichens</p> <p>CO3: Understand the application of mycology in various fields of economic and ecological Significance</p> <p>CO4: Understand the economic and pathological importance of fungi, bacteria and viruses</p> <p>CO5: Identify common plant diseases and their control measures</p>
CC- IV Archegoniate	<p>CO1: The students will be made aware of the group of plants that have given rise to land habit and the flowering plants. Through field study they will be able to see these plants grow in nature and become familiar with the biodiversity.</p> <p>CO2: Students should create their small digital reports where they can capture the zoomed in and zoomed out pictures as well as videos in case they are able to find some rare structure or phenomenon related to these plants.</p>
COURSE OUTCOME FOR II YEAR	
Semester III	
CC-V Anatomy of Angiosperms	<p>CO1: Knowledge of various cells and tissues, meristem, epidermal and vascular tissue system in plants.</p> <p>CO2: Various aspects of growth, development of the tissues and differentiation of various plant organs. Knowledge of basic structure and organization of plant parts in angiosperms.</p> <p>CO3: Correlation of structure with morphology and functions.</p>
CC-VI Economic Botany	<p>CO1: Students would have first-hand information of plants used as food, the various kinds of nutrients available in the plants. The dietary requirements of proteins, fats, amino-acids, vitamins etc that can be met by plants.</p> <p>CO2: The students will learn to perform the micro-chemical tests to demonstrate various components.</p> <p>CO3: The students will learn about the use of fiber plants, beverages, fruits and vegetables that are integral to day to day life of plants.</p>

	CO4: Students will learn to explore the regional diversity in food crops and other plants and their ethno-botanical importance as well.
CC-VII Genetics	CO1: To generate interest among the students in Genetics and make them aware about the importance and opportunities in higher education and research, the first unit should be Introductory dealing with how this area has revolutionized all aspects of our life from its growth from Mendel to Genetic Engineering. CO2: Modes of inheritance of traits/ phenotypes and Phenotype-genotype correlation are the basic learning.
Semester IV	
CC-VIII Molecular Biology	CO1: Understanding of nucleic acid, organization of DNA in prokaryotes and Eukaryotes, DNA replication mechanism, genetic code and transcription process. CO2: Processing and modification of RNA and translation process, function and regulation of expression. CO3: Application in biotechnology
CC-IX Ecology	CO1: It acquaint the students with complex interrelationship between organisms and environment; make them understand methods to studying vegetation, community patterns and processes, ecosystem functions, and principles of phytogeography. CO2: This knowledge is critical in evolving strategies for sustainable natural resource management and biodiversity conservation.
CC-X Plant Systematics	CO1: Understanding of systematics its importance in bio resource utilization and biodiversity management. Nomenclature pattern, Phylogeny, Classification systems of the plants.
COURSE OUTCOME FOR III YEAR	
Discipline Specific Elective Paper	
Semester V	
DSE 1: Analytical Techniques in Plant Sciences	CO1: Understanding of principles and use of light, confocal transmission and electron microscopy, centrifugation, spectrophotometry, chromatography, x-ray diffraction technique and chromatography technique
DSE 2: Biostatistics	CO1: Understanding of interpreting the scientific data that is generated during scientific experiments. It is the responsibility of biostatisticians and other experts to consider the variables in subjects to understand them, and to make sense of different sources of variation. CO2: In essence, the goal of biostatistics is to disentangle the data received and make valid inferences that can be used to solve problems in public health. Biostatistics uses the application of statistical methods to conduct

	<p>research in the areas of biology, public health, and medicine.</p> <p>CO3: Many times, experts in biostatistics collaborate with other scientists and researchers.</p>
<p>DSE 3:</p> <p>Industrial and Environmental Microbiology</p>	<p>CO1: Understand how microbiology is applied in manufacturing of industrial products</p> <p>CO2: Know about design of bioreactors, factors affecting growth and production</p> <p>CO3: Understand the rationale in medium formulation & design for microbial fermentation, sterilization of medium and air</p> <p>CO4: Comprehend the different types of fermentation processes</p> <p>CO5: Comprehend the techniques and the underlying principles in upstream and down- stream processing</p> <p>CO6: Learn the occurrence, abundance and distribution of microorganism in the environment and their role in the environment and also learn different methods for their detection</p> <p>CO7: Understand various biogeochemical cycles – Carbon and Nitrogen, and microbes involved</p> <p>CO8: Understand the basic principles of environment microbiology and application of the same in solving environmental problems – waste water treatment and bioremediation</p> <p>CO9: Comprehend the various methods to determine the quality of water</p>
Semester VI	
DSE 4 Bioinformatics	<p>CO1: With a working knowledge of the practical and theoretical concepts of bioinformatics, you will be well qualified to progress onto advanced graduate study.</p> <p>CO2: The portfolio of skills developed on the programme is also suited to academic research or work within the bioinformatics industry as well as range of commercial settings.</p>
Generic Elective Paper	
<p>GE 1:</p> <p>Biodiversity (Microbes, Algae, Fungi and Archegoniatae)</p>	<p>CO1: Combination of Theoretical and Practical components will provide comprehensive information and insight into the fascinating world of Microbes and Plants.</p> <p>CO2: Hands on Training will help students learn use of microscope, mounting, section-cutting and staining techniques for the study of plant materials.</p> <p>CO3: Making Drawings in Practical Records will enhance understanding morphological and structural details and related functional aspects in diverse plant groups.</p>

	<p>CO4: Use of Illustrations, Photographs, Charts, Permanent Slides, Museum and Herbarium Specimens along with ICT Methods will provide an interesting insight into the beautiful world of microbes and plants.</p> <p>CO5: Scope of Biodiversity includes Medicinal field, Industry, Agriculture, Research and Study, Job Opportunities and Environmental Conservation. This paper is both informative and interesting and will enable students to learn about Biodiversity not only as a plant or nature lover, but also for higher academic pursuits, particularly in the field of Biological Sciences, Environment and Biodiversity Conservation.</p>
GE 2: Plant Anatomy and Embryology	<p>CO1: Knowledge regarding anatomy equipped the students to identify different types of tissues and make them able to correlate their physiology in a better away.</p> <p>CO2: This will also help them to understand how different plant tissue evolve and modify their structure and functions with respect to their environment.</p> <p>CO3: Knowledge regarding embryology will make them understand how reproduction play significant role in defining population structure, natural diversity and sustainability of ecosystem in a better way.</p>
GE 3: Plant Ecology and Taxonomy	<p>CO1: After successful completion of the course the student shall have adequate knowledge about the basic principles of environment and taxonomy.</p>
GE 4: Plant Physiology and Metabolism	<p>CO1: The students are able to correlate morphology, anatomy, cell structure and biochemistry with plant functioning.</p> <p>CO2: The link between theory and practical syllabus is established, and the employability of youth would be enhanced. The youth can also begin small-scale enterprises.</p>
GE 5: Environmental Biotechnology	<p>CO1: Explain the various global and regional environmental concerns due to natural causes and/or human activities.</p> <p>CO2: Investigate some examples of different types of environmental pollution and their impacts.</p> <p>CO3: Describe existing and emerging technologies that are important in the area of environmental biotechnology.</p> <p>CO4: Demonstrate an awareness of emerging concerns such as climate change, waste management or reductions in fossil fuels, and new technologies for addressing these.</p> <p>CO5: Appreciate the scientific, ethical and/or social issues associated with certain applications of biotechnology for alleviating the environmental concerns.</p> <p>CO6: Explain national and international legislations, policies and role of public participation in Environmental</p>

	<p>Protection</p> <p>CO7: Students will have an insight on the causes and consequences of environmental pollution, pollutants, They can think about the prevent of degradation of environment and management of pollutants.</p>
GE 6: Economic Botany and Biotechnology	CO1: Understanding of morphology, and processing and economic value of plant sources of cereals, legumes, spices, oil, rubber, timber and medicines
Skill Enhancement Course	
SEC 1: Ethnobotany	CO1: Students would have an understanding of the treasure, value and usefulness of the natural products and their efficient use by the local communities as food and medicine and their conservation practices .
SEC 2: Floriculture	CO1: Students would be able to identify the ornamental plants, They will have an understanding of cultivation methods, landscaping and making the flower arrangement.
SEC 3: Intellectual Property Rights	<p>CO2: Students would have deep understanding of patents copyrights, their importance.</p> <p>CO3: They can think about the importance of traditional knowledge, bio-prospecting, bio piracy.</p> <p>CO4: They would gain the knowledge of farmers rights and the importance on indigenous plant varieties, concept of novelty and biotechnological inventions</p>
SEC 4: Medicinal Botany	<p>CO1: An appreciation of the contribution of medicinal plants to traditional and modern medicine and the importance of holistic mode of treatment of the Indian traditional systems of medicine.</p> <p>CO2: To develop an understanding of the constraints in promotion and marketing of medicinal plants.</p>
SEC 5: Mushroom Culture Technology	CO1: As mushroom cultivation is a booming field Government of India is also supporting this type of work because students can learn the techniques and small scale and large scale industries can be established by the students. Hand on experience will be given to students so they can utilize this training in long run. In small area also they can establish the business.
SEC 6: Nursery and Gardening	<p>Students would have an understanding of</p> <p>CO1: How nursery of the plants is prepared?</p> <p>CO2: How rooting is promoted in the stem cuttings?</p> <p>CO3: How seeds are stored and what are the soil conditions for seed sowing and seedling growth?</p> <p>CO4: How landscaping is designed?</p>

SEC 7: Plant Diversity and Human welfare	CO1: The students would be able to judge the value of biodiversity and its role in stabilizing the climate and economy. They would know the causes and consequences of loss of biodiversity and planning of conservation strategies.
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SUBJECT: CHEMISTRY	
PROGRAMME OUTCOME	<p>PO1: The B.Sc. (Hons) Chemistry programme covers a wide range of basic and applied courses as well as courses of interdisciplinary nature.</p> <p>PO2: The core courses offered in the programme aim to build a strong conceptual chemical knowledge base in the student.</p> <p>PO3: The contents of electives and skill enhancement courses help them explore their fitness and suitability to pursue studies in these areas.</p>
PROGRAMME SPECIFIC OUTCOME For Chemistry Honors	<p>PSO1: The B.Sc. (Hons) programme in Chemistry is designed to develop in students in depth knowledge of the core concepts and principles that are central to the understanding of this core science discipline.</p> <p>PSO2: Undergraduates pursuing this programme of study go through laboratory work that specifically develops their quantitative and qualitative skills, provides opportunities for critical thinking and team work, and exposes them to techniques useful for applied areas of scientific study.</p>
COURSE OUTCOME FOR I YEAR	
Semester I	
CC I (Inorganic Chemistry-I): Atomic Structure & Chemical Bonding,	<p>CO1: Solve the conceptual questions using the knowledge gained by studying the quantum mechanical model of the atom, quantum numbers, electronic configuration, radial and angular distribution curves, shapes of s, p, and d orbitals, and periodicity in atomic radii, ionic radii, ionization energy and electron affinity of elements.</p> <p>CO2: Draw the plausible structures and geometries of molecules using Radius Ratio Rules, VSEPR theory and MO diagrams (homo- & hetero-nuclear diatomic</p>

	<p>molecules).</p> <p>CO3: Understand the concept of lattice energy using Born-Landé and Kapustinskii expression.</p> <p>CO4: Rationalize the conductivity of metals, semiconductors and insulators based on the Band theory.</p> <p>CO5: Understand the importance and application of chemical bonds, inter-molecular and intramolecular weak chemical forces and their effect on melting points, boiling points, solubility and energetics of dissolution.</p>
CC II (Physical Chemistry-I): States of Matter & Ionic Equilibrium,	<p>CO1: Derive mathematical expressions for different properties of gas, liquid and solids and understand their physical significance.</p> <p>CO2: Explain the crystal structure and calculate related properties of cubic systems.</p> <p>CO3: Explain the concept of ionization of electrolytes with emphasis on weak acid and base and hydrolysis of salt.</p> <p>CO4: Apply the concepts of gas equations, pH and electrolytes while studying other chemistry courses and everyday life.</p>
Semester II	
CCIII (Organic Chemistry-I): Basics and Hydrocarbons	<p>CO1: Understand and explain the different nature and behavior of organic compounds based on fundamental concepts learnt.</p> <p>CO2: Formulate the mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved.</p> <p>CO3: Learn and identify many organic reaction mechanisms including Free Radical Substitution, Electrophilic Addition and Electrophilic Aromatic Substitution.</p> <p>CO4: Understand the fundamental concepts of stereochemistry.</p>
CCIV (Physical Chemistry-II): Chemical Thermodynamics and its Application	<p>CO1: Understand the three laws of thermodynamics, concept of State and Path functions, extensive and intensive properties.</p> <p>CO2: Derive the expressions of ΔU, ΔH, ΔS, ΔG, ΔA for ideal gases under different conditions.</p> <p>CO3: Explain the concept of partial molar properties.</p> <p>CO4: Explain the thermodynamic basis of colligative properties and applications in surroundings</p>
COURSE OUTCOME FOR II YEAR	
Semester III	
CC V (Inorganic Chemistry-II): s- and p- Block Elements	<p>CO1: Learn the fundamental principles of metallurgy and understand the importance of recovery of byproducts during extraction.</p> <p>CO2: Understand the basic and practical applications in various fields of metals and alloy behavior and their</p>

	<p>manufacturing processes.</p> <p>CO3: Apply the thermodynamic concepts like that of Gibbs energy and entropy to the principles of extraction of metals.</p> <p>CO4: Understand the periodicity in atomic and ionic radii, electronegativity, ionization energy, electron affinity of elements of the periodic table.</p> <p>CO5: Understand oxidation states with reference to elements in unusual and rare oxidation states like carbides and nitrides.</p> <p>CO6: Understand vital role of sodium, potassium, calcium and magnesium ions in biological systems and the use of caesium in devising photoelectric cells.</p>
CC VI (Organic Chemistry- II): Oxygen containing Functional Groups	<p>CO1: Understand preparation, properties and reactions of haloalkanes, haloarenes and oxygen containing functional groups.</p> <p>CO2: Use the synthetic chemistry learnt in this course to do functional group transformations.</p> <p>CO3: To propose plausible mechanisms for any relevant reaction.</p>
CC VII (Physical Chemistry-III): Phase Equilibria and Electrochemical cells	<p>CO1: Understand phase equilibrium, criteria, CST, Gibbs-Duhem-Margules equation.</p> <p>CO2: Learn the working of electrochemical cells, galvanic cell, corrosion and happenings in surroundings related to electrochemistry.</p>
Semester IV	
CC VIII (Inorganic Chemistry-III): Coordination Chemistry	<p>CO1: Understand the terms, ligand, denticity of ligands, chelate, coordination number and use standard rules to name coordination compounds.</p> <p>CO2: Discuss the various types of isomerism possible in such compounds and understand the types of isomerism possible in a metal complex.</p> <p>CO3: Use Valence Bond Theory to predict the structure and magnetic behaviour of metal complexes and understand the terms inner and outer orbital complexes</p> <p>CO4: Explain the meaning of the terms Δ_o, Δ_t, pairing energy, CFSE, high spin and low spin and how CFSE affects thermodynamic properties like lattice enthalpy and hydration enthalpy.</p> <p>CO5: Explain magnetic properties and colour of complexes on basis of Crystal Field Theory</p> <p>CO6: Understand the important properties of transition metals like variable oxidation states, colour, magnetic and catalytic properties and use Latimer diagrams to predict and identify species which are reducing, oxidizing and tend to disproportionate and calculate skip step</p>

	potential. CO7: Understand reaction mechanisms of coordination compounds and differentiate between kinetic and thermodynamic stability.
CC IX (Organic Chemistry-III): Heterocyclic Chemistry	CO1: Gain theoretical understanding of chemistry of compounds having nitrogen containing functional groups, heterocyclics, polynuclear hydrocarbons, alkaloids and terpenes which includes various methods for synthesis through application of the synthetic organic chemistry concepts learnt so far. CO2: Become familiar with their particular properties, chemical reactions, criterion of aromaticity with reference to polynuclear hydrocarbons and heterocyclic compounds, trends in basicity of amines and heterocyclic compounds and their behaviour at different pH. CO3: Learn practical approach to structural elucidation of organic compounds with specific examples of terpenes and alkaloids. CO4: Predict the carbon skeleton of amines and heterocyclic compounds via use of Hoffmann's exhaustive methylation and Emde's modification methods. CO5: Understand the applications of these compounds including their medicinal applications through their reaction chemistry.
CC X (Physical Chemistry-IV): Conductance and Chemical Kinetics	CO1: Explain the chemistry of conductance and its variation with dilution, migration of ions in solutions. CO2: Learn the applications of conductance measurements, CO3: Have understanding of rate law and rate of reaction, theories of reaction rates and catalysts; both chemical and enzymatic CO4: Have knowledge of the laws of absorption of light energy by molecules and the subsequent photochemical reactions.
COURSE OUTCOME FOR III YEAR	
Semester V	
CC XI (Organic Chemistry-IV): Biomolecules	CO1: Understand and demonstrate how structure of biomolecules determines their reactivity and biological functions. CO2: Gain insight into concepts of heredity through the study of genetic code, replication, transcription and translation. CO3: Demonstrate understanding of metabolic pathways, their inter-relationship, regulation and energy production from biochemical processes.
CCXII	CO1: Learn about limitations of classical mechanics and

(Physical Chemistry-V): Quantum Chemistry and Spectroscopy	<p>solution in terms of quantum mechanics for atomic/molecular systems.</p> <p>CO2: Develop an understanding of quantum mechanical operators, quantization, probability distribution, uncertainty principle and application of quantization to spectroscopy.</p> <p>CO3: Interpret various types of spectra and know about their application in structure elucidation</p>
Semester VI	
CC XIII (Inorganic Chemistry-IV): Organometallic Chemistry	<p>CO1: Understand and explain the basic principles of qualitative inorganic analysis.</p> <p>CO2: Apply 18-electron rule to rationalize the stability of metal carbonyls and related species</p> <p>CO3: Understand the nature of Zeise's salt and compare its synergic effect with that of carbonyls.</p> <p>CO4: Identify important structural features of the metal alkyls tetrameric methyl lithium and dimeric trialkyl aluminium and explain the concept of multicenter bonding in these compounds</p> <p>CO5: Diagrammatically explain the working of the sodium-potassium pump in organisms and the factors affecting it and understand and describe the active sites and action cycles of the metalloenzymes carbonic anhydrase and carboxypeptidase</p> <p>CO6: Explain the sources and consequences of excess and deficiency of trace metals and learn about the toxicity of certain metal ions, the reasons for toxicity and antidotes</p> <p>CO7: Explain the use of chelating agents in medicine and, specifically, the role of cisplatin in cancer therapy and explain the applications of iron in biological systems with particular reference to haemoglobin, myoglobin, ferritin and transferrin</p> <p>CO8: Get a general idea of catalysis and describe in detail the mechanism of Wilkinson's catalyst, Zeigler- Natta catalyst and synthetic gasoline manufacture by Fischer-Tropsch process.</p>
CCXIV (Organic Chemistry-V): Spectroscopy	<p>CO1: Gain insight into the basic principles of UV, IR and NMR spectroscopic techniques.</p> <p>CO2: Use spectroscopic techniques to determine structure and stereochemistry of known and unknown compounds.</p> <p>CO3: Develop a sound understanding of the structure of Pharmaceutical Compounds. They will also understand the importance of different classes of drugs and their applications for treatment of various diseases.</p> <p>CO4: Learn about the chemistry of natural and synthetic</p>

	<p>polymers including fabrics and rubbers.</p> <p>CO5: Understand the chemistry of biodegradable and conducting polymers and appreciate the need of biodegradable polymers with emphasis on basic principles.</p> <p>CO6: Learn about the theory of colour and constitution as well as the chemistry of dyeing.</p> <p>CO7: Know applications of various types of dyes including those in foods and textiles.</p>
Discipline Specific Elective Paper	
DSE 1: Novel Inorganic Solids	<p>CO1: Gain insight into the basic principles of UV, IR and NMR spectroscopic techniques.</p> <p>CO2: Use spectroscopic techniques to determine structure and stereochemistry of known and unknown compounds.</p> <p>CO3: Develop a sound understanding of the structure of Pharmaceutical Compounds. They will also understand the importance of different classes of drugs and their applications for treatment of various diseases.</p> <p>CO4: Learn about the chemistry of natural and synthetic polymers including fabrics and rubbers.</p> <p>CO5: Understand the chemistry of biodegradable and conducting polymers and appreciate the need of biodegradable polymers with emphasis on basic principles.</p> <p>CO6: Learn about the theory of colour and constitution as well as the chemistry of dyeing.</p> <p>CO7: Know applications of various types of dyes including those in foods and textiles.</p>
DSE 2: Inorganic Materials of Industrial Importance	<p>CO1: Learn the composition and applications of the different kinds of glass.</p> <p>CO2: Understand glazing of ceramics and the factors affecting their porosity.</p> <p>CO3: Give the composition of cement and discuss the mechanism of setting of cement.</p> <p>CO4: Explain the suitability of fertilizers for different kinds of crops and soil.</p> <p>CO5: Explain the process of formulation of paints and the basic principle behind the protection offered by the surface coatings.</p> <p>CO6: Explain the principle, working and applications of different batteries.</p> <p>CO7: List and explain the properties of engineering materials for mechanical construction used in day to day life.</p> <p>CO8: Explain the synthesis and properties of nano-dimensional materials, various semiconductor and</p>

	superconductor oxides.
DSE 3: Green Chemistry	<p>CO1: Understand the twelve principles of green chemistry and will build the basic understanding of toxicity, hazard and risk of chemical substances.</p> <p>CO2: Understand stoichiometric calculations and relate them to green chemistry metrics. They will learn about atom economy and how it is different from percentage yield.</p> <p>CO3: Learn to design safer chemical, products and processes that are less toxic, than current alternatives. Hence, they will understand the meaning of inherently safer design for accident prevention and the principle "what you don't have can't harm you"</p> <p>CO4: Understand benefits of use of catalyst and bio catalyst ,use of renewable feed stock which helps in energy efficiency and protection of the environment, renewable energy sources, importance led reactions in various green solvents.</p> <p>CO5: Appreciate the use of green chemistry in problem solving skills, critical thinking and valuable skills to innovate and find out solution to environmental problems. Thus the students are able to realise that chemistry can be used to solve rather than cause environmental problems.</p>
DSE4: Industrial Chemicals & Environment	<p>CO1: The different toxic gases and their toxicity hazards</p> <p>CO2: Safe design systems for large scale production of industrial gases.</p> <p>CO3: Manufacturing processes, handling and storage of inorganic chemicals.</p> <p>CO4: Hazardous effects of the inorganic chemicals on human beings and vegetation.</p> <p>CO5: The requirement of ultra-pure metals for the semiconducting technologies</p> <p>CO6: Composition of air, various air pollutants, effects and control measures of air pollutants.</p> <p>CO7: Different sources of water, water quality parameters, impacts of water pollution, water treatment.</p> <p>CO8: Different industrial effluents and their treatment methods.</p> <p>CO9: Different sources of energy.</p> <p>CO10: Generation of nuclear waste and its disposal.</p> <p>CO11: Use of biocatalyst in chemical industries.</p>
DSE 5: Analytical Methods in Chemistry	<p>CO1: Perform experiment with accuracy and precision.</p> <p>CO2: Develop methods of analysis for different samples independently.</p> <p>CO3: Test contaminated water samples.</p> <p>CO4: Understand basic principle of instrument like Flame</p>

	<p>Photometer, UV-vis spectrophotometer.</p> <p>CO5: Learn separation of analytes by chromatography.</p> <p>CO6: Apply knowledge of geometrical isomers and keto-enol tautomers to analysis.</p> <p>CO7: Determine composition of soil.</p> <p>CO8: Estimate macronutrients using Flame photometry</p>
DSE 6: Applications of Computers in Chemistry.	<p>CO1: Have knowledge of most commonly used commands and library functions used in QBASIC programming.</p> <p>CO2: Develop algorithm to solve problems and write corresponding programs in BASIC for performing calculations involved in laboratory experiments and research work.</p> <p>CO3: Use various spreadsheet software to perform theoretical calculations and plot graphs</p>
DSE 7: Analytical Methods in Chemistry	<p>CO1: Perform experiment with accuracy and precision.</p> <p>CO2: Develop methods of analysis for different samples independently.</p> <p>CO3: Test contaminated water samples.</p> <p>CO4: Understand basic principle of instrument like Flame Photometer, UV-vis spectrophotometer.</p> <p>CO5: Learn separation of analytes by chromatography.</p> <p>CO6: Apply knowledge of geometrical isomers and keto-enol tautomers to analysis.</p> <p>CO7: Determine composition of soil.</p> <p>CO8: Estimate macronutrients using Flame photometry.</p>
DSE 8: Instrumental Methods of Analysis	<p>CO1: Handle analytical data</p> <p>CO2: Understand basic components of IR, FTIR, UV-Visible and Mass spectrometer.</p> <p>CO3: Interpret of IR, FTIR, UV-visible spectra and their applications.</p> <p>CO4: Understand the use of single and double beam instruments.</p> <p>CO5: Learn separations techniques like Chromatography.</p> <p>CO6: Learn elemental analysis, NMR spectroscopy, Electroanalytical Methods, Radiochemical Methods, X-ray analysis and electron spectroscopy.</p>
DSE 9: Polymer Chemistry	<p>CO1: Know about history of polymeric materials and their classification</p> <p>CO2: Learn about different mechanisms of polymerization and polymerization techniques</p> <p>CO3: Evaluate kinetic chain length of polymers based on their mechanism</p> <p>CO4: Differentiate between polymers and copolymers</p> <p>CO5: Learn about different methods of finding out average molecular weight of polymers</p> <p>CO6: Differentiate between glass transition temperature (T_g)</p>

	<p>and crystalline melting point (T_m)</p> <p>CO7: Determine T_g and T_m</p> <p>CO8: Know about solid and solution properties of polymers</p> <p>CO9: Learn properties and applications of various useful polymers in our daily life.</p>
DSE 10: Industrial Chemicals & Environment	<p>CO1: The different toxic gases and their toxicity hazards</p> <p>CO2: Safe design systems for large scale production of industrial gases.</p> <p>CO3: Manufacturing processes, handling and storage of inorganic chemicals.</p> <p>CO4: Hazardous effects of the inorganic chemicals on human beings and vegetation.</p> <p>CO5: The requirement of ultra-pure metals for the semiconducting technologies</p> <p>CO6: Composition of air, various air pollutants, effects and control measures of air pollutants.</p> <p>CO7: Different sources of water, water quality parameters, impacts of water pollution, water treatment.</p> <p>CO8: Different industrial effluents and their treatment methods.</p> <p>CO9: Different sources of energy.</p> <p>CO10: Generation of nuclear waste and its disposal.</p> <p>CO11: Use of biocatalyst in chemical industries.</p>
DSE 11: Applications of Computers in Chemistry	<p>CO1: Have knowledge of most commonly used commands and library functions used in QBASIC programming.</p> <p>CO2: Develop algorithm to solve problems and write corresponding programs in BASIC for performing calculations involved in laboratory experiments and research work.</p> <p>CO3: Use various spreadsheet software to perform theoretical calculations and plot graphs</p>
DSE 12: Molecular Modelling & Drug Design	<p>CO1: Understand theoretical background of computational techniques and selective application to various molecular systems.</p> <p>CO2: Learn Energy minimization methods through use of different force fields.</p> <p>CO3: Learn ESP Plots by suitable soft wares, electron rich and electron deficient sites,</p> <p>CO4: Compare computational and experimental results and explain deviations.</p> <p>CO5: Carry out Molecular dynamics (MD) and Monte Carlo (MC) simulations on several molecules and polymers.</p> <p>CO6: Learn QSAR properties and their role in molecular modelling, cheminformatics and drug discovery.</p> <p>CO7: Perform Optimization of geometry parameters of a molecule (such as shape, bond length and bond angle)</p>

	through use of software like Chem Sketch and Argus Lab in interesting hands-on exercises.
DSE 13: Green Chemistry	<p>CO1: Understand the twelve principles of green chemistry and will build the basic understanding of toxicity, hazard and risk of chemical substances.</p> <p>CO2: Understand stoichiometric calculations and relate them to green chemistry metrics. They will learn about atom economy and how it is different from percentage yield.</p> <p>CO3: Learn to design safer chemical, products and processes that are less toxic, than current alternatives. Hence, they will understand the meaning of inherently safer design for accident prevention and the principle "what you don't have can't harm you"</p> <p>CO4: Understand benefits of use of catalyst and bio catalyst, use of renewable feed stock which helps in energy efficiency and protection of the environment, renewable energy sources, importance led reactions in various green solvents.</p> <p>CO5: Appreciate the use of green chemistry in problem solving skills, critical thinking and valuable skills to innovate and find out solution to environmental problems. Thus the students are able to realise that chemistry can be used to solve rather than cause environmental problems.</p> <p>CO6: Green chemistry is a way to boost profits, increase productivity and ensure sustainability with absolute zero waste. Success stories and real world cases also motivate them to practice green chemistry. These days customers are demanding to know about a product: Is it green? Does it contribute to global warming? Was it made from non-depletable resources? Students have many career opportunities as "green" is the path to success.</p>
DSE 14: Research Methodology for Chemistry	<p>CO1: Learn how to identify research problems.</p> <p>CO2: Evaluate local resources and need for addressing the research problem</p> <p>CO3: Find out local solution.</p> <p>CO4: Know how to communicate the research findings.</p>
Generic Elective Paper	
GE 1: Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons	<p>CO1: Solve the conceptual questions using the knowledge gained by studying the quantum mechanical model of the atom, quantum numbers, electronic configuration, radial and angular distribution curves, shapes of s, p, and d orbitals, and periodicity in atomic radii, ionic radii, ionization energy and electron affinity of elements.</p>

	<p>CO2: Draw the plausible structures and geometries of molecules using radius ratio rules, VSEPR theory and MO diagrams (homo- & hetero-nuclear diatomic molecules).</p> <p>CO3: Understand and explain the differential behavior of organic compounds based on fundamental concepts learnt.</p> <p>CO4: Formulate the mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved.</p> <p>CO5: Learn and identify many organic reaction mechanisms including free radical substitution, electrophilic addition and electrophilic aromatic substitution.</p>
GE 2: Chemical Energetics, Equilibria & Functional Group Organic Chemistry-I	<p>CO1: Understand the laws of thermodynamics, thermochemistry and equilibria.</p> <p>CO2: Understand concept of pH and its effect on the various physical and chemical properties of the compounds.</p> <p>CO3: Use the concepts learnt to predict feasibility of chemical reactions and to study the behaviour of reactions in equilibrium.</p> <p>CO4: Understand the fundamentals of functional group chemistry through the study of methods of preparation, properties and chemical reactions with underlying mechanism.</p> <p>CO5: Use concepts learnt to understand stereochemistry of a reaction and predict the reaction outcome</p> <p>CO6: Design newer synthetic routes for various organic compounds.</p>
GE 3: Solutions, Phase Equilibrium, Conductance, Electrochemistry & Functional Group Organic Chemistry-II	<p>CO1: Explain the concepts of different types of binary solutions-miscible, partially miscible and immiscible along with their applications.</p> <p>CO2: Explain the thermodynamic aspects of equilibria between phases and draw phase diagrams of simple one component and two component systems.</p> <p>CO3: Explain the factors that affect conductance, migration of ions and application of conductance measurement.</p> <p>CO4: Understand different types of galvanic cells, their Nernst equations, measurement of emf, calculations of thermodynamic properties and other parameters from the emf measurements.</p> <p>CO5: Understand and demonstrate how the structure of biomolecules determines their chemical properties, reactivity and biological uses.</p> <p>CO6: Design newer synthetic routes for various organic compounds.</p>
GE 4:	<p>CO1: Understand the chemistry and applications of s- and p-</p>

Chemistry of s- and p-block elements, States of matter and Chemical Kinetics	<p>block elements.</p> <p>CO2: Derive ideal gas law from kinetic theory of gases and explain why the real gases deviate from ideal behaviour.</p> <p>CO3: Explain Maxwell-Boltzmann distribution, critical constants and viscosity of gases.</p> <p>CO4: Explain the properties of liquids especially surface tension and viscosity.</p> <p>CO5: Explain symmetry elements, crystal structure specially NaCl, KCl and CsCl</p> <p>CO6: Define rate of reactions and the factors that affect the rates of reaction.</p> <p>CO7: Understand the concept of rate laws e.g., order, molecularity, half-life and their determination</p> <p>CO8: Learn about various theories of reaction rates and how these account for experimental observations.</p>
GE 5: Chemistry of d-block elements, Quantum Chemistry and Spectroscopy	<p>CO1: Understand chemistry of d and f block elements, Latimer diagrams, properties of coordination compounds and VBT and CFT for bonding in coordination compounds</p> <p>CO2: Understand basic principles of quantum mechanics: operators, eigen values, averages, probability distributions.</p> <p>CO3: Understand and use basic concepts of microwave, IR and UV-VIS spectroscopy for interpretation of spectra.</p> <p>CO4: Explain Lambert-Beer's law, quantum efficiency and photochemical processes.</p>
GE 6: Organometallics, Bioinorganic chemistry, Polynuclear hydrocarbons and UV, IR Spectroscopy	<p>CO1: Understand the chemistry and applications of 3d elements including their oxidation states and important properties of the familiar compounds potassium dichromate, potassium permanganate and potassium ferrocyanide</p> <p>CO2: Use IR data to explain the extent of back bonding in carbonyl complexes</p> <p>CO3: Get a general idea of toxicity of metal ions through the study of Hg^{2+} and Cd^{2+} in the physiological system</p> <p>CO4: Understand the fundamentals of functional group chemistry, polynuclear hydrocarbons and heterocyclic compounds through the study of methods of preparation, properties and chemical reactions with underlying mechanism.</p> <p>CO5: Gain insight into the basic fundamental principles of IR and UV-Vis spectroscopic techniques.</p> <p>CO6: Use basic theoretical principles underlying UV-visible and IR spectroscopy as a tool for functional group identification in organic molecules.</p>

GE 7: Molecules of life	<p>CO1: Learn and demonstrate how the structure of biomolecules determines their chemical properties, reactivity and biological uses.</p> <p>CO2: Gain an insight into mechanism of enzyme action and inhibition.</p> <p>CO3: Understand the basic principles of drug-receptor interaction and SAR.</p> <p>CO4: Understand biological processes like replication, transcription and translation.</p> <p>CO5: Demonstrate an understanding of metabolic pathways, their inter-relationship, regulation and energy production from biochemical processes.</p>
Skill Enhancement Courses (Elective)	
SEC 1: IT Skills for Chemists	<p>CO1: Become familiar with the use of computers</p> <p>CO2: Use software for tabulating data, plotting graphs and charts, carry out statistical analysis of the data.</p> <p>CO3: Solve chemistry problems and simulate graphs.</p> <p>CO4: Prepare documents that will incorporate chemical structure, chemical equations, mathematical expressions from chemistry</p>
SEC 2: Basic Analytical Chemistry	<p>CO1: Handle analytical data</p> <p>CO2: Determine composition and pH of soil, which can be useful in agriculture</p> <p>CO3: Do quantitative analysis of metal ions in water</p> <p>CO4: Separate mixtures using separation techniques</p> <p>CO5: Estimate macro nutrients using Flame photometry</p>
SEC 3: Chemical Technology & Society	<p>CO1: Understand the use of basic chemistry to chemical engineering</p> <p>CO2: Learn and use various chemical technology used in industries</p> <p>CO3: Develop scientific solutions for societal needs</p>
SEC 4: Chemoinformatics	<p>CO1: Have a comprehensive understanding of drug discovery process and techniques including structure-activity relationship, quantitative structure activity relationship and the use of chemoinformatics in this, including molecular modelling and docking studies.</p> <p>CO2: Appreciate role of modern computation techniques in the drug discovery process and perform their own modelling studies.</p>
SEC 5: Business Skills for Chemists	<p>CO1: Learn basics skills of of business and project management.</p> <p>CO2: Understand the process of product development and business planning that includes environmental compliancy.</p> <p>CO3: Learn the process by which technical innovations are conceived and converted into successful business</p>

	<p>ventures.</p> <p>CO4: Understand the intellectual property rights and patents which drive business viability and commercialization of innovation.</p> <p>CO5: Relate to the importance of chemistry in daily life, along with the employment and business opportunities. They will effectively use the skills to contribute towards the well-being of the society and derive commercial value.</p>
SEC 6: Intellectual Property Rights	<p>CO1: Learn theoretical concepts of evolution of Intellectual Property Laws, and to differentiate between the different kinds of IP.</p> <p>CO2: Know the existing legal framework relating to IP in India.</p> <p>CO3: Comprehend the value of IP and its importance in their respective domains.</p> <p>CO4: This course may motivate the students to make their career in multifaceted field of intellectual property rights.</p>
SEC 7: Analytical Clinical Biochemistry	<p>CO1: Understand and establish how the structure of biomolecules determines their reactivity and biological uses.</p> <p>CO2: Understand the basic principles of drug-receptor interaction and structure activity relation (SAR).</p> <p>CO3: Gain an insight into concept of heredity through biological processes like replication, transcription and translation.</p> <p>CO4: Demonstrate an understanding of the biochemistry of diseases.</p> <p>CO5: Understand the application of chemistry in biological systems.</p>
SEC 8: Green Methods in Chemistry	<p>CO1: Get idea of toxicology, environmental law, energy and the environment</p> <p>CO2: Think to design and develop materials and processes that reduce the use and generation of hazardous substances in industry.</p> <p>CO3: Think of chemical methods for recovering metals from used electronics materials.</p> <p>CO4: Get ideas of innovative approaches to environmental and societal challenges.</p> <p>CO5: Know how chemicals can have an adverse/potentially damaging effect on human and vegetation.</p> <p>CO6: Critically analyse the existing traditional chemical pathways and processes and creatively think about bringing environmentally benign reformations in these protocols.</p>

	CO7: Convert biomass into valuable chemicals through green technologies.
SEC 9: Pharmaceutical Chemistry	CO1: Gain insight into retro-synthesis approach in relation to drug design and drug discovery. CO2: Learn synthetic pathways of major drug classes. CO3: Understand the fermentation process and production of ethanol, citric acids, antibiotics and some classes of vitamins.
SEC 10: Chemistry of Cosmetics & Perfumes	CO1: Learn basic of cosmetics, various cosmetic formulation, ingredients and their roles in cosmetic products. CO2: Learn the use of safe, economic and body-friendly cosmetics CO3: Prepare new innovative formulations
SEC 11: Pesticide Chemistry	CO1: Students will be able to learn about the basic role of pesticide in everyday life, various ingredients and their role in controlling the pest. Students can also educate the farmers/gardeners to choose the appropriate pesticides for their crop production.
SEC 12: Fuel Chemistry	CO1: The course covers both conventional petroleum-based fuels, and alternative & renewable fuels, including gaseous fuels. CO2: The students will learn the chemistry that underpins petroleum fuel technology, will understand the refining processes used to produce fuels and lubricants and will know how differences in chemical composition affect properties of fuels and their usage in different applications. CO3: The course will also cover origin of petroleum, crude oil, composition, different refining processes employed industrially to obtain different fractions of petroleum. Further, course will cover various alternative and renewable fuels like Biofuels (Different generations), Gaseous Fuels (e.g. CNG, LNG, CBG, Hydrogen etc.). CO4: The course will also cover fuel product specifications, various test methods used to qualify different types of fuels as well characterization methods. CO5: Review of energy scenario (Global & India), Energy sources (renewable and non-renewable). Types of Crude Oils, Composition and Properties. Crude oil assay

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

SUBJECT: COMMERCE FOR HONOURS	
PROGRAMME OUTCOME	<p>PO1: Commerce programme aims to equip students with the knowledge, skills and attitude to meet the challenges of the modern-day business organizations.</p> <p>PO2: The curriculum of B. Com. (Hons) degree provides a carefully selected subject combination of Accounting, Economics, Finance, Management, Tax, Marketing and Law etc.</p> <p>PO3: The programme aims to nurture the students in intellectual, personal, interpersonal and social skills with a focus on Holistic Education and development to make informed and ethical decisions and equips graduates with the skills required to lead management position.</p> <p>PO4: This programme brings out reflective and scientific thinking in the students which makes them inquisitive and curious to get deep insights of the business world and tackle the complex situations with much knowledge and wisdom.</p>
PROGRAMME SPECIFIC OUTCOME B.Com. (Hons)	<p>PSO1: This programme will instil in the students the knowledge and capability of understanding the business world and its complexities. It will also develop the ability and competence to have a problem-solving approach towards the issues which accompany the dynamism attached to the business world.</p> <p>PSO2: This degree course intends to inculcate attitudes and character that will help students evolve into sensitive and technically sound future business leaders rather than managers and aims at enhancing employability options of the students. The curriculum helps instilling learnability among students for upskilling and reskilling even in later part of life.</p> <p>PSO3: Disciplinary Knowledge: The curriculum planning of B.Com. (Hons.) course envisages the students demonstrating inclusive knowledge of the areas related to finance, human resource management, marketing, will be made capable of using modern ways and means of dealing with issues arising in the dynamic business world and will also help them tackle the resistances.</p> <p>PSO4: Critical Thinking: The graduates of this programme will be trained to develop skills and attitudes needed for critical thinking and adopting a comprehensive problem solving approach. They shall be exposed to the pedagogy</p>

	<p>that helps them understand real life situations through case-studies. It aims at building the basic ability to think critically, evaluate dispassionately and solve complex problems creatively. The content is organised in such a way that the students would be able to think from diverse perspectives and suggest solutions according to their own sensibilities.</p> <p>PSO5: Communication Skills : The teaching learning pedagogies used in the programme make the students capable enough to deliver and communicate information effectively with a mark.</p> <p>PSO6: Cooperation/Team Work : The curriculum also inculcates in the young minds the qualities of teamwork, cooperation and solidarity which can be seen as a vision of the current business world though full of competition. The courses included in the programme teach the students to cultivate such characteristics keeping the larger societal goal in mind.</p> <p>PSO7: Research Related Skills : The curriculum planning of B.Com. (Hons.) programme not only infuses into the students the skillset and competence required to maintain the national standards but also makes them competent enough to be capable of comprehending international frameworks keeping in view research aspects in consideration. The courses make them understand the need of the current business world and make them capable to look at various aspects from global perspective. The courses aim at instituting entrepreneurial skills in the students by instilling in them competencies needed to become an entrepreneur. These would lead to develop an attitude of life-long learning.</p> <p>PSO8: Moral and Ethical Awareness : The courses also involve training the students to check unethical behaviour, falsification and manipulation of information in order to avoid debacles which can be seen rising persistently over the period of time. It would also help in making responsible citizens and facilitate character building.</p> <p>PSO9: Lifelong Learning : This course broadens the horizons of the students by making them understand the intricacies of the business world and overall the economics of the country as well as the world. This learning makes them inquisitive to raise concerns and act accordingly. The curriculum is designed in such a way that the students are driven to develop an attitude of life-long learning.</p> <p>PSO10: Information/Digital literacy : This programme enables the students to be technologically updated as it has</p>
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	<p>courses like computerised accounting system, computer applications etc. which not only make them work using software but also makes them independent enough in this world of digitization. In all the courses, wherever applicable and possible, components related to technological changes have been incorporated which not only makes them digitally literate but also makes them aware of various cyber-crimes and how to take precautionary measures.</p> <p>PSO11: Multicultural Competence : The courses of this programme give a global perspective to the students such that they will be able to integrate national values and beliefs with international culture and competence.</p> <p>PSO12: Reflective Thinking : This programme enables the student to analyse the situation objectively and give effective arguments and judgments on the basis of the analysis being done. This programme teaches the student how to move sequentially in order to solve a problem effectively.</p> <p>PSO13: Scientific reasoning : This programme enables the students to think of a given problem or situation from different perspectives like economic, financial, social, national, global etc. and broadens the horizon of their thought processes. It not only helps the students add dimensions to its decision making but also in reaching to inclusive conclusions.</p>
COURSE OUTCOME FOR I YEAR	
Semester I	
BCH 1.2: FINANCIAL ACCOUNTING	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand the theoretical framework of accounting and to prepare financial statements</p> <p>CO2: Explain and determine depreciation and value of inventory</p> <p>CO3: Learn accounting for hire purchase transactions, leases, branches and departments</p> <p>CO4: Understand the concepts of partnership firm and prepare accounts for dissolution of a partnership firm</p> <p>CO5: Develop the skill of preparation of trading and profit and loss account and balance sheet using computerized accounting.</p>

Paper BCH 1.3: BUSINESS LAWS	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand basic aspects of contracts for making the agreements, contracts and subsequently enter valid business propositions.</p> <p>CO2: Be able to recognize and differentiate the special contracts and identify their appropriate usage at varied business scenarios.</p> <p>CO3: Equip the students about the legitimate rights and obligations under The Sale of Goods Act</p> <p>CO4: Enable with skills to initiate entrepreneurial ventures as LLP</p> <p>CO5: Understand the fundamentals of Internet based activities under The Information and Technology Act.</p>
Semester II	
Paper BCH 2.2: CORPORATE ACCOUNTING	<p>After completing the course, the student shall be able to:</p> <p>CO1: Develop an understanding of accounting for share capital and debentures</p> <p>CO2: prepare financial statements of a company</p> <p>CO3: develop an understanding of cash flow statements</p> <p>CO4: understand the accounting for amalgamation and liquidation of companies</p> <p>CO5: prepare consolidated balance sheet for Holding company</p>
Paper BCH 2.3: CORPORATE LAWS	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand the regulatory aspects and the broader procedural aspects involved in different types of companies covering the Companies Act 2013 and Rules there under.</p> <p>CO2: Follow the basic legal documents and their usage essential for operations and management of company.</p> <p>CO3: Enable the students to synthesis company processes, meetings and decisions.</p> <p>CO4: Equip the students with framework of dividend distribution and role of auditors in a company.</p> <p>CO5: Comprehend and evaluate working of depositories and their functions in stock markets.</p>
COURSE OUTCOME II YEAR (PAPERWISE)	
Semester III	
Paper BCH 3.1: HUMAN RESOURCE MANAGEMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand basic nature and importance of human resource management.</p> <p>CO2: Analyze the current theory and practice of recruitment and selection.</p> <p>CO3: Realize the importance of performance management system in enhancing employee performance.</p> <p>CO4: Recommend actions based on results of the compensation analysis and design compensation schemes that are cost</p>

	<p>effective, that increase productivity of the workforce, and comply with the legal framework.</p> <p>CO5: Understand role of modern hrn in meeting challenges of changing business environment.</p>
Paper BCH 3.2: INCOME TAX LAW AND PRACTICE	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand the basic concepts in the law of income tax and determine the residential status of different persons.</p> <p>CO2: Identify the five heads in which income is categorised and compute income under the heads 'salaries' and 'income from house property'.</p> <p>CO3: Compute income under the head ' profits and gains of business or profession', 'capital gains' and 'income from other sources'.</p> <p>CO4: Understand clubbing provisions, aggregate income after set-off and carry forward of losses, and deductions allowed under the income tax act; and further to compute taxable income and tax liability of individuals and firms.</p> <p>CO5: Develop the ability to file online returns of income.</p>
Paper BCH 3.3: MANAGEMENT PRINCIPLES AND APPLICATIONS	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand the evolution of management and apprehend its effect on future managers.</p> <p>CO2: Analyze how organisations adapt to an uncertain environment and decipher decision making techniques managers use to influence and control the internal environment.</p> <p>CO3: Comprehend the changes happening in organisation structure over time.</p> <p>CO4: Analyze the relationship amongst functions of management i.e. Planning, organizing, directing and controlling.</p> <p>CO5: Appreciate the changing dynamics of management practice.</p>
Semester IV	
Paper BCH 4.1: COST ACCOUNTING	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand thoroughly the conceptual framework of Cost Accounting; identification of differences between different financial and cost accounting; cost concepts and elements of cost; preparation of cost sheet.</p> <p>CO2: Understand the accounting and control of material and labour cost.</p> <p>CO3: Develop ability to understand classification, allocation, apportionment and absorption of overheads in cost determination; under and over absorption of overheads; treatment of various item of overheads</p> <p>CO4: Develop ability to calculate the cost of products, jobs, contracts, processes and services after understanding the</p>

	<p>basic concepts and processes involved in them.</p> <p>CO5: Understand cost accounting book keeping systems and reconciliation of cost and financial account profits</p>
Paper BCH 4.1: COST ACCOUNTING	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand thoroughly the conceptual framework of Cost Accounting; identification of differences between different financial and cost accounting; cost concepts and elements of cost; preparation of cost sheet.</p> <p>CO2: Understand the accounting and control of material and labour cost.</p> <p>CO3: Develop ability to understand classification, allocation, apportionment and absorption of overheads in cost determination; under and over absorption of overheads; treatment of various item of overheads</p> <p>CO4: Develop ability to calculate the cost of products, jobs, contracts, processes and services after understanding the basic concepts and processes involved in them.</p> <p>CO5: Understand cost accounting book keeping systems and reconciliation of cost and financial account profits</p>
Paper BCH 4.2: BUSINESS MATHEMATICS	<p>After completing the course, the student shall be able to:</p> <p>CO1: comprehend the concept of systematic processing and interpreting the information in quantitative terms to arrive at an optimum solution to business problems.</p> <p>CO2: develop proficiency in using different mathematical tools (matrices, calculus, linear programming, and mathematics of finance) in solving daily life problems.</p> <p>CO3: CO3: acquire competence to use computer for mathematical computations, especially with Big data.</p> <p>CO4: CO4: obtain critical thinking and problem-solving aptitude.</p> <p>CO5: CO5: evaluate the role played by mathematics in the world of business and economy.</p>
Paper BCH 4.3: COMPUTER APPLICATIONS IN BUSINESS	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand the various concepts and terminologies used in computer networks and internet and be aware of the recent developments in the fast changing digital business world.</p> <p>CO2: Handle document creation for communication.</p> <p>CO3: Acquire skills to create and make good presentations</p> <p>CO4: Make various computations in the area of accounting and finance and represent the business data using suitable charts. S/he should be able to manipulate and analyze the business data for better understanding of the business environment and decision making</p> <p>CO5: Understand and apply the various database concepts and tools in the related business areas with the help of suggested popular software.</p>

COURSE OUTCOME III YEAR (PAPERWISE)	
Semester V	
Paper BCH 5.1: PRINCIPLES OF MARKETING	<p>After completing the course, the student shall be able to:</p> <p>CO1: Develop understanding of basic concepts of marketing, marketing philosophies and environmental conditions effecting marketing decisions of a firm.</p> <p>CO2: Understand the dynamics of consumer behaviour and process of market selection through STP stages.</p> <p>CO3: Understand and analyze the process of value creation through marketing decisions involving product development.</p> <p>CO4: Understand and analyze the process of value creation through marketing decisions involving product pricing and its distribution.</p> <p>CO5: Understand and analyze the process of value creation through marketing decisions involving product promotion and also to equip them with the knowledge of various developments in marketing area that may govern marketing decisions of a firm.</p>
Paper BCH 5.2: FINANCIAL MANAGEMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: Explain the nature and scope of financial management as well as time value of money and risk return trade off</p> <p>CO2: Analyze capital budgeting process and capital budgeting techniques</p> <p>CO3: Estimate various capital structure theories and factors affecting capital structure decisions in a firm</p> <p>CO4: Critically examine various theories of dividend and factors affecting dividend policy</p> <p>CO5: Evaluate working capital requirement</p>
Paper BCH 5.3(a): MANAGEMENT ACCOUNTING	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand thoroughly the conceptual framework of Management Accounting; identification of differences between different forms of accounting—Financial, Cost and Managerial; distinction between cost control and cost reduction.</p> <p>CO2: Understand the concept of marginal cost and marginal costing; preparation of income statements using absorption and variable costing; learning of cost-volume-profit analysis and break-even analysis using mathematical and graphical approaches; and the application in businesses.</p> <p>CO3: Understand the concept of relevant and irrelevant costs and make decisions related to different business situations using marginal costing and differential costing techniques.</p> <p>CO4: Understand budgetary control system as a tool of managerial planning and control; ability to prepare various</p>

	<p>types of budget. Ability to understand standard costing system as a tool of managerial control; calculation of variances in respect of each element of cost and sales; control ratios.</p> <p>CO5: Understand management accounting issues of Responsibility accounting, Divisional performance measurement and Transfer pricing.</p>
Paper BCH 5.3(b): ORGANISATIONAL BEHAVIOR	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand the development of organisational behavior and its importance in managing people at the workplace.</p> <p>CO2: Understand how individuals behave under different conditions and why individuals behave as they do.</p> <p>CO3: Appreciate different theories of motivation.</p> <p>CO4: Critically evaluate leadership styles and strategies.</p> <p>CO5: Critically evaluate the potential effects of organisation culture and stress on behavior in organisation so as to direct the same towards predetermined goals.</p>
Paper BCH 5.3(c): MACRO ECONOMICS	<p>After completing the course, the student shall be able to:</p> <p>CO1: Describe the nature and scope of Macro Economics, Income, Expenditure and their components and determinants.</p> <p>CO2: Expose fiscal and monetary policy implications through IS-LM framework in short run and long run.</p> <p>CO3: Comprehend the different theories of demand for money, supply of money approach and working of money multiplier.</p> <p>CO4: Elucidate causes and effects of different types of inflation and trade-off between inflation and unemployment.</p> <p>CO5: Describe the role of saving and investment in different size of economies on trade and exchange rate and rate of interest.</p>
Paper BCH 5.3(d): ENTREPRENEURSHIP DEVELOPMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand the concept of entrepreneurship in the context of Indian economic scenario.</p> <p>CO2: Link the individual's capability and strength as a guiding factor towards entrepreneurial orientation.</p> <p>CO3: Understand social support system for gaining strength towards entrepreneurial preferences.</p> <p>CO4: Understand entrepreneurial process for initiating new venture creation.</p> <p>CO5: Understand various dimensions of managing a business enterprise once it is formed.</p>
Paper BCH 5.4(a): CORPORATE TAX PLANNING	<p>After completing the course, the student shall be able to:</p> <p>CO1: Differentiate between various tax planning concepts and understand the procedure of assessment of corporate assesses.</p>

	<p>CO2: Devise strategies for tax planning in respect of a new business, understand the specific tax issues for start-ups, and comprehend the income tax provisions relevant for financial management decisions.</p> <p>CO3: Decipher the tax factors relevant for managerial decisions and to understand how to develop pay packages for employees.</p> <p>CO4: Recognize the relevant tax provisions for non-resident indians and to understand how to claim relief in case of double taxation of income.</p> <p>CO5: Understand tax planning with reference to business restructuring.</p>
Paper BCH 5.4(b): FINANCIAL MARKETS, INSTITUTIONS & SERVICES	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand the meaning and scope of financial markets as well as institutions in India.</p> <p>CO2: Understand the concepts of Money Market and Capital Market</p> <p>CO3: Explain Commercial Banking and its Current developments.</p> <p>CO4: Explain concept of Non-Banking Financial Companies (NBFC's)</p> <p>CO5: Examine the Financial Services Industry</p>
Paper BCH 5.4(c): ADVERTISING AND PERSONAL SELLING	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand the communication objectives behind advertising and promotions.</p> <p>CO2: Understand the various advertising and media elements in the advertising decisions.</p> <p>CO3: Identify the ethical and legal issues of advertising.</p> <p>CO4: Comprehend the importance and role of personal selling.</p> <p>CO5: Understand the process of personal selling</p>
Paper BCH 5.4(d): BUSINESS STATISTICS	<p>After completing the course, the student shall be able to:</p> <p>CO1: Acquire a fair degree of proficiency in comprehending statistical data, processing and analysing it using descriptive statistical tools.</p> <p>CO2: Gather knowledge about various probability concepts and distributions and their business applications.</p> <p>CO3: Understand the relationship between two variables using concepts of correlation and regression and its use in identifying and predicting the variables.</p> <p>CO4: Develop an understanding of the index numbers and their utility in daily life and stock market.</p> <p>CO5: Become aware of the patterns revealed by the time series data and to use it to make predictions for the future.</p>
Semester VI	
Paper BCH 6.1: AUDITING AND	<p>After completing the course, the student shall be able to:</p> <p>CO1: differentiate between different aspects of auditing especially</p>

CORPORATE GOVERNANCE	<p>for internal check, internal control and for overall corporate governance.</p> <p>CO2: understand the concept of corporate governance in organisations and its essence for management.</p> <p>CO3: provide and assimilate information leading to failure of organisation and corporate scams.</p> <p>CO4: comprehend the governance framework for an organisation provided by different regulatory bodies in India and Abroad.</p> <p>CO5: recognise the essence of ethics in business.</p>
Paper BCH 6.2: GOODS & SERVICES TAX (GST) AND CUSTOMS LAW	<p>After completing the course, the student shall be able to:</p> <p>CO1: connect with the genesis of goods and services tax (GST), decipher the constitutional amendment carried out to install GST in India and comprehend the composition and working of GST council.</p> <p>CO2: understand the meaning of supply under GST law, differentiate between intra-state and inter-state supply, comprehend rules related to the place of supply and compute the value of supply.</p> <p>CO3: comprehend the utilization of input tax credit, and the reverse charge mechanism of paying GST and to know the procedure for claiming refund under GST law.</p> <p>CO4: understand the provisions for registration under GST along with special provisions such as those related to anti-profiteering; avoidance of dual control; e-way bills and penalties.</p> <p>CO5: know the basic concepts of Customs Act and to compute the assessable value for charging customs duty.</p>
Paper BCH 6.3(a): FUNDAMENTALS OF INVESTMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: explain investment environment and concept of return & risk.</p> <p>CO2: understand bond valuation & role of credit rating agencies.</p> <p>CO3: examine equity approaches.</p> <p>CO4: analyze two securities portfolio using Harry Markowitz model, Calculating portfolio risk and return, explaining CAPM and evaluating Mutual Funds and Financial derivatives.</p> <p>CO5: evaluate investors protection framework</p>
Paper BCH 6.3(b): COMPENSATION MANAGEMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: acquaint with basic legal framework envisaged under the statutes for compensation and welfare of employees in different modes.</p> <p>CO2: identify the internal and external environmental factors that have an impact on pay structure of an organisation.</p> <p>CO3: understand the various principles involved and premise of the grant of bonus, wages, and minimum wages to workers.</p>

	<p>CO4: understand international compensation rules to meet requirement of overseas workforce.</p> <p>CO5: know various compensation laws to meet employee satisfaction.</p>
Paper BCH 6.3(c): BUSINESS TAX PROCEDURE AND MANAGEMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: know the schedule for the payment of tax in advance, understand the provisions for deduction of tax at source and compute the tax interest and fee payable to / by government.</p> <p>CO2: understand the procedure of assessment and filing of appeals.</p> <p>CO3: know penalties for offences related to income tax, provisions relating to undisclosed income, and provisions of search and seizure.</p> <p>CO4: understand the concept of GAAR and conditions for levy of Securities Transaction Tax.</p> <p>CO5: know Information Technology network of Income Tax Department and learn about various Income Tax authorities and their powers.</p>
Paper BCH 6.3(d): CONSUMER AFFAIRS & CUSTOMER CARE	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the importance of consumer buying process and to identify the ethical and legal issues in advertisements and in packaging.</p> <p>CO2: learn how to pursue the consumer rights under consumer protection act 1986.</p> <p>CO3: understand the procedure of filing a complaint.</p> <p>CO4: analyse the role of industry regulators in consumer protection.</p> <p>CO5: comprehend the hearings, enquiry and appeal provisions.</p>
Paper BCH 6.4(a): FINANCIAL REPORTING AND ANALYSIS	<p>After completing the course, the student shall be able to:</p> <p>CO1: describe the conceptual framework of financial reporting have an understanding the components of financial statements</p> <p>CO2: identify major disclosures to be made in the annual report by the listed companies</p> <p>CO3: explain techniques of analysis of financial statements</p> <p>CO4: analyze and interpret financial statements of companies using the case study method</p> <p>CO5: gain understanding of emerging areas in financial reporting - Accounting for E-commerce business, value added statements and Integrated Reporting</p>
Paper BCH 6.4(b): BANKING & INSURANCE	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the meaning and scope of Banking with functions of Banks and their role into banking</p> <p>CO2: familiarize with regard to operations of Banking and various services and benefits.</p>

	<p>CO3: develop insights on lending operations of banking and causes of NPA into banking sector.</p> <p>CO4: acquaint with the concept of Insurance through functions and fundamental principles of Insurance.</p> <p>CO5: understand the types of Insurance and Regulatory framework of Insurance.</p>
Paper BCH 6.4(c): PROJECT MANAGEMENT AND TECHNIQUES	<p>After completing the course, the student shall be able to:</p> <p>CO1: explain the concept and attributes of projects, project management system, process and its principles</p> <p>CO2: perform technical feasibility, marketing feasibility and commercial viability using NPV, and further to understand tax and legal aspects of a project.</p> <p>CO3: analyse project appraisal in public & private sector and estimate shadow prices and social discount rate.</p> <p>CO4: examine project risk and performance assessment.</p> <p>CO5: evaluate project management techniques using case studies.</p>
Paper BCH 6.4(d): INTERNATIONAL BUSINESS	<p>CO1: understand the process of globalization, its impact on the evolution and growth of international business and to appreciate the changing dynamics of the diverse international business environment.</p> <p>CO2: analyze the theoretical dimensions of international trade and intervention measures adopted; to appreciate the significance of different forms of regional economic integration and to understand the concept of Balance of payment account and its components.</p> <p>CO3: understand the significance of different forms of regional economic integration and to appreciate the role played by various international economic organisations such as the WTO, UNCTAD, IMF and World Bank.</p> <p>CO4: familiarize students with the international financial environment, and get them acquainted with the basic features of the foreign exchange market – its characteristics and determinants.</p> <p>CO5: critically examine the concept and form of foreign direct investment, and to create awareness about emerging issues in international business such as outsourcing and ecological issues.</p>
Paper BCH 6.4(e): INDUSTRIAL RELATIONS AND LABOUR LAWS	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand evolution of industrial relations and its significance in managerial world.</p> <p>CO2: imbibe how to interact, negotiate and transact with trade unions.</p> <p>CO3: acquaint with the basic framework of collective bargaining and workers' participation.</p> <p>CO4: design and understand the discipline measures and address grievance mechanisms.</p>

	CO5: understand the legal structure provided for grievance handling under the Industrial Disputes Act 1947.
OUT COME FOR SKILL ENHANCEMENT COURSE (SEC)	
Semester III	
Paper BCH 3.5(a): E-COMMERCE	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the basics of E-commerce, current and emerging business models.</p> <p>CO2: familiarize with basic business operations such as sales, marketing, HR etc. on the web.</p> <p>CO3: enhance the students' skills for designing and developing website.</p> <p>CO4: identify the emerging modes of e-payment.</p> <p>CO5: understand the importance of security, privacy, ethical and legal issues of e-commerce.</p>
Paper BCH 3.5(b): TRAINING AND DEVELOPMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: learn the practical applications of training and development theories in recent times.</p> <p>CO2: learn to design training programmes for diverse workforce.</p> <p>CO3: understand the role of development officers.</p> <p>CO4: evaluate training and development programmes.</p> <p>CO5: recognize the mechanism of career development programmes.</p>
Paper BCH 3.5(c): DIGITAL MARKETING	<p>After completing the course, the student shall be able to:</p> <p>CO1: identify and assess the impact of digital technology in transforming the business environment and also the customer journey.</p> <p>CO2: understand how marketers think, conceptualize, test continuously to optimise their product search on digital platforms.</p> <p>CO3: illustrate how the effectiveness of a digital marketing campaign can be measured</p> <p>CO4: demonstrate their skills in digital marketing tools such as SEO, Social media, and Blogging for engaging the digital generation.</p> <p>CO5: appreciate the need for regulatory framework for digital marketing in India.</p>

Paper BCH 3.5(d): PERSONAL TAX PLANNING	After completing the course, the student shall be able to: CO1: understand the concept of tax planning, use the residential status to plan the scope of income and devise tax planning strategy in relation to agricultural income. CO2: apply critical thinking and problem solving skills related to minimization of tax liability of individuals with respect to salary income and understand how to develop efficient pay packages CO3: devise tax planning strategies in relation to house property and understand the presumptive scheme of taxation of computing business income. CO4: use Indexation technique to reduce capital gains tax and learn about specific exemptions available from capital gains. CO5: use deductions to reduce taxable income and use rebates to reduce tax liability.
Paper BCH 3.5(e): COMMUNICATION AND DOCUMENTATION IN BUSINESS	After completing the course, the student shall be able to: CO1: realize the significance of effective communication in business. CO2: learn business vocabulary and understand varied ways/methods to present business plans. CO3: gain knowledge on drafting of official letters and documents. CO4: develop appropriate skills for report writing and different ways of documentation. CO5: understand the role of information technology for enabling business communication and documentation.
Paper BCH 3.5(f): PERSONAL FINANCE AND PLANNING	After completing the course, the student shall be able to: CO1: understand the meaning and relevance of Financial Planning. CO2: familiarize with regard to the concept of Investment Planning and its methods. CO3: examine concept of Personal Tax Planning. CO4: analyze Insurance Planning and its relevance CO5: develop insights in to Retirement planning and its relevance
Semester IV	
Paper BCH 4.5(a): COMPUTERISED ACCOUNTING SYSTEM	After completing the course, the student shall be able to: CO1: understand Computerized Accounting System environment CO2: create structure of Computerized Accounting System for a business firm CO3: record day to day business transactions in Computerized Accounting System CO4: make necessary tax adjustments while recording business transactions and to generate various Accounting Reports for analysis and decision making CO5: perform verification and audit activities for the voucher entries passed in computerized accounting environment. CO5: know about various types of GST returns and their filing.

Paper BCH 4.5(b): BUSINESS RESEARCH METHODS AND ANALYTICS	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand meaning and scope of business research.</p> <p>CO2: familiarize with research terminologies and various types of research design.</p> <p>CO3: get an insight into various scaling techniques and sources of data collection.</p> <p>CO4: get acquainted with various techniques of data analysis and its implications.</p> <p>CO5: have basic learning of analytics in business.</p>
Paper BCH 4.5(c): LEADERSHIP AND TEAM DEVELOPMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: gain theoretical and practical knowledge to evaluate leadership skills, styles and strategies in contemporary world so as to become a successful leader and effective employee in organisation.</p> <p>CO2: understand the group dynamics and group decision making so as to develop acumen to utilize the leadership and team building concepts, tools and techniques to handle the complex organisational problems at different levels.</p> <p>CO3: recognize the dynamics of group decision making.</p> <p>CO4: understand the working of various teams in organisations.</p> <p>CO5: evaluate the role of women as leader and using various social media platforms as effective means of communication in contemporary world as a leader.</p>
Paper BCH 4.5(d): COLLECTIVE BARGAINING AND NEGOTIATION SKILLS	<p>After completing the course, the student shall be able to:</p> <p>CO1: identify issues in collective bargaining, its significance.</p> <p>CO2: understand the levels, coverage and agreements of collective bargaining.</p> <p>CO3: work on liaison in negotiations</p> <p>CO4: differentiate between negotiations, collective bargaining and use of its approaches.</p> <p>CO5: administer the negotiation agreement and handle grievance management</p>
Paper BCH 4.5(e): E- FILING OF RETURNS	<p>After completing the course, the student shall be able to:</p> <p>CO1: know the difference between e-filing and regular filing of Income tax returns and understand the circumstances when e-filing is mandatory.</p> <p>CO2: understand the basic process of computing taxable income and tax liability, and know about various types of income tax return forms.</p> <p>CO3: understand the concept of advance payment of tax and tax deduction at source and develop the ability of e-filing of TDS returns.</p> <p>CO4: become aware of the basic framework and structure of GST, including the meaning of input tax credit and the process of its utilization.</p>

Paper BCH 4.5(f): CYBER CRIMES AND LAWS	<p>After completing the course, the student shall be able to:</p> <p>CO1: identify cyber risk associated with online activities</p> <p>CO2: prepare them for safe working in the vertical having varied access points, data sources, network and system related issues, especially in online transactions.</p> <p>CO3: generate and preserve electronic evidences for personal and professional use.</p> <p>CO4: work in virtual space safely and with business process or products confirming to the regulatory framework and not falling under the ambit of cyber crimes.</p> <p>CO5: analyse the cases and find pertinent facts for resolutions.</p>
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OUT COME GENERIC ELECTIVE (For Honours Students from other than Commerce Programmes)	
Semester-I	
Paper BCH 1.4(a): BASICS OF ACCOUNTING	<p>After completing the course, the student shall be able to:</p> <p>CO1: gain an understanding of theoretical framework of accounting</p> <p>CO2: explain the concept of accounting equation and accounting process</p> <p>CO3: develop understanding of depreciation and inventory</p> <p>CO4: understand financial statements of a company</p> <p>CO5: state the meaning, objectives and significance of different types of ratios.</p>
Paper BCH 1.4(b): BUSINESS ORGANISATION AND MANAGEMENT	<p>CO1: learn business activities to compete in competitive world.</p> <p>CO2: understand entrepreneurship from local to international perspective.</p> <p>CO3: evaluate the application of functional areas of business activity.</p> <p>CO4: analyze decision making and communication.</p> <p>CO5: evaluate the impact of legal, social, and economic environment on business.</p>
Semester-II	
Paper BCH 2.4(a): ENTREPRENEURSHIP	<p>CO1: understand entrepreneurship as volition in context of India.</p> <p>CO2: gather knowledge and ideas on the existing support system for entrepreneurial orientation.</p> <p>CO3: understand enterprise formation process for gaining ideas as to creation of an enterprise for pursuing a career.</p> <p>CO4: understand requirements of post-enterprise creation for effective operation of the business.</p> <p>CO5: gain knowledge on available growth strategies for implementing effective suitable strategy for expansion and growth.</p>
Paper BCH 2.4(b): FINANCE FOR NON- FINANCE EXECUTIVES	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the overview of finance, concept of time value of money as well as concept of risk & return</p> <p>CO2: learn financial analysis with the aid of various financial statements & analyze capital budgeting process and techniques.</p> <p>CO3: analyze cost of capital, capital structure and leverage</p>

	CO4: examine dividend & working capital dividend decisions CO5: perform valuation of securities
Semester-III	
Paper BCH 3.4(a): INVESTING IN STOCK MARKETS	After completing the course, the student shall be able to: CO1: learn the basics of investing in stock market, the investment environment as well as risk & return CO2: analyze Indian securities market including the derivatives market CO3: examine EIC framework and conduct fundamental analysis CO4: perform technical analysis CO5: invest in mutual funds market
Paper BCH 3.4(b): HUMAN RESOURCE MANAGEMENT	After completing the course, the student shall be able to: CO1: understand different tools used in forecasting and planning human resource needs. CO2: demonstrate the ability to prepare a selection strategy for a specific job. CO3: understand the significance of different methods of performance appraisal. CO4: recommend actions based on results of the compensation analysis and design compensation schemes that are cost effective, that increase productivity of the work force, and comply with the legal framework. CO5: understand modern HRM to meet the challenges of changing business environment.
Paper BCH 3.4(c): FUNDAMENTALS OF MARKETING	CO1: learn the basic concepts and principles of marketing and to develop their conceptual skill to be able to manage marketing operations of a business firm. CO2: understand the complexities involved in various targeting and positioning decisions. CO3: take effective decisions for launching new products and to understand the implications of different pricing strategies. CO4: develop the skills to design the promotion-mix strategies CO5: familiarize about the current trends in marketing to take proactive measures while taking marketing decisions
Semester-IV	
Paper BCH 4.4(a): INSURANCE & RISK MANAGEMENT	CO2 : learn the Concepts and Principles of Insurance and its operations. CO3: develop insights into various types of Insurance CO4: examine the Legal aspects of Insurance contract and Actuaries CO5: familiarize with the Regulatory Framework of Insurance
Paper BCH 4.4(b): PROJECT MANAGEMENT & TECHNIQUES	CO1 familiarize with the concept of project management and its attributes CO2 understand project planning and project analysis CO3 perform project appraisal. CO4 examine project risk and conduct performance assessment and quality management of the project CO5 learn cases in project management.

B. COM. (PROGRAMME)

	FOR B.Com. (PROGRAMME)
PROGRAMME SPECIFIC OUT COME	<p>PO1: B.Com offers a deep dive into various facets of commerce and business.</p> <p>PO2: The curriculum of this programme provides a carefully selected subject combination of Accounting, Management, Tax, Finance, Marketing and Law.</p> <p>PO3: The programme will be able to make the students blend theoretical concepts with practice, furthering students with a better skillset and a fresh perspective.</p> <p>PO4: This programme will be able to give insight to the students of the day to day commercial procedures for becoming good leaders and assets for an organization.</p>
COURSE OUTCOME FOR I YEAR (PAPERWISE)	
Semester I	
Paper BC 1.2: FINANCIAL ACCOUNTING	<p>After completing the course, the student shall be able to:</p> <p>CO1: build an understanding of theoretical framework of accounting and be able to prepare financial statements.</p> <p>CO2: explain and determine depreciation and inventory value</p> <p>CO3: develop understanding of accounting for hire purchase transactions and lease transactions</p> <p>CO4: understand branch and departmental accounting</p> <p>CO5: develop the skill of preparation of trading and profit and loss account and balance sheet using computerized accounting or prepare accounts for dissolution of a partnership firm</p>
Semester I Paper BC 1.3: BUSINESS ORGANISATION AND MANAGEMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand dynamics of business organisations and management practices with respect to stakeholders.</p> <p>CO2: understand varied perspectives related to business environment and entrepreneurship.</p> <p>CO3: analyze how organisations adapt to an uncertain environment and decipher decision making techniques managers use to influence and control the internal environment.</p> <p>CO4: analyze the relationship amongst functions of management i.e. planning, organizing, directing and controlling.</p> <p>CO5: appreciate the change in working pattern of modern organisations.</p>
Semester II Paper BC 2.2: BUSINESS LAWS	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand basic aspects of contracts for making the agreements, contracts and subsequently enter valid business propositions.</p> <p>CO2: handle the execution of special contracts used in different types of business.</p> <p>CO3: learn legitimate rights and obligations under The Sale of Goods Act.</p> <p>CO4: acquire skills to initiate entrepreneurial ventures as LLP.</p>

	CO5: understand the fundamentals of Internet based activities under The Information and Technology Act.
Semester II Paper BC 2.3: BUSINESS MATHEMATICS AND STATISTICS	After completing the course, the student shall be able to: CO1: acquire proficiency in using different mathematical tools (matrices, calculus and mathematics of finance) in solving real life business and economic problems. CO2: develop an understanding of the various averages and measures of dispersion to describe statistical data. CO3: understand the relationship between two variables through correlation and regression. CO4: understand the construction and application of index numbers to real life situations. CO5: understand the trends and tendencies over a period of time through time series analysis.
COURSE OUTCOME FOR II YEAR (PAPERWISE)	
Semester III	
Paper BC 3.1: COMPANY LAW	After completing the course, the student shall be able to: CO1: understand the rules and the broader procedural aspects involved in different types of companies covering the Companies Act 2013. CO2: comprehend and appropriately use the basic legal documents essential for operations and management of company. CO3: distinguish between varied company processes, meetings and decisions. CO4: know the framework of dividend distribution and role of auditors in a company. CO5: understand and evaluate working of depositories and their functions for working in stock market.
Paper BC 3.2: INCOME TAX LAW & PRACTICE	After completing the course, the student shall be able to: CO1: understand the basic concepts in the law of income tax and determine the residential status of different persons. CO2: identify the five heads in which income is categorised and to compute income under the heads 'Salaries' and 'Income from House Property'. CO3: compute income under the head 'Profits and gains of business or profession', 'Capital gains' and 'Income from other sources'. CO4: understand clubbing provisions, aggregate income after set-off and carry forward of losses, and deductions allowed under the Income Tax Act. CO5: compute tax liability of individuals and firms and understand the provisions of filing return of income.
Semester IV	
Paper BC 4.2: CORPORATE ACCOUNTING	After completing the course, the student shall be able to: CO1: develop an understanding of accounting for share capital and debentures. CO2: prepare financial statements of a company.

	CO3: develop understanding of cash flow statements. CO4: understand the accounting for amalgamation of companies. CO5: prepare consolidated balance sheet for Holding company.
Paper BC 4.3: COST ACCOUNTING	After completing the course, the student shall be able to: CO1: understand conceptual framework of Cost Accounting. CO2: understand in detail the accounting and control of material and labour cost. CO3: understand classification, allocation, apportionment and absorption of overheads in cost determination. CO4: calculate the cost of products, jobs, contracts, processes and services. CO5: have basic understanding of cost accounting book keeping systems and reconciliation of cost and financial account profits.
COURSE OUTCOME FOR III YEAR (PAPERWISE)	
Semester V	
Paper BC 5.1 (a): HUMAN RESOURCE MANAGEMENT	After completing the course, the student shall be able to: CO1: understand the concept of HRM and its role in effective business administration. CO2: understand the role of recruitment and selection in relation to organisation's business and HRM objectives. CO3: explain the importance of performance management system in enhancing employee performance. CO4: design compensation schemes that are cost effective, increase productivity of the workforce, and comply with the legal framework. CO5: recognize emerging horizons of HRM and also enduring international HRM, e-HRM, HRIS.
Paper BC 5.1 (b): PRINCIPLES OF MARKETING	After completing the course, the student shall be able to: CO1: develop understanding of basic concepts of marketing, marketing philosophies and environmental conditions effecting marketing decisions of a firm. CO2: understand the dynamics of consumer behaviour and process of market selection through STP stages. CO3: learn about marketing decisions related to product produced by a firm. CO4: learn about marketing decisions involving product pricing and its distribution. CO5: learn marketing decisions involving product promotion.
Paper BC 5.1 (c): AUDITING AND CORPORATE GOVERNANCE	After completing the course, the student shall be able to: CO1: differentiate between different aspects of auditing especially for internal check, internal control and for overall corporate governance. CO2: understand the concept of corporate governance in organisations and its essence for management. CO3: provide and assimilate information leading to failure of organisation and corporate scams.

	<p>CO4: comprehend the governance framework for an organisation provided by different regulatory bodies in India and Abroad.</p> <p>CO5: recognise the essence of ethics in business.</p>
Paper BC 5.1 (d): FINANCIAL REPORTING AND ANALYSIS	<p>After completing the course, the student shall be able to:</p> <p>CO1-describe the conceptual framework of financial reporting to have an understanding of components of financial statements.</p> <p>CO2- identify major disclosures related to financial statements.</p> <p>CO3- explain techniques of analysis of financial statements.</p> <p>CO4-analyze and interpret financial statements of companies.</p> <p>CO5- gain understanding of emerging areas in financial reporting - Accounting for E-commerce business, value added statements and Integrated Reporting.</p>
Paper BC 5.1 (e): DOCUMENT MANAGEMENT SYSTEM	<p>After completing the course, the student shall be able to:</p> <p>CO1: appreciate the importance of effective documentation in business.</p> <p>CO2: understand traditional methods of documentation.</p> <p>CO3: understand significance and utility of modern documentation methods.</p> <p>CO4: practice business documentation with the help of real life cases.</p> <p>CO5: understand complexities involved in field project work.</p>
Paper BC 5.2 (a): FUNDAMENTALS OF FINANCIAL MANAGEMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: explain the nature, scope and objective of financial management, along with Time Value of Money, Risk & Return.</p> <p>CO2: analyze Capital Budgeting Process and Techniques including NPV, IRR and Profitability Index.</p> <p>CO3: examine various Capital structure theories and estimating cost of capital.</p> <p>CO4: critically examine basic Theories and policies of Dividend.</p> <p>CO5: estimate working capital along with an overview of cash receivables and inventory management.</p>
Paper BC 5.2 (b): GOODS & SERVICES TAX (GST) AND CUSTOMS LAW	<p>After completing the course, the student shall be able to:</p> <p>CO1: connect with the genesis of goods and services tax (GST), decipher the constitutional amendment carried out to install GST in India and comprehend the composition and working of GST council.</p> <p>CO2: understand the meaning of supply under GST law, differentiate between intra-state and inter-state supply, comprehend rules related to the place of supply and compute the value of supply.</p> <p>CO3: comprehend the utilization of input tax credit, and the reverse charge mechanism of paying GST and to know the procedure for claiming refund under GST law.</p> <p>CO4: understand the provisions for registration under GST along with special provisions such as those related to anti-profiteering and avoidance of dual control.</p> <p>CO5: know the basic concepts of Customs Act and to compute the assessable value for charging customs duty.</p>

Paper BC 5.2 (c): TRAINING AND DEVELOPMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: link training and development to company's strategy effectively and assess training needs of the people working in the organisation.</p> <p>CO2: apply various methods of training and development in real life situations.</p> <p>CO3: design, develop, and conduct management development programmes.</p> <p>CO4: evaluate the effectiveness of training and development programmes.</p> <p>CO5: leverage the emerging trends in training and development field.</p>
Paper BC 5.2 (d): Industrial Laws	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the schemes for labour and their benefits enacted under the Indian Legislature.</p> <p>CO2: imbibe how to extend the benefits of different schemes of insurance available for defined set of employees.</p> <p>CO3: acquaint with the basic framework of payment of just and fair wages and bonus to employees of factories, industrial establishments or other establishments.</p> <p>CO4: understand the legal structure provided for social welfare under the Gratuity Act 1972.</p> <p>CO5: design and understand the calculation and payment of compensation under the Employees Compensation Act 1923.</p>
Semester VI	
Paper BC 6.1 (a) : CORPORATE TAX PLANNING	<p>After completing the course, the student shall be able to:</p> <p>CO1: differentiate between various tax planning concepts and understand the procedure of assessment of corporate assesses.</p> <p>CO2: devise strategies for tax planning in respect of a new business, understand the specific tax issues for start-ups, and comprehend the Income Tax provisions relevant for financial management decisions.</p> <p>CO3: decipher the tax factors relevant for managerial decisions.</p> <p>CO4: understand how to claim relief in case of double taxation of income.</p> <p>CO5: understand tax planning with reference to business restructuring.</p>
Paper BC 6.1 (b): BANKING AND INSURANCE	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the meaning and scope of Banking with functions of Banks and their role into banking.</p> <p>CO2: familiarize with the operations of Banking and various services and benefits.</p> <p>CO3: get an insight of lending operations of banking and causes of NPAs into banking sector.</p> <p>CO4: acquaint with the concept of Insurance through functions and fundamental principles of Insurance.</p> <p>CO5: understand the types of Insurance and Regulatory framework of Insurance.</p>

Paper BC 6.1 (c): MANAGEMENT ACCOUNTING	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand thoroughly the conceptual framework of Management Accounting; different forms of accounting—Financial, Cost and Managerial; types of costs for decision making and cost control; cost control and cost reduction.</p> <p>CO2: understand the concept of marginal cost and marginal costing; preparation of income statements using absorption and variable costing; learning of cost-volume-profit analysis and break-even analysis using mathematical and graphical approaches; and their application in businesses.</p> <p>CO3: understand the concept of relevant cost and make decisions related to different business situations using marginal costing and differential costing techniques.</p> <p>CO4: understand preparation of various types of budgets and budgetary control system as a tool of managerial planning and control; Ability to understand standard costing system as a tool of managerial control; calculation of variances in respect of each element of cost and sales; control ratios.</p> <p>CO5: have basic understanding of techniques of performance measurement such as Responsibility Accounting, Divisional Performance Measurement and Transfer Pricing.</p>
Paper BC 6.1 (d): COMPUTERISED ACCOUNTING SYSTEM	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand Computerized Accounting System environment</p> <p>CO2: create structure of Computerized Accounting System for a business firm</p> <p>CO3: record day to day business transactions in Computerized Accounting System</p> <p>CO4: make necessary tax adjustments while recording business transactions and to generate various Accounting Reports for analysis and decision making</p> <p>CO5: perform verification and audit activities for the voucher entries passed in computerized accounting environment.</p>
Paper BC 6.1 (e): FINANCIAL MARKETS, INSTITUTIONS AND SERVICES	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the meaning and scope of Financial Markets as well as institutions in India.</p> <p>CO2: familiarize the students with the concepts of Money Market and Capital Market.</p> <p>CO3: explain Commercial Banking and its Current developments.</p> <p>CO4: familiarize the students with the concept of Non-Banking Financial Companies (NBFC's).</p> <p>CO5: examine the Financial Services Industry.</p>
Paper BC 6.2 (a): INTERNATIONAL BUSINESS	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the process of globalization, its impact on the evolution and growth of international business and to appreciate the changing dynamics of the diverse international business environment.</p>

	<p>CO2: analyze the theoretical dimensions of international trade and intervention measures adopted; to appreciate the significance of different forms of regional economic integration and to understand the concept of Balance of payment account and its components.</p> <p>CO3: understand the significance of different forms of regional economic integration and to appreciate the role played by various international economic organisations such as the WTO, UNCTAD, IMF and World Bank.</p> <p>CO4: familiarize students with the international financial environment, and get them acquainted with the basic features of the foreign exchange market – its characteristics and determinants.</p> <p>CO5: critically examine the concept and form of foreign direct investment, and to create awareness about emerging issues in international business such as outsourcing and ecological issues.</p>
Paper BC 6.2 (b): FUNDAMENTALS OF INVESTMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1 – acquaint with the Investment Environment and concept of Return & Risk.</p> <p>CO2 – develop the understanding of Bond valuation & role of Credit Rating agencies.</p> <p>CO3 – understand the methods of Equity analysis approaches.</p> <p>CO4 – analyze two securities portfolio using Harry Markowitz model and CAPM, Mutual Funds and Financial derivatives.</p> <p>CO5 – examine investors’ protection framework.</p>
Paper BC 6.2 (c): CONSUMER PROTECTION	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the importance of consumer buying process and to identify the alternatives available to dissatisfied consumers.</p> <p>CO2: learn how to pursue the consumer rights under consumer protection act 1986.</p> <p>CO3: understand the procedure of filing a complaint.</p> <p>CO4: analyse the role of industry regulators in consumer protection.</p> <p>CO5: comprehend the hearings, enquiry and appeal provisions.</p>
Paper BC 6.2 (d): ORGANISATIONAL BEHAVIOR	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the development of organisational behavior and its importance in managing people at the workplace.</p> <p>CO2: understand human behavior as an individual.</p> <p>CO3: appreciate different theories of motivation.</p> <p>CO4: critically evaluate leadership styles and strategies.</p> <p>CO5: understand the importance of organisational culture and learn to deal with change and stress.</p>
OUTCOME FOR SKILL ENHANCEMENT COURSE (SEC)	
Semester III (SEC)	
Paper BC 3.4 (a): COMPUTER APPLICATIONS IN	<p>After completing the course, the student shall be able to:</p> <p>CO1: handle document creation for communication.</p> <p>CO 2: acquire skills to create and make good presentations.</p>

BUSINESS	<p>CO 3: make various computations in the area of accounting and finance and present business data using appropriate charts.</p> <p>CO4: process and analyze the business data and generalize the work sheets for better understanding of the business environment and decision making.</p> <p>CO5: understand and apply the various database concepts and tools in the related business areas.</p>
Paper BC 3.4 (b): CYBER CRIMES AND LAWS	<p>After completing the course, the student shall be able to:</p> <p>CO1: identify cyber risk associated with online activities.</p> <p>CO2: learn safe working in the vertical having varied access points, data sources, network and system related issues, especially in online transactions.</p> <p>CO3: identify the threats attached with using different popular virtual places or platforms.</p> <p>CO4: generate and preserve electronic evidences for personal and professional use.</p> <p>CO5: work in virtual space safely and with business process or products confirming to the regulatory framework and not falling under the ambit of cyber crimes.</p>
Semester IV (SEC)	
Paper: BC 4.4 (a): E-COMMERCE	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the basics of E-commerce, current and emerging business models.</p> <p>CO2: familiarize with basic business operations such as sales, marketing, HR etc. on the web.</p> <p>CO3: enhance the students' skills for designing and developing website.</p> <p>CO4: identify the emerging modes of e-payment.</p> <p>CO5: understand the importance of security, privacy, ethical and legal issues of e-commerce.</p>
Paper BC 4.4 (b): INVESTING IN STOCK MARKETS	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the basics of Investing, the Investment Environment as well as Risk & Return.</p> <p>CO2: learn Indian securities market including the Derivatives Market.</p> <p>CO3: learn EIC framework and conduct Fundamental Analysis.</p> <p>CO4: understand Technical Analysis.</p> <p>CO5: understand the Mutual funds market and learn to Invest in Mutual Funds.</p>
Paper BC 4.4 (c): PERSONAL TAX PLANNING	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the concept of Tax Planning and relevance of residential status to plan the scope of income.</p> <p>CO2: apply critical thinking and problem solving skills to minimize tax liability.</p> <p>CO3: devise tax planning strategy in relation to income from house property and business.</p> <p>CO4: devise tax planning strategies w.r.t. capital gains and income</p>

	<p>from other sources.</p> <p>CO5: understand provisions related to clubbing and certain deductions under Income Tax Act.</p>
Semester V (SEC)	
Paper BC 5.3 (a): ENTREPRENEURSHIP DEVELOPMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the concept of entrepreneurship in the context of Indian economic scenario.</p> <p>CO2: link the individual's capability and strength as a guiding factor towards entrepreneurial orientation and their commitment to act as an agent of social change through entrepreneurial participation.</p> <p>CO3: understand entrepreneurial process for initiating new venture creation.</p> <p>CO4: understand social support system for garnering strength towards entrepreneurial preferences.</p> <p>CO5: understand various dimensions of managing a business enterprise once it is formed.</p>
Paper BC 5.3 (b): PERSONAL FINANCE	<p>After completing the course, the student shall be able to:</p> <p>CO1 - understand the meaning and relevance of financial planning, time value of money & process of financial planning.</p> <p>CO2 - explain the concept of investment planning and its methods.</p> <p>CO3 - examine the concept of personal tax planning.</p> <p>CO4 - analyse insurance planning.</p> <p>CO5 - understand retirement planning.</p>
Semester VI (SEC)	
Paper BC 6.3 (a): ADVERTISING, PERSONAL SELLING AND SALESMANSHIP	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the communication objectives behind advertising and promotions.</p> <p>CO2: understand the various message and media elements in the advertising decisions.</p> <p>CO3: analyse the effectiveness of advertising.</p> <p>CO4: comprehend the importance and role of personal selling.</p> <p>CO5: understand the process of personal selling.</p>
Paper BC 6.3 (b): COLLECTIVE BARGAINING AND NEGOTIATION SKILLS	<p>After completing the course, the student shall be able to:</p> <p>CO1: identify issues in collective bargaining, its significance.</p> <p>CO2: understand the levels, coverage and agreements of collective bargaining.</p> <p>CO3: enable to liaison in negotiations.</p> <p>CO4: differentiate between negotiations, collective bargaining and use of its approaches.</p> <p>CO5: administer the negotiation agreement and handle grievance management.</p>
<p align="center">COURSE OUTCOME FOR GENERIC ELECTIVE (GE) (For Students other than Commerce)</p>	
Semester V (G.E)	
Paper BC 5.4 (a):	<p>After completing the course, the student shall be able to:</p>

HUMAN RESOURCE MANAGEMENT	<p>CO1: Understand different tools used in forecasting and planning human resource needs.</p> <p>CO2: Demonstrate the ability to prepare strategies for acquisition of human resources.</p> <p>CO3: Understand the administrative complexities of providing a full array of benefits to employees and the ways and means of delivering these benefits.</p> <p>CO4: Appreciate the varied initiatives undertaken to maintain human resources.</p> <p>CO5: Understand modern HRM to meet challenges of changing business environment.</p>
Paper BC 5.4 (b): BASICS OF ACCOUNTING	<p>After completing the course, the student shall be able to:</p> <p>CO1: gain an understanding of theoretical framework of accounting.</p> <p>CO2: explain the concept of accounting equation and process.</p> <p>CO3: develop understanding of depreciation and inventory.</p> <p>CO4: develop the skill of preparation of trading and profit and loss account and balance sheet.</p> <p>CO5: state the meaning, objectives and significance of different types of ratios.</p>
Paper BC 5.4 (c): FUNDAMENTALS OF MARKETING	<p>After completing the course, the student shall be able to:</p> <p>CO1: familiarize with the basic concepts and principles of marketing and to develop their conceptual skills to be able to manage marketing operations of a business firm.</p> <p>CO2: discuss and make the students understand the complexities involved in various targeting and positioning decisions.</p> <p>CO3: equip the students to take effective decisions for launching new products and to understand the implications of different pricing strategies.</p> <p>CO4: develop the skills among students to enable them to design the promotion-mix strategies.</p> <p>CO5: make the students aware about the current trends in marketing to enable them to take proactive measures while taking marketing decisions.</p>
Paper BC 5.4 (d): BUSINESS ETHICS AND SUSTAINABILITY	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the essence of business ethics and be able to imbibe it in regular business activities.</p> <p>CO2: to relate the social responsibility of business as part of strategy for long term survival of business.</p> <p>CO3: realize that how the concerns of corporate governance can be devastating for business survival.</p> <p>CO4: understand the role of business in sustainable development and corporate social responsibility.</p> <p>CO5: recognize the Global Reporting Initiatives and its challenges.</p>
Semester VI (G.E)	
Paper BC 6.4 (a): ENTREPRENEURSHIP	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand entrepreneurship as volition in context of India.</p>

DEVELOPMENT	<p>CO2: gather knowledge and ideas on the existing support system for entrepreneurial orientation.</p> <p>CO3: understand enterprise formation process for gaining ideas as to creation of an enterprise for pursuing a career.</p> <p>CO4: understand of requirement of post-enterprise creation for effective operation of the business.</p> <p>CO5: gain knowledge on available growth strategies for implementing effective suitable strategy for expansion and growth.</p>
Paper BC 6.4 (b): TRAINING AND DEVELOPMENT	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand the learning environment of a firm.</p> <p>CO2: identify the various inputs that should go into any training Programme.</p> <p>CO3: understand the role of development officers.</p> <p>CO4: understand the need and significance of evaluation of training and development programmes.</p> <p>CO5: recognize the mechanism of career development programmes.</p>
Paper BC 6.4 (c): FINANCE FOR NON- FINANCE EXECUTIVES	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand Investment Environment and concept of Return & Risk.</p> <p>CO2: analyze Bond valuation & role of Credit Rating agencies.</p> <p>CO3: examine Equity analysis approaches.</p> <p>CO4: develop insights in to two securities portfolio using Harry Markowitz model and understand CAPM.</p> <p>CO5: familiarize with Investors' protection framework.</p>

B.A. (Prog.) Commerce Based Papers under CBCS

ENTREPRENEURSHIP AND SMALL BUSINESS

FOR B.A. (PROGRAMME)	
PROGRAMME SPECIFIC OUTCOME	The new curriculum of Commerce based courses in BA (prog.) is aimed at enabling students to not only seek but also create knowledge, become industry-ready and achieve personal happiness while simultaneously contributing effectively to society.
COURSE OUTCOME	B.A. (Prog.) : 1ST YEAR (PAPERWISE)
SEMESTER -I	
Fundamentals of Business Organisation	CO1: understand the relationship between business and the environment. CO2: analyze the environmental factors affecting business with special reference to SWOT analysis. CO3: learn about various forms of business organisations. CO4: explore the principles of business management. CO5: appreciate the functions of management.
SEMESTER –II	
Fundamentals of Entrepreneurship	After completing the course, the student shall be able to: CO1: understand entrepreneurship and its process. CO2: gain knowledge on the existing socio-economic support system for promotion of entrepreneurship. CO3: link the individual's capability and strength as a guiding force towards entrepreneurial orientation and their commitment to act as an agent of social change through entrepreneurial participation. CO4: motivate himself towards entrepreneurial desire leading to selection of entrepreneurship as a career. CO5: understand entrepreneurial process for initiating new venture creation.
COURSE OUTCOME	B.A. (Prog.) : 2nd YEAR (PAPERWISE)
SEMESTER -III	
Feasibility Study and Business Plan	After completing the course, the student shall be able to: CO1: understand how a business idea is generated by analyzing all the interplaying factors. CO2: gain know-how of conducting a feasibility study. CO3: explore entrepreneurial opportunities in contemporary business environment. CO4: learn the concept and implementation of a business plan. CO5: learn the significance of Business Planning
SEMESTER -IV	
Managerial Aspects of Small Business:	After completing the course, the student shall be able to: CO1: explore the managerial roles and operations in small

Operations, Office, Accounting and Functional	businesses. CO2: understand theoretical and practical aspect of funds flow statement, cash flow statement and integrated ratio analysis. CO3: gain basic awareness of manual and computerized office systems and procedures. CO4: understand the applicability of management of cash, receivables and inventory in real life. CO5: understand the concept and application of product life cycle and learn about entrepreneurial self-renewal and succession planning and its utility in business operations.
COURSE OUTCOME	B.A. (Prog.) : 3rd YEAR (PAPERWISE)
DSE SEMESTER -V	
DSE Paper 5(a): Management of Small Business Enterprises	After completing the course, the student shall be able to: CO1: understand entrepreneurial style of management CO2: analyze the significance of having appropriate capital structure mix in the organisation CO3: construct an influential marketing plan CO4: realize the significance of having right mix of employees in the organisation CO5: understand the process of planning for management succession.
DSE Paper 5(b): Evolution of Policy & Institutional Framework	After completing the course, the student shall be able to: CO1: gain knowledge on the evolution of government policy towards small enterprise sector CO2: understand various policies with reference to small enterprises CO3: understand available institutional support system for promotion of small scale sector CO4: understand the Policy framework for entrepreneurship and small business CO5: review the Non-Governmental Initiative in Entrepreneurial Promotion
SEMESTER -VI	
DSE Paper 6(a): Social Entrepreneurship	After completing the course, the student shall be able to: CO1: have enhanced knowledge horizon in the sphere of social issues having propensity for business opportunities. CO2: identify new non-traditional business format that helps in attainment of sustainable business development. CO3: understand the efforts of both governmental and non-governmental organisation towards promotion of social entrepreneurs. CO4: understand cases of social entrepreneurship so as to have an insight in to the societal roles in the promotion of social entrepreneurship.

	CO5: review the success and failure stories on entrepreneurship.
DSE Paper 6(b): Contemporary Policy & Institutional Framework Duration: 3 hrs. Marks: 100 Credits	After completing the course, the student shall be able to: CO1: know about legal framework governing MSMEs. CO2: gain knowledge about government support system for entrepreneurial options. CO3: be well-versed with the changing face of MSME in the light of liberalized economic policy. CO4: understand the working of promotional programmes for SMEs. CO5: gain knowledge of marketing and financial support system.
COURSE OUTCOME	B.A. (Prog.) : SKILL ENHANCEMENT COURSE (SEC)
SEMESTER III	
(SEC) PAPER 3(a): Computer Applications in Business	After completing the course, the student shall be able to: CO1: understand the basics of computer systems, its fundamentals. CO2: understand the components of computer system CO3: acquire the knowledge and use of word processor, spreadsheet and power point CO4: develop understanding about the usage and analysis of manual as well as online data in the IT platform. CO5: acquire the knowledge and hands on experience working in spreadsheet program and hands on practice for presentation of power point report.
(SEC) PAPER 3(b): Cyber Crimes and Laws	After completing the course, the student shall be able to: CO1: identify cyber crimes associated in online activities CO2: work in the vertical having varied access points, data sources, network and system related issues, especially in online transactions. CO3: generate and preserve electronic evidences for personal and professional use. CO4: work in virtual space safely CO5: understand business process or products not falling under the ambit of cyber crimes
SEMESTER IV	
(SEC) PAPER 4(a): E-Commerce	After completing the course, the student shall be able to: CO1: comprehend the foundation of e-commerce, current and emerging business models. CO2: recognize the dynamic of website designing for online business. CO3: find out various components of internet information technology structure. CO4: recognize how to meet the needs of the website visitors. CO5: understand the importance of security, privacy, ethical and legal issues of e-commerce.
(SEC) PAPER 4(b): Investing in Stock	After completing the course, the student shall be able to: CO1: acquaint with the Investment Fundamentals of Equity shares,

Markets	<p>IPO/FPO & Bonds</p> <p>CO2: understand online trading of stocks, Analysis of the company, the Principles of investing</p> <p>CO3: perform Comparative analysis of companies, Stock valuations</p> <p>CO4: Learn to Invest in Mutual Fund</p> <p>CO5: understand Derivatives: Instruments & Markets</p>
SEMESTER –V	
(SEC) PAPER 5(a): Entrepreneurship	<p>After completing the course, the student shall be able to:</p> <p>CO1: understand entrepreneurship as volition in context of India</p> <p>CO2: gather knowledge and ideas on the existing support system for entrepreneurial orientation</p> <p>CO3: understand enterprise formation process for gaining ideas</p> <p>CO4: understand requirements of post-enterprise creation for effective operations of the business</p> <p>CO5: gain knowledge on available growth strategies for implementing effective suitable strategy for expansion and growth</p>
(SEC) PAPER 5(b): SEMESTER –V Advertising	<p>After completing the course, the student shall be able to:</p> <p>CO1: learn the concepts and techniques of advertising used in marketing</p> <p>CO2: understand the major media decisions, media choice and scheduling.</p> <p>CO3: comprehend various appeals and models used by the marketers for promoting their brands in the market.</p> <p>CO4: measure advertising effectiveness with pre and post testing techniques.</p> <p>CO5: know organisational arrangements for advertising in India.</p>
SEMESTER –VI	
(SEC) PAPER 6(a): Personal Selling & Salesmanship	<p>After completing the course, the student will be able to:</p> <p>CO1: explain the concepts of personal selling, roles and opportunities for sales persons.</p> <p>CO2: understand the theories, models and approaches of selling.</p> <p>CO3: comprehend the meaning of motivation in the context of personal selling.</p> <p>CO4: describe the role of a salesperson in entire personal selling process in order to develop a customer oriented attitude in selling.</p> <p>CO5: learn various sales reports and ethical issue in selling.</p>
SEMESTER –VI	
(SEC) PAPER 6(b): Collective Bargaining and Negotiation Skills	<p>After completing the course, the student shall be able to:</p> <p>CO1: identify issues in collective bargaining, its significance.</p> <p>CO2: understand the levels, coverage and agreements of collective bargaining.</p> <p>CO3: enable to liaison in negotiations</p> <p>CO4: recognise the skills required for efficient negotiations.</p> <p>CO5: administer the negotiation agreement and handle grievance</p>

	management
COURSE OUTCOME	B.A. (Prog.) : GENERIC ELECTIVE (GE) (For Students other than Commerce)_
SEMETER V	
(GE) PAPER 5: Modern Business Organisation	After completing the course, the student shall be able to: CO1: understand the concept underlying businesses and objectives thereof CO2: realize the relevance of different types of organisational structure CO3: analyze different forms of business organisations CO4: evaluate the emerging modes of business CO5: understand the emerging modes of business
SEMETER VI	
(GE) PAPER 6: Business Management	After completing the course, the student shall be able to: CO1: understand the evolution of management and its significance CO2:comprehend management's four functions: planning, organizing, leading, and controlling CO3: understand the role of motivation in business CO4: appreciate the changing dynamics of management practice CO5: understand the controlling and contemporary issues in management

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

SUBJECT: Computer Science for Honours

SUBJECT: Computer Science for Honours	
PROGRAMME OUTCOME	<p>PO1: To develop theoretical foundations in computer science to build computational thinking, analytical, and problem solving skills.</p> <p>PO2: To builds a base for entry level jobs in information technology and prepares the students for higher studies in the area of Computer Science/Applications</p> <p>PO3: To produce skilled graduates with a creative mind-set who can recognize a computational problem either in IT industry or society, and develop effective solutions.</p> <p>PO4: Understanding the needs of society and societal obligations are instilled in courses related to AI and Information security.</p> <p>PO5: Student will learn about ICT and ICT based problem solving tools and techniques for mathematical as well as ethical issues.</p>

PROGRAMME SPECIFIC OUTCOME For Computer Science Honours	<p>PSO1: Ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.</p> <p>PSO2: Ability to design, implement, and evaluate a computer-based system, process, component, or program to solve the given problem.</p> <p>PSO3: Ability to communicate effectively through oral and written means.</p> <p>PSO4: Ability to work in a team to achieve a common goal.</p>
COURSE OUTCOME FOR Computer Science Honours 1ST YEAR (PAPERWISE)	
Semester I	
Programming Fundamentals using C++	<p>This course will enable the students to:</p> <p>CO1: Explain significance of object oriented paradigm.</p> <p>CO2: Solve programming problems using object oriented features.</p> <p>CO3: Handle external files as well as exceptions.</p> <p>CO4: Reuse classes to create new classes.</p> <p>CO5: Handle exceptions in programs.</p>
Computer System Architecture	<p>This course will enable the students to:</p> <p>CO1: Design Combinational Circuits using basic building blocks. Simplify these circuits using</p> <p>CO2: Boolean algebra and Karnaugh maps. Differentiate between combinational circuits and sequential circuits.</p> <p>CO3: Represent data in binary form, convert numeric data between different number systems and perform arithmetic operations in binary.</p> <p>CO4: Determine various stages of instruction cycle and describe interrupts and their handling.</p> <p>CO5: Explain how CPU communicates with memory and I/O devices.</p> <p>CO6: Simulate the design of a basic computer using a software tool.</p>
Semester II	
Programming in JAVA	<p>This course will enable the students to:</p> <p>CO1: Implement Exception Handling and File Handling.</p> <p>CO2: Implement multiple inheritance using Interfaces.</p> <p>CO3: Logically organize classes and interfaces using packages.</p> <p>CO4: Use AWT and Swing to design GUI applications.</p>
Discrete Structure	<p>The course will enable the students to:</p> <p>CO1: Define mathematical structures (relations, functions, sequences,</p>

	<p>series, and graphs) and use</p> <p>CO2: them to model real life situations.</p> <p>CO3: Understand (trace) and construct simple mathematical proofs using logical arguments.</p> <p>CO4: Solve class room puzzles based on counting principles.</p> <p>CO5: Compare functions and relations with respect to their growth for large values of the input.</p>
COURSE OUTCOME FOR	
2ND YEAR (PAPERWISE)	
Semester III	
Data Structures	<p>This course will enable the students to:</p> <p>CO1: Implement and empirically analyse linear and non-linear data structures like Arrays, Stacks,</p> <p>CO2: Queues, Lists, Trees, Heaps and Hash tables as abstract data structures. (RBT L2/3)</p> <p>CO3: Write a program, choosing a data structure, best suited for the application at hand. (RBT L3/4)</p> <p>CO4: Re-write a given program that uses one data structure, using a more appropriate/efficient data</p> <p>CO5: structure (RBT L4)</p> <p>CO6: Write programs using recursion for simple problems. Explain the advantages and disadvantages of recursion.(RBT L2/L3)</p> <p>CO7: Identify Ethical Dilemmas.</p>
Operating System	<p>The course will enable the students to:</p> <p>CO1: Implement multiprogramming, multithreading concepts for a small operating system.</p> <p>CO2: Create, delete, and synchronize processes for a small operating system.</p> <p>CO3: Implement simple memory management techniques.</p> <p>CO4: Implement CPU and disk scheduling algorithms.</p> <p>CO5: Use services of modern operating system efficiently</p> <p>CO6: Implement a basic file system.</p>
Computer Networks	<p>The course will enable the students to:</p> <p>CO1: Describe the hardware, software components of a network and their interrelations.</p> <p>CO2: Compare OSI and TCP/IP network models.</p> <p>CO3: Describe, analyze and compare different data link, network, and transport layer protocols.</p> <p>CO4: Design/implement data link and network layer protocols in a simulated networking environment.</p>
Semester IV	

Design and Analysis of Algorithms	<p>The course will enable the students to:</p> <p>CO1: Given an algorithm, identify the problem it solves.</p> <p>CO2: Write algorithms choosing the best one or a combination of two or more of the algorithm design techniques: Iterative, divide-n-conquer, Greedy, Dynamic Programming using appropriate data structures.</p> <p>CO3: Write proofs for correctness of algorithms.</p> <p>CO4: Re-write a given algorithm replacing the (algorithm design) technique used with a more appropriate/efficient (algorithm design) technique.</p>
Software Engineering	<p>The course will enable the students to:</p> <p>CO1: Analyse and model customer's requirements and model its software design.</p> <p>CO2: Use suitable software model for the problem at hand.</p> <p>CO3: Estimate cost and efforts required in building software.</p> <p>CO4: Analyse and compute impact of various risks involved in software development.</p> <p>CO5: Design and build test cases, and to perform software testing.</p>
Database Management Systems	<p>The course will enable the students to:</p> <p>CO1: Describe major components of DBMS and their functions</p> <p>CO2: Model an application's data requirements using conceptual modelling tools like ER diagrams</p> <p>CO3: and design database schemas based on the conceptual model.</p> <p>CO4: Write queries in relational algebra / SQL</p> <p>CO5: Normalize a given database schema to avoid data anomalies and data redundancy.</p> <p>CO6: Describe the notions of indexes, views, constraints and transactions.</p>
COURSE OUTCOME FOR 3RD YEAR (PAPERWISE)	
Semester V	
Internet Technologies	<p>The course will enable the students to:</p> <p>CO1: Describe Internet, its architecture, services and protocol.</p> <p>CO2: Implement a simple search engine.</p> <p>CO3: Implement a web crawler.</p> <p>CO4: Use javascript technologies to make a website highly responsive, more efficient and user friendly</p>
Theory of Computation	<p>The course shall enable students to:</p> <p>CO1: Design a finite automaton, pushdown automaton or a Turing machine for a problem at hand.</p>

	<p>CO2: Apply pumping lemma to prove that a language is non-regular/non-context-free.</p> <p>CO3: Describe limitations of a computing machine.</p>
DSE-1 (i): Data Analysis and Visualization	<p>The course will enable the students to:</p> <p>CO1: Use data analysis tools in the pandas library.</p> <p>CO2: Load, clean, transform, merge and reshape data.</p> <p>CO3: Create informative visualization and summarize data sets.</p> <p>CO4: Analyze and manipulate time series data.</p> <p>CO5: Solve real world data analysis problems.</p>
DSE-1 (ii): System Programming	<p>The course will enable the students to:</p> <p>CO1: Describe the working of assemblers and compilers.</p> <p>CO2: Use Lex/ Yacc for building basic compiler.</p> <p>CO3: Develop a two pass Assemblers.</p> <p>CO4: Describe the role of the loaders, linkers and relocatable programs.</p>
DSE-1 (iii): Combinatorial Optimization	<p>After completion of this paper, student will be able to:</p> <p>CO1: Model problems using linear and integer programs</p> <p>CO2: Apply polyhedral analysis to develop algorithms for optimization problems</p> <p>CO3: Use the concept of duality for design of algorithms</p>
DSE-2 (i): Digital Image Processing	<p>This course will enable the students to:</p> <p>CO1: Describe the roles of image processing systems in a variety of applications;</p> <p>CO2: Write programs to read/write and manipulate images: enhancement, segmentation, and compression, spatial filtering.</p> <p>CO3: Develop Fourier transform for image processing in frequency domain.</p> <p>CO4: Evaluate the methodologies for image segmentation, restoration</p>
DSE-2 (ii): Microprocessors	<p>After the course, the student will be able to:</p> <p>CO1: Describe the internal architecture of Intel microprocessors</p> <p>CO2: Define and implement interfaces between the microprocessor and the devices.</p> <p>CO3: Write assembly language programs</p>
Semester VI	
Artificial Intelligence	<p>The completion of the course will enable the students to:</p> <p>CO1: Identify problems that are amenable to solution by specific AI methods</p> <p>CO2: Represent knowledge in Prolog and write code for drawing inferences.</p> <p>CO3: Identify appropriate AI technique for the problem at hand</p> <p>CO4: Compare strengths and weaknesses of different artificial</p>

	<p>Intelligence techniques.</p> <p>CO5: Sensitive towards development of responsible Artificial Intelligence.</p>
Computer Graphics	<p>The completion of the course will enable the students to:</p> <p>CO1: Describe Standard raster and vector scan devices as well as Graphical Input and output devices</p> <p>CO2: Implement algorithms for drawing basic primitives such as line, circle and ellipse.</p> <p>CO3: Implement algorithms for line clipping and polygon clipping and filling.</p> <p>CO4: Implement a 3D object representation scheme and carry out 2D and 3D Transformation, 3D projections.</p> <p>CO5: Implement visible surface determination algorithms, Illumination models and surface rendering methods, color models.</p> <p>CO6: Implement a simple computer animation algorithm</p>
DSE-3 (i): Information Security	<p>On completion of this course, the student will be able to:</p> <p>CO1: Identify the major types of threats to information security</p> <p>CO2: Describe the role of cryptography in security</p> <p>CO3: Select appropriate error-detection and error-correction methods for an application</p> <p>CO4: Discuss the strengths and weaknesses of private and public key crypto systems</p> <p>CO5: Describe malwares and memory exploits</p> <p>CO6: Discuss the need for security in IoT</p>
DSE-3 (ii): Data Mining	<p>This course will enable the students to:</p> <p>CO1: Pre-process the data, and perform cleaning and transformation.</p> <p>CO2: Apply suitable classification algorithm to train the classifier and evaluate its performance.</p> <p>CO3: Apply appropriate clustering algorithm to cluster data and evaluate clustering quality</p> <p>CO4: Use association rule mining algorithms and generate frequent item-sets and association rules</p>
DSE-3 (iii): Advanced Algorithms	<p>The course will empower the student to:</p> <p>CO1: Implement and empirically analyze advanced data-structures like tries, suffix trees.</p> <p>CO2: Apply amortized analysis.</p> <p>CO3: Develop more sophisticated algorithms using techniques like divide and conquer, dynamic</p> <p>CO4: programming, greedy strategy, and augmentation</p> <p>CO5: Prove that certain problems are too hard to admit fast solutions.</p> <p>CO6: Develop algorithms using backtracking for the hard problems.</p>
DSE-4 (i): Machine	<p>This course will enable the students to:</p>

Learning	CO1: Differentiate between supervised and unsupervised learning tasks. CO2: Differentiate between linear and non-linear classifiers. CO3: Describe theoretical basis of SVM CO4: Implement various machine learning algorithms learnt in the course.
DSE-4 (ii): Deep Learning	This course will enable the students to: CO1: Describe the feed-forward and deep networks. CO2: Design single and multi-layer feed-forward deep networks and tune various hyper-parameters. CO3: Implement deep neural networks to solve a problem CO4: Analyse performance of deep networks.
DSE-4 (iii): Unix Network Programming	The course will enable the students to: CO1: Describe and analyse the various Internet Transport layer protocols used in TCP/IP AND UDP. CO2: Comprehend the concepts and structures of both TCP based connection-oriented and UDP based connection-less client server applications. CO3: Write various real-life client-server applications using socket programming. CO4: Modify, maintain and extend the present internet client-server applications and write any new type of internet applications to suit the current needs of Internet users.
DSE-4 (iii): Project Work/ Dissertation Other	The course will enable the students to: CO1: To develop a project plan based on informal description of the project. CO2: Implement the project as a team. CO3: Write a report on the project work carried out by the team and defend the work done by the team collectively. CO4: Present the work done by the team to the evaluation committee.
Skill Enhancement Course	
SEC-1: a) Web Design and Development	This course will enable the students to: CO1: Design and develop a website CO2: Use Front end technologies like HTML, CSS and JavaScript CO3: Use backend technologies like PHP and MySQL CO4: Work on platforms like WAMP/XAMP/LAMP
SEC-1: b) Programming in Python	After studying this course the student will be able to: CO1: Develop, document, and debug modular python programs to solve computational problems. CO2: Select a suitable programming construct and data structure for a situation.

	CO3: Use built-in strings, lists, sets, tuples and dictionary in applications. CO4: Define classes and use them in applications. CO5: Use files for I/O operations..
SEC-2: a) Android Programming	After studying this course the student will be able to: CO1: Describe characteristics of Android operating system CO2: Describe components of an android applications CO3: Design user interfaces using various widgets, dialog boxes, menus CO4: Define interaction among various activities/applications using intents, broadcasting, services CO5: Develop Android applications that require database handling
SEC-2: b) Introduction to R Programming	After studying this course the student will be able to: CO1: Develop an R script and execute it CO2: Install, load and deploy the required packages, and build new packages for sharing and reusability CO3: Extract data from different sources using API and use it for data analysis CO4: Visualize and summarize the data CO5: Design application with database connectivity for data analysis
Generic Elective	
Semester I	
GE-1: Programming using Python	This course will enable the students to: CO1: Describe the components of a computer and notion of an algorithm. CO2: Apply suitable programming constructs and built-in data structures to solve a problem. CO3: Develop, document, and debug modular python programs. CO4: Use classes and objects in application programs and visualize data.
Semester II	
GE-2: Database Management System	After completion of this paper, the students will be able to: CO1: Describe the features of database management systems. CO2: Differentiate between database systems and file systems. CO3: Model an application's data requirements using conceptual modelling tools like ER diagrams and design database schemas based on the conceptual model. CO4: Write queries in relational algebra / SQL. CO5: Normalize a given database schema
Semester III	
GE-3: Computer Networks	This course will enable the students to: CO1: State the use of computer networks and different network

	<p>topologies.</p> <p>CO2: Distinguish between LAN, MAN, WAN, and between Intranet, Extranet and Internet.</p> <p>CO3: Compare OSI and TCP/IP architectures</p> <p>CO4: Enumerate different transmission media and describe the use of each of them.</p> <p>CO5: Design web pages using HTML.</p>
Semester IV	
GE-4: Information Security and Cyber Laws	<p>This course will enable the students to:</p> <p>CO1: Learn, structure, mechanics and evolution of various crime threats</p> <p>CO2: Learn to protect information systems from external attacks by developing skills in enterprise security, wireless security and computer forensics.</p> <p>CO3: Analyse the risks involved while sharing their information in cyber space and numerous related solutions like sending protected and digitally signed documents</p> <p>CO4: Insights of ethical hacking and usage of password cracking tools</p> <p>CO5: Get an overview of different ciphers used for encryption and decryption.</p>
Generic Elective for Non Honours Courses	
Semester III	
GE-1: IT Fundamentals	<p>On successful completion of this course, students will be able to:</p> <p>CO1: Develop a vocabulary of key terms related to the computer and to software program menus, identify the components of a personal computer system and use the interface deftly.</p> <p>CO2: Organize files and documents on storage devices.</p> <p>CO3: Compose, format and edit a word document.</p> <p>CO4: Use spreadsheet for storing data and performing preliminary analysis.</p> <p>CO5: Acquire fundamental knowledge of networking and distinguish between different types of networks.</p> <p>CO6: Acquire knowledge of internet applications and use them.</p>
Semester IV	
GE-2: Multimedia and Web Design	<p>On successful completion of the course, students will be able to:</p> <p>CO1: Understand fundamental Web design principles and technologies.</p> <p>CO2: Understand the detailed design plan required to create a successful Web site that considers audience needs, accessibility features, and various technical issues.</p> <p>CO3: Understand the coverage of ownership, permissions, and copyright issues.</p> <p>CO4: Incorporate text, images, animation, sound, and video into Web pages.</p> <p>CO5: Create a website with popular multimedia authoring tools, such as Macromedia Flash.</p>

Semester V	
GE-3: Data Science using R	On successful completion of the course, students will be able to: CO1: Create effective solutions to data analysis challenges. CO2: Effectively organize and manage data science projects. CO3: Analyse problems and identify solutions. CO4: Communicate data science problems, methods, and findings effectively, visually, and in writing.
Semester VI	
GE-4: Data Science using Python	After completion of the course, students will be able to: CO1: Analyse and solve data science problems in real world projects. CO2: Effectively organize and manage data sets for data science projects. CO3: Use Python packages to perform statistical analysis of given dataset. CO4: Display data in suitable visual form.

SUBJECT: Computer Science for Physical Sciences

SUBJECT: Computer Science for Physical Sciences	
PROGRAMME OUTCOME	PO1: To develop the ability to think critically, logically and analytically. PO2: To develop computational thinking, analytical, and problem solving skills. PO3: It covers core computer science topics and offers electives so that students can apply these skills while studying subjects like Maths, Physics, Chemistry etc. PO4: it will lays down the foundation for higher studies in the field of Computer Science/Applications. PO5: It will help students in making an informed decision regarding the goals that they wish to pursue in further education and life, at large
PROGRAMME SPECIFIC OUT COME For Computer Science in Physical Science	PSO1: To attain understanding of computer systems, their applications and fundamentals. PSO2: To develop ability to apply knowledge of computing to solve computational problems. PSO3: To analyze a problem, and identify the computing requirements appropriate to its solution. PSO4: To design, implement, and evaluate a computer-based system, process or program to meet the desired needs.

	PSO5: To communicate effectively with a range of audiences
COURSE OUTCOME FOR Computer Science in Physical Science	
1ST YEAR (PAPERWISE)	
Semester I	
Problem Solving using Computers	<p>This course will enable the students to:</p> <p>CO1: Describe the components of a computer and the notion of an algorithm.</p> <p>CO2: Apply suitable programming constructs and data structures to solve a problem.</p> <p>CO3: Develop, document, and debug modular python programs.</p> <p>CO4: Use classes and objects in application programs.</p> <p>CO5: Use files for I/O operations.</p>
Semester II	
Database Management Systems	<p>This course will enable the students to:</p> <p>CO1: Use database management system to manage data.</p> <p>CO2: Create entity relationship diagrams for modeling real-life situations and design the database schema.</p> <p>CO3: Use the concept of functional dependencies to remove data anomalies and arrive at normalized database design.</p> <p>CO4: Write queries using relational algebra and SQL.</p>
COURSE OUTCOME FOR	
2ND YEAR (PAPERWISE)	
Semester III	
Operating Systems	<p>This course will enable the students to:</p> <p>CO1: Understand the rationale behind the current design and implementation decisions in modern operating Systems by considering the historic evolution.</p> <p>CO2: Identify modules of the operating systems and learn about important functions performed by operating system as resource manager.</p> <p>CO3: Use the OS in a more efficient manner.</p>
Semester IV	
Computer System Architecture	<p>The course will enable the students to:</p> <p>CO1: Design combinational circuits using basic building blocks. Simplify these circuits using Boolean Algebra and Karnaugh maps.</p>

	CO2: Differentiate between combinational circuits and sequential circuits CO3: Represent data in binary form, convert numeric data between different number systems and perform arithmetic operations in binary. CO4: Determine various stages of instruction cycle, various instruction formats and instruction set. CO5: Describe interrupts and their handling. CO6: Explain how CPU communicates with memory and I/O devices.
Skill Enhancement Paper Semester III	
SEC-1: a) Data Analysis using Python Programming	The course will enable the students to: CO1: Develop a python script for data analysis and execute it. CO2: Install, load and deploy the required packages. CO3: Clean and prepare the data for accurate analysis. CO4: Analyse the data stored in files in different formats. CO5: Experiment with data visualization methods.
SEC-1: b) Introduction to R Programming	The course will enable the students to: CO1: Develop an R script for data analysis and execute it. CO2: Install, load and deploy the required packages. CO3: Analyse the data stored in files in different formats. CO4: Identify suitable data visualization and exploration methods to answer a business question. CO5: Interpret the results of analysis.
Skill Enhancement Paper Semester IV	
SEC-2: a) Programming in C++	The course will enable the students to: CO1: Solve simple programming problems using iteration and selection, and basic constructs: structures, arrays and functions. CO2: Create classes and their objects and use access specifiers for data hiding depicting advantage of Abstraction. CO3: Construct classes for code reusability depicting advantage of Inheritance. CO4: Implement Function Overloading depicting advantage of Polymorphism. CO5: Create file, read/write from/to files.
SEC-2: b) Programming in Java	The course will enable the students to: CO1: Develop and execute Java programs using iteration and selection. CO2: Create classes and their objects. CO3: Implement OOPS concepts to solve problems using JAVA

**COURSE OUTCOME FOR
3RD YEAR (PAPERWISE)**

Semester V

DSE-1 (i): Data Structures

The course will enable the students to:

- CO1: Demonstrate a thorough understanding of the behaviour of basic data structures.
- CO2: Implement data structures efficiently in programming language C++.
- CO3: Demonstrate an understanding of recursion by applying recursive techniques to solve problems.

DSE-1 (ii): Digital Image Processing

The course shall enable students to:

- CO1: Describe general terminology of Digital Image Processing and the roles of image processing systems in a variety of applications.
- CO2: Describe the basic issues and the scope (or principal applications) of image processing.
- CO3: Explain representation and manipulation of digital images, image acquisition, reading, writing, enhancement, displaying and segmentation and image Fourier transform.
- CO4: Examine various types of images, intensity transformations and spatial filtering.

**Skill Enhancement Paper
Semester V**

**SEC-3: a)
Advanced Programming in Java**

On successful completion of the course, students will be able to:

- CO1: Implement Exception Handling and File Handling.
- CO2: Implement multiple inheritance using Interfaces.
- CO3: Logically organize classes and interfaces using packages
- CO4: Use AWT classes to design GUI applications.

SEC-3: b) Web Design using HTML5

On successful completion of this course, the student will be able to:

- CO1: Define the principles and basics of Web page design.
- CO2: Recognize the elements of HTML.
- CO3: Apply basic concepts of CSS.
- CO4: Publish web pages.

Semester VI

DSE-2 (i): Computer Networks

The completion of the course will enable the students to:

- CO1: Understand the basics of data communication.
- CO2: Differentiate between various types of computer networks and their topologies.
- CO3: Understand the difference between the OSI and TCP/IP protocol suit.
- CO4: Explain merits and demerits of different types of communication

	<p>media.</p> <p>CO5: Distinguish between different types of network devices and their functions.</p> <p>CO6: Use IP addressing and understand the need of various application layer protocols.</p>
DSE-2 (ii): Analysis of Algorithms	<p>The completion of the course will enable the students to:</p> <p>CO1: Understand the idea of algorithm analysis.</p> <p>CO2: Understand characteristics of searching and sorting algorithms and compare efficiency of different solutions for an application at hand.</p> <p>CO3: Model simple problems as graphs and solve those using graph algorithms.</p>
DSE-2 (iii): Project Work / Dissertation	<p>The completion of the course will enable the students to:</p> <p>CO1: Develop a project plan based on informal description of the project.</p> <p>CO2: Implement the project as a team.</p> <p>CO3: Write a report on the project work carried out by the team and defend the work done by the team collectively.</p> <p>CO4: Present the work done by the team to the evaluation committee.</p>
Skill Enhancement Paper Semester VI	
SEC-4: a) Android Programming	<p>On successful completion of the course, students will be able to:</p> <p>CO1: Describe the design of Android operating system.</p> <p>CO2: Describe various components of Android applications.</p> <p>CO3: Design user interfaces using various widgets, dialog boxes, menus.</p> <p>CO4: Design application with interaction among various activities/applications using intents.</p> <p>CO5: Develop application(s) with database handling.</p>
SEC-4: b) PHP Programming	<p>On successful completion of the course, students will be able to:</p> <p>CO1: Use different data types and control structures in PHP.</p> <p>CO2: Handle arrays and strings in PHP.</p> <p>CO3: Create dynamic interactive web pages with PHP.</p> <p>CO4: Use PHP built-in functions as well as define custom functions.</p> <p>CO5: Perform data validation in PHP.</p> <p>CO6: Manipulate and manage a database using PHP.</p>

SUBJECT: Computer Application for B.A. Programme

SUBJECT: Computer Application for B.A. Programme	
PROGRAMME	PO1: To promotes computer literacy and programming skills so that the students can make effective use of computer technology in their

OUTCOME	<p>courses of study.</p> <p>PO2: The program also builds some basic skills for entry level jobs in information technology.</p> <p>PO3: To introduce the discipline of Computer Applications to the students who wish to either take up entry level jobs in small scale computer industry or use computer technology in study of Humanities.</p> <p>PO4: To attain understanding of computer technology, their applications and fundamentals.</p> <p>PO5: To develop ability to apply knowledge of computing to solve computational problems.</p> <p>PO6: To analyze a problem, and identify the computing requirements appropriate to its solution.</p> <p>PO7: To design, implement, and evaluate a computer-based system, process or program to meet the desired needs.</p>
PROGRAMME SPECIFIC OUTCOME For Computer Application in B.A. Programme	<p>PSO1: Efficiently use Office Automation Tools like word processors, spreadsheets and presentation tools.</p> <p>PSO2: Develop simple programming constructs in a Programming Language (eg. Python)</p> <p>PSO3: Use multimedia authoring tools to design small applications using sound, audio, and video/animation.</p> <p>PSO4: Develop simple websites using HTML/DHTML, CSS and JavaScript programming codes.</p> <p>PSO5: Handle Computer Networks, modems and routers, and efficiently use Internet</p> <p>PSO6: Develop and implement a simple project based on case studies.</p>
Course Outcome For Computer Application in B.A. Programme 1st Year (Paperwise)	
Semester I	
Computer Fundamentals	<p>On successful completion of this course, a student will be able to:</p> <p>CO1: Handle a computer system for day to day use.</p> <p>CO2: Enumerate different types of input/ output devices and types of memory.</p> <p>CO3: Perform basic arithmetic operations using different number systems including binary arithmetic.</p> <p>CO4: Differentiate between system and application software.</p> <p>CO5: Prepare documents / spreadsheets.</p>

Semester II	
Database Management Systems	<p>On successful completion of this course, a student will be able to:</p> <p>CO1: Differentiate between database systems and file systems.</p> <p>CO2: Describe the features of database management systems.</p> <p>CO3: Analyze the problem and arrive at an information model in the form of an ER diagram.</p> <p>CO4: Normalize a database.</p> <p>CO5: Transform an ER model into a relational database schema.</p> <p>CO6: Use SQL for query and data update operations.</p>
Semester III	
Computer Networks and Internet Technologies	<p>On successful completion of this course, a student will be able to:</p> <p>CO1: Enumerate various network topologies and identify situations when different network topologies would be useful.</p> <p>CO2: Distinguish between LAN, MAN, WAN.</p> <p>CO3: Distinguish between Intranet, Extranet and Internet.</p> <p>CO4: Describe client-server architecture.</p> <p>CO5: Enumerate different transmission media and describe the use of each of them.</p> <p>CO6: Design web pages using HTML.</p>
SEC-1A: Word Processing and Presentation Software	<p>On successful completion of this course, a student will be able to:</p> <p>CO1: Create and refine documents using text formatting, tables and graphics.</p> <p>CO2: Use mail merge.</p> <p>CO3: Create macros and templates in documents.</p> <p>CO4: Protect documents.</p> <p>CO5: Create presentations containing transitions and animations. Learn advanced presentation features like custom slide show, call outs and action buttons.</p>
SEC-1B: PHP Programming	<p>On successful completion of this course, a student will be able to:</p> <p>CO1: Write PHP scripts to handle HTML forms.</p> <p>CO2: Write regular expressions including modifiers, operators, and meta-characters.</p> <p>CO3: Write PHP programs that use various PHP library functions, and that manipulate files and directories.</p> <p>CO4: Create a dynamic web site employing server side scripting.</p>
Semester IV	
Multimedia Systems and Applications	<p>On successful completion of this course, a student will be able to:</p> <p>CO1: Enumerate and describe the multimedia components.</p> <p>CO2: Generate, manipulate and use images in multimedia projects using bitmap, vector and 3-D images.</p> <p>CO3: Create basic animations.</p>

SEC-2A: Data Handling using Spreadsheet	On successful completion of this course, a student will be able to: CO1: Perform data analysis and manipulation in a spreadsheet. CO2: Use built-in mathematical functions in a spreadsheet. CO3: Perform what-if analysis using goal seek, asap utility add-ins in spreadsheets. CO4: Sort and filter data. CO5: Protect a spreadsheet
SEC-2B: Web Designing using HTML 5	On successful completion of this course, a student will be able to: CO1: Define the principle and basics of Web page design CO2: Visualize the basic concept of HTML. CO3: Recognize the elements of HTML. CO4: Apply basic concept of CSS. CO5: Publish the web pages.
Semester V	
DSE-1: a) Programming in Java	On successful completion of this course, a student will be able to: 29 CO1: Understand the concepts of object-oriented software design. CO2: Develop, compile and run Java programs using basic programming constructs. CO3: Use object-oriented software design principles like inheritance and polymorphism . CO4: Use visibility modifiers (public, private, protected) to implement appropriate abstraction and encapsulation.
DSE-1: b) Programming in Python	On successful completion of this course, a student will be able to: CO1: Select a suitable programming construct and inbuilt data structure for a situation. CO2: Develop and document modular python programs. CO3: Use classes and objects in application programs.
SEC-3A: Open Source Softwares	On successful completion of this course, a student will be able to: CO1: Install open source software. CO2: Work on an open source operating system like linux, gambas and gimp. CO3: Describe common open source licenses and the impact of choosing a license. CO4: Find open source projects related to a given development problem. CO5: Identify open source alternatives available for a given proprietary software. CO6: Participate in a public open source project/ task.
SEC-3B: Desktop Publishing	On successful completion of this course, a student will be able to: CO1: Write, edit and print documents using word processing and spreadsheet. CO2: Use tools for desktop publishing and would be able to create and design documents with text and graphics like newspaper ads,

	visiting cards, posters etc.
Semester VI	
DSE-2: a) Information Security and Cyber Laws (IS & CL)	On successful completion of this course, a student will be able to: CO1: Enumerate issues in computer security. CO2: Enumerate and describe common forms of attacks. CO3: Describe the importance of security policy in the security framework. CO4: Describe security related terms like cryptography, privacy, steganography. CO5: Describe the need for cyber laws, and important provisions of IT Act.
DSE-2: b) Project Work / Dissertation	On successful completion of this course, a student will be able to: CO1: Develop a project plan based on informal description of the project. CO2: Implement the project as a team. CO3: Write a report on the project work carried out by the team and defend the work done by the team collectively. CO4: Present the work done by the team to the evaluation committee.
SEC-4A: System Administration and Maintenance	On successful completion of the course, a student will be able to: CO1: Distinguish between features of Linux/Unix and windows operating system. CO2: Install/uninstall hardware and software. CO3: Configure system environment. CO4: Troubleshoot network connectivity issues. CO5: Examine system performance issues. CO6: Examine file structure and properties.
SEC-4B: Android Programming	On successful completion of this course, a student will be able to: CO1: Describe various components of an Android application. CO2: Design user interfaces using various widgets, dialog boxes, menus. CO3: Design and implement interaction among various activities/applications using intents. CO4: Develop application(s) that require database handling.
SEC-4C: Data Visualization using R	On successful completion of this course, a student will be able to: CO1: Import/export small data sets in and out of R environment. CO2: Draw different types of plots to aid analysis of datasets. CO3: Identify a suitable technique for analysis data for the given objective. CO4: Interpret and use the results of analysis.

	FOR B.A. (Hons) Economics
PROGRAMME	PO1: Get an understanding of basic economic theory;

OUTCOME	<p>PO2: Learn the mathematical and statistical techniques necessary for a proper understanding of the discipline;</p> <p>PO3: Get an introduction to real world economic issues and problems facing the country and the world;</p> <p>PO4: Gain an understanding of proper policy responses to economic problems;</p> <p>PO5: Get trained to collect primary data and learn sampling techniques;</p> <p>PO6: Learn to use scientific empirical methods to arrive at conclusions about the validity of economic theories;</p> <p>PO7: Get trained in the art of economic modelling.</p>
PROGRAMME SPECIFIC OUT COME	<p>PSO1: The study of Economics as a discipline encourages analytical thinking and a pragmatic approach to problems related to Economics.</p> <p>PSO2: In addition to providing a strong foundation in Economic theory, the focus is on issues specific to the Indian context. The process of rational decision making taught in Economics is of great value, irrespective of the career a person chooses.</p>
COURSE OUTCOME FOR I YEAR	
Semester -I	
Introductory Microeconomics	<p>CO1: The course introduces the students to the first course in economics from the perspective of individual decision making as consumers and producers.</p> <p>CO2: CO2:The students learn some basic principles of microeconomics, interactions of supply and demand, and characteristics of perfect and imperfect markets</p>
Mathematical methods for Economic-1	<p>CO1: The course hones and upgrades the mathematical skills acquired in school and paves the way for the second semester course Mathematical Methods in Economics II.</p> <p>CO2: Collectively, the two papers provide the mathematical foundations necessary for further study of a variety of disciplines</p> <p>CO3: Including economics, statistics, computer science, and finance and data analytics.</p> <p>CO4: The analytical tools introduced in this course have applications wherever optimization techniques are used in business decision-making. These tools are necessary for anyone seeking employment as an analyst in the corporate world.</p> <p>CO5: The course additionally makes the student more logical in making or refuting arguments.</p>
Semester II	
Introductory Macroeconomics	<p>CO1: This course aims to develop the broad conceptual frameworks which will enable students to understand and comment upon real economic issues like inflation, money</p>

	<p>supply, GDP and their interlinkages.</p> <p>CO2: CO2: It will also allow them to critically evaluate various macroeconomic policies in terms of a coherent logical structure</p>
Mathematical methods for Economic-II	<p>CO1: The course provides the mathematical foundations necessary for further study of a variety of disciplines including postgraduate economics, statistics, computer science, and finance and data analytics.</p> <p>CO2: The analytical tools introduced in this course have applications wherever optimization techniques are used in business decision-making for managers and entrepreneurs alike.</p> <p>CO3: These tools are necessary for anyone seeking employment as an analyst in the corporate world.</p>
COURSE OUTCOME FOR II YEAR	
Semester III	
Intermediate Microeconomic-I	<p>CO1: The course trains the students of Economics about the basic elements of consumer theory and production theory and the functioning of perfectly competitive market.</p> <p>CO2: This course aims to give students a solid grasp of microeconomic analysis at the intermediate-level using mathematical techniques where appropriate.</p>
Intermediate Macroeconomic-I	<p>CO1: This course enables students to analyse the macroeconomic performance of various countries using formal analytical tools. It also allows them to evaluate important macroeconomic policies and their implications.</p> <p>CO2: At the end of the course, the student should understand the concept of random variables and be familiar with some commonly used discrete and continuous distributions of random variables.</p> <p>CO3: They will be able to estimate population parameters based on random samples and test hypotheses about these parameters</p>
Statistical methods for economics	<p>CO1: An important learning outcome of the course will be the capacity to analyse statistics in everyday life to distinguish systematic differences among populations from those that result from random sampling.</p>
Semester IV	
Intermediate Microeconomic-II	<p>CO1: CO1: This course helps the students to understand efficiency of markets and the environment where the standard market mechanism fails to generate the desirable outcomes.</p> <p>CO2: CO2: The issues of market imperfection and market failures are important building blocks of this course.</p>
Intermediate Macroeconomic-II	<p>CO1: This course will enable students to combine their knowledge of the working of the macro economy with long run economic phenomena like economic growth, technological</p>

	<p>progress, R&D and innovation.</p> <p>CO2: It will also enable students to understand business cycles and the concomitant role of policies.</p>
Introductory econometrics	<p>CO1: Students will learn to estimate linear models using ordinary least squares and make inferences about population parameters.</p> <p>CO2: They will also understand the biases created through mis-specified models, such as those that occur when variables are omitted.</p>
COURSE OUTCOME FOR II YEAR	
Semester V	
Indian Economy-I	CO1: At the end of the course, a student should be able to understand the development paradigm adopted in India since independence and evaluate its impact on economic as well as social indicators of progress and well being.
Development Economics-I	CO1: This course introduces students to the basics of development economics, with in-depth discussions of the concepts of development, growth, poverty, inequality, as well as the underlying political institutions
Semester VI	
Indian Economy-II	CO1: At the end of the course, a student should be able to understand the role of economic policies in shaping and improving economic performance in agriculture, manufacturing and services
Development Economics-II	<p>CO1: This course teaches the student various aspects of the Indian economy, as well as important themes relating to the environment and sustainable development.</p> <p>CO2: It also introduces them to some issues of globalization.</p>
Discipline Specific Elective	
DSE-I Paper 5(a) Public Economics	<p>CO1: The module aims to introduce students to the main theoretical and empirical concepts in public economics, equip students with a thorough analytical grasp of implications of government intervention for allocation, distribution and stabilization, and familiarise students with the main issues in government revenues and expenditure.</p> <p>CO2: At the end of the module the students should be able to demonstrate their understanding of the public economics.</p> <p>CO3: In some models, the student will be required to deal with simple algebra problems that will help them to better understand these concepts, use diagrammatic analysis to demonstrate and compare the economic welfare effects of various environmental policy options, demonstrate their understanding of the usefulness and problems related to taxation and government expenditure, and demonstrate their critical understanding of public policies.</p>
DSE-I Paper 5(b)	CO1: Students will learn the theoretical basis for techniques

Applied Econometrics	<p>widely used in empirical research and consider their application in a wide range of problems.</p> <p>CO2: The students will learn how to model multi-person decision making in an interactive setting.</p> <p>CO3: They will understand how to formulate different real life situations as games and learn to predict the optimal strategies of players and how the players can exploit strategic situations for their own Benefit.</p>
DSE-I Paper 5(c) Game Theory	<p>CO1: CO1: By analysing the history of industrialisation and economic transition, students will be able to visualise economic development in a historical perspective and assimilate material from a diverse range of opinions.</p> <p>CO2: It will help them to think in an interdisciplinary manner and therefore aid them in jobs where developing and presenting comparative perspectives are key tasks.</p>
DSE-I Paper 5(d) Economic history of India (1850-1950)	CO3:
DSE –II paper 5(a) International Economics	<p>CO1: The module aims to introduce students to the main theoretical and empirical concepts in international trade, equip students with a thorough analytical grasp of trade theory, ranging from Ricardian comparative advantage to modern theories of intra-industry trade, and familiarize students with the main issues in trade policy and with the basic features of the international trading regime.</p> <p>CO2: At the end of the course, the students should be able to demonstrate their understanding of the economic concepts of trade theory.</p> <p>CO3: In some models, the student will be required to deal with simple algebraic problems that will help them to better understand these concepts, use diagrammatic analysis to demonstrate and compare the economic welfare effects of free trade and protection, demonstrate their understanding of the usefulness and problems related to topics in international trade, and demonstrate their critical understanding of trade policies.</p>
DSE –II paper 5(b) Financial Economics	<p>CO1: Students acquire extensive theoretical knowledge in portfolio risk management, capital asset pricing, and the operation of financial derivatives.</p> <p>CO2: The course familiarises students with the terms and concepts related to financial markets and helps them comprehend business news/articles better. The course also helps to enhance a student's understanding of real life investment decisions.</p> <p>CO3: The course has a strong employability quotient given the relatively high demand for skilled experts in the financial</p>

	sector.
DSE –II paper 5(c) Political Economy I	<p>CO1: This course prepares the students to develop critical thinking by exposing them to elements of economic thought, juxtaposing ideas and theoretical structures based largely on original texts and journal articles. CO2: Students learn to assimilate from a diverse range of opinions and crystallize their own thought processes and standpoints. This also helps them to develop advanced writing, presentation and research skills.</p> <p>CO2: It further enables them to comprehend a larger view of the world around us by analysing the existing social and political structures and their links with the economic processes.</p> <p>CO3: It is thus a crucial course, which exposes the social science dimension of economics to the students and also provides them skills to think and analyse in an interdisciplinary manner. The exposure to interdisciplinary thinking further enables the students for pursuing studies in diverse related areas such as development studies, economic sociology, critical geography, gender studies and social work as also for taking up employment in organisations ranging from international development agencies to development NGOs and corporate CSR.</p> <p>CO4: It also prepares the students to face the practical world of work, where economics, business, civil society organisations, social institutions and politics often cohabit in a complex interlinked structure.</p>
DSE-I Paper 6(a) Money and Financial markets	<p>CO1: This allows students to understand current monetary policies and financial market outcomes. It also enables them to critically evaluate policies</p>
DSE-I Paper 6(b) Environment Economic	<p>CO1: The module aims to introduce students to the main theoretical and empirical concepts in environmental economics, equip students with a thorough analytical grasp of environmental policy theory, ranging from externalities to international environmental agreements, and familiarize students with the main issues in environmental valuation and with the basic features of the environmental policy tools.</p> <p>CO2: At the end of the module the students should be able to demonstrate their understanding of the economic concepts of environmental policy.</p> <p>CO3: In some models, the student will be required to deal with simple algebra problems that will help them to better understand these concepts, use diagrammatic analysis to demonstrate and compare the economic welfare effects of various environmental policy options, demonstrate their understanding of the usefulness and problems related to</p>

	environmental valuation, and demonstrate their critical understanding of environmental policies.
DSE-I Paper 6(c) Open Economy Macroeconomics	<p>CO1: The student will know how exchange rates, interest rates and capital movements between currencies are determined within different institutional settings for monetary policy (e.g. inflation targeting versus money supply targeting or exchange rate targeting), how a country's current account balance is determined, or, which amounts to the same, how capital movements between countries are determined, how shocks emanating abroad or in the foreign exchange market affect output, employment, inflation and interest rates, how the effects of changes in fiscal and monetary policy and shifts in private sector behaviour are modified through the foreign exchange markets and foreign trade, the role of cost competitiveness in the determination of economic activity, the different responses to economic shocks in the traded-goods and non-traded goods sectors of the economy, how the effects of policy actions and economic shocks are transmitted from country to country in the world economy, and the merits of different exchange rate systems (fixed versus flexible, monetary unions).</p> <p>CO2: They will learn more about the effects over time as flows accumulate to stocks and as the economy moves towards long-run equilibrium.</p> <p>CO3: At the end of course they will acquire to analyze the effects of macroeconomic events on the future time path of the economy, analyse how forces inherent in the initial state of the economy will tend to change the economy over time, discuss how current and future events may influence the exchange rate through expectations, and come up with policy suggestions and consider their effects over time</p>
DSE-I Paper 6(d) Law and Economics	<p>CO1: This course will familiarise students with the economic approach towards thinking about the law and public policy. Students will come to recognise the law as an important organising force that influences the actions of private citizens as well as government agencies.</p> <p>CO2: Students will also learn how the law can support and, at times conflict with, the functioning of the market and the government, the other two important organising forces of an economy.</p> <p>CO3: The course will enhance critical thinking and an inter-disciplinary approach towards the law, economics, and policymaking. Thereby, the course will help to develop an inter-disciplinary approach and enhance the employability of students.</p>
DSE-II paper 6(a)	CO1: This is a course in applied economics, which will introduce

Economics of health and education	<p>the students to the study of health and education as components of human capital in the framework of economic theory.</p> <p>CO2: The students will learn the role of health and education in human development. They will be able to apply economic theory to understand the demand for health care, market failure in health insurance, economic evaluation of health care programmes and the role of public policy in the healthcare industry.</p> <p>CO3: They will also learn to analyse the returns to education, its role in labor market signalling, and the progress of schooling in India. They will also be exposed to the theories of discrimination.</p>
DSE-II paper 6(b) Political economy II	<p>CO1: : This course exposes the students to the realities of the contemporary world economy and teaches them to develop critical analysis in an integrated and broader political economy framework. It thus enables them to form a more informed view of the world we inhabit by analyzing some of the most contemporary trends and developments from different perspectives.</p> <p>CO2: CO2: It also exposes the students to interdisciplinary skills and written argumentation, and prepares them for a more holistic research framework. The exposure to interdisciplinary thinking further enables the students for pursuing studies in diverse related areas such as development studies, economic sociology, critical geography, gender studies and social work as also for taking up employment in organizations ranging from international development agencies to development NGOs and corporate CSR.</p> <p>CO3: CO3: It also prepares the students to face the practical world of work, where economics, business, civil society organisations, social institutions and politics often cohabit in a complex interlinked structure, and employees are expected to comprehend and synthesize materials from diverse sources and perspectives.</p>
DSE-II paper 6(c) Comparative Economic	<p>CO1: This course analyses key aspects of Indian economic development during the second half of British colonial rule. In doing so, it investigates the mechanisms that linked economic development in India to the compulsions of colonial rule.</p>
OUTCOME of SKILL ENHANCEMENT COURSE(SEC)	
Data Analysis	<p>CO1: The course will use data simulations and publicly available data sources to help students learn about data types, their organization and visual representation.</p> <p>CO2: They will learn how to compute summary statistics and do</p>

	some basic statistical inference.
Research Methodology	CO1: The course imparts skills to undertake data based research. The student enrolling in this course would develop competency in executing sample surveys and would have reasonable exposure to a variety of secondary data sources.
Contemporary Economics issues	CO1: Students will have the capability to understand government policies and will in general be informed participants in economic decision making.
OUTCOMES OF B.A. (Hons.) Economics : Generic Elective	
Introductory Microeconomics	CO1: The course introduces the students to the first course in Economics from the perspective of individual decision making as consumers and producers. CO2: The students learn some basic principles of microeconomics, interactions of supply and demand and characteristics of perfect and imperfect markets.
Introductory Macroeconomic	CO1: This course will allow students to understand the basic functioning of the macroeconomy
Indian Economy	CO1: This course will help students understand the key issues related to the Indian economy. CO2: It will broaden their horizons and enable them to analyze current economic policy thus improving their chances of getting employed, and be more effective, in positions of responsibility and decision making.
Money & Banking	CO3: This course exposes students to the theory and functioning of the monetary and financial sectors of the economy
Economic History of India	CO1: The course exposes the students to understanding the intricacies of India's economic, political and social developments both in the past and present times. CO2: It develops analytical skills, and will be useful in a variety of careers in academics, research, journalism, private sector and government.
Data Analysis	CO1: The course will use data simulations and publicly available data sources to help students learn about data types, their organization and visual representation. CO2: They will learn how to compute summary statistics and do some basic statistical inference.
Indian Economy-II	CO1: Students will have capability to understand government policies and will enable informed participation in economic decision making, thus improving their employment prospects and career advancement.
Economic History of India 1857-1947	CO1: The course develops critical analytical skills and exposes students to understanding the intricacies of India's economic, political and social developments both in the past and present times. CO2: It increases their employability by enhancing their ability to deal with a variety of textual and statistical sources, and to

	draw upon them to construct a coherent argument. CO3: These skills would be useful in a variety of careers in academics, research, journalism and the government
Public Finance	CO1: The module aims to introduce students to the main concepts in public finance, equip students with a thorough analytical grasp of government taxes: direct and indirect taxes, and familiarise students with the main issues in government expenditure. CO2: At the end of the module the students should be able to demonstrate their understanding of the economic concepts of public finances, use diagrammatic analysis to demonstrate and compare the economic welfare effects of various government policy options, and demonstrate their understanding of the usefulness and problems related to government revenues and expenditures.

	FOR B.A. (Hons) Geography
PROGRAMME OUTCOME	PO1: To orient the students towards identification and analysis of various facets of geographic and geographical features and processes. PO2: To develop students' aptitude for acquiring basic skills of carrying out field work. PO3: To facilitate the students to learn skills of map making. PO4: To guide students to learn the science and art of collecting, processing and interpreting the data. PO5: To expose the students to the use of the updated technologies of remote sensing, GNSS, Geographical Information System (GIS) and GI Science.
PROGRAMME SPECIFIC OUTCOME	PSO1: The learning outcome is to prepare the students of BA/BSc Honours degree in Geography, to understand the development of the subject and delve around issues suited to the needs of the contemporary world. It covers a wide range of papers covering various themes and also maintains uniformity of structure across universities in the country. Geography being interdisciplinary in nature integrates learning derived from all basic and applied sciences/social sciences. PSO2: Students of the BA/BSc Honours degree in Geography will learn to use geographic understanding of various sub fields such as physiography, resources, global economic systems, socio- cultural aspects, rural and urban milieu, environmental and disaster studies and mapping methods. PSO3: They are trained to read and interpret maps, prepare transect charts and thematic atlas. PSO4: They are also able to read and analyse weather phenomenon through weather maps and charts.

	<p>PSO5: Students will acquire scientific methodology of data handling, hypothesis generation, testing and analysis.</p> <p>PSO6: After the completion of the course, students will also gain knowledge of various technological applications through study of Remote Sensing and Geographic Information Science.</p> <p>PSO7: The curriculum also provides an opportunity to digitally produce maps and modelling applications.</p> <p>PSO8: The students also learn hand on skills to prepare building disaster plans, community disaster preparedness and also awareness creation.</p> <p>PSO9: They will also develop an understanding of global issues from economic, social, environmental and political perspectives, which has relevance in further studies all across the globe.</p> <p>PSO10: They also develop effective communication skills, team work, travel exposure and zeal of investigation and exploration.</p> <p>PSO11: The learners can greatly contribute to the subject through teaching, research and field oriented studies.</p> <p>PSO12: The students will also be able to pursue a career in spatial planning, sustainable practices, environmental and resource management.</p> <p>PSO13: The geography graduates will be well informed citizens who can play immense role in the civil society too. They will be able to pursue wide range of careers as planners, administrators, academicians, and managers.</p>
COURSE OUTCOME FOR I YEAR	
Semester I	
Geomorphology	<p>CO1: To understand the associations between geomorphologic landforms, concepts and processes.</p> <p>CO2: CO2: To critically evaluate and connect information about geomorphic processes.</p> <p>CO3: CO3: To provide a theoretical and empirical framework for understanding landscape evolution and the characteristics of individual types of geomorphic landscapes.</p> <p>CO4: CO4: understand the functioning of Earth systems in real time and analyze how the natural and anthropogenic operating factors affects the development of landforms</p> <p>CO5: CO5: distinguish between the mechanisms that control these processes</p>
Cartographic Technique(practical)	<p>CO1: Create professional and aesthetically pleasing maps through thoughtful application of cartographic conventions;</p> <p>CO2: CO2: Develop an understanding of the concepts regarding scale, map projections to suit map purposes;</p> <p>CO3: CO3: Better understand the techniques of interpretation of</p>

	<p>topographical and weather maps.</p> <p>CO4: CO4: Recognize the benefits and limitations of some common map projections and their use.</p> <p>CO5: CO5: Understand and perform interpretation of topographical maps and weather maps.</p>
Semester II	
Human Geography	<p>CO1: Various dimensions of human geography and cultural landscape.</p> <p>CO2: Detailed analysis of population growth and distribution.</p> <p>CO3: Understanding of the relationship between population and resource</p> <p>CO4: Detailed exposure of contemporary relevance of cultural landscape</p> <p>CO5: Understanding the settlement pattern and population resource relationship.</p>
Thematic Cartography (Practical)	<p>CO1: Create thematic maps through thoughtful application of Cartographic conventions;</p> <p>CO2: Enhance understanding of the concepts regarding thematic mapping techniques</p> <p>CO3: Better understand preparation and interpretation of thematic maps</p> <p>CO4: Explain how maps work, conceptually and technically and will be able to understand science and art of cartography</p> <p>CO5: Understand and perform interpretation of thematic maps.</p>
COURSE OUTCOME FOR II YEAR	
Semester III	
Climatology	<p>After completing the course, the student shall be able to:</p> <p>CO1: Various dimensions of climatology like structure and composition.</p> <p>CO2: Detailed analysis of global atmospheric pressure and wind system.</p> <p>CO3: Understanding of the concept of oceanic topography</p> <p>CO4: Detailed exposure of climatology and oceanic relief features.</p> <p>CO5: In-depth knowledge of upper atmospheric conditions and cyclonic features.</p> <p>CO6: Understanding the characteristics of climatic regions.</p>
Statistical methods in Geography (Practical)	<p>CO1: To differentiate between qualitative and quantitative information.</p> <p>CO2: To know the nature of various data, different sources and methods of data collection.</p> <p>CO3: To apply sampling methods for data collection.</p> <p>CO4: To classify, summarize and produce various types of data tabulations.</p> <p>CO5: To present data through graphical and diagrammatic formats</p>
Geography of India	<p>CO1: Detailed exposure to the human and physical features of India.</p>

	CO2: CO2: In-depth knowledge of different resource base of India. CO3: Understanding socio-cultural base of India
Semester IV	
Economic geography	CO1: Distinguish to different types of economic activities and their utilities. CO2: Appreciate the factors responsible for the location and distribution of activities. CO3: Examine the significance and relevance of theories in relation to the location of different economic activities.
Environmental Geography	CO1: Detailed exposure of human – environment relationship. CO2: In-depth knowledge of environmental issues in tropical, temperate and polar ecosystems. CO3: Understanding the environmental programmes and policies at local as well as global level
Field work & Research methodology (practical)	CO1: Detailed exposure of new geographical landscape as study area. CO2: In-depth knowledge of different field techniques. CO3: Understanding the field ethics and different tools of field study.
COURSE OUTCOME FOR II YEAR	
Semester V	
Regional planning and Development	After completing the course, the student shall be able to: CO1: Conceptualize the Regional Planning and its theories. CO2: Get the overview of Sustainable Regional Development. CO3: Have sound knowledge to Sustainable Development Policies and Programmes.
Remote Sensing and GIS (practical)	CO1: Explain principles of remote sensing, different satellite systems and sensors. CO2: Perform image pre-processing, enhancement and classification and interpretation of satellite images. CO3: Apply Image preprocessing for land use land cover and urban studies.
Discipline Specific Elective Paper	
DSE-1 Paper 5(a): Population Geography	CO1: This paper would bring an understanding of Population Geography along with relevance of Demographic data. CO2: The students would get an understanding of distribution and trends of population growth in the developed and less developed countries, along with population theories. CO3: The students would get an understanding of the dynamics of population. CO4: An understanding of the implications of population composition in different regions of the world. CO5: An appreciation of the contemporary issues in the field of population studies
DSE-1 Paper 5(b):	CO1: Understand the basic concept of resource development

Resource Geography	CO2: Understand the problems of Land, water, Forest and energy resources. CO3: Assess the issues associated with the Conservation of Development. CO4: Understand the sustainable resources development policies and programmes
DSE-2 Paper 5(a): Urban Geography	CO5: Understand the fundamentals and patterns of urbanization process CO6: Learn the functional classification of cities and central place theories. CO7: Know contemporary problems of Delhi, Mumbai, Kolkata and Chennai.
DSE-2 Paper 5(b): Agriculture Geography	CO1: Conceptualize the agriculture and its determinants. CO2: Get the overview of Indian and World agriculture regions and systems. CO3: Have sound knowledge of agriculture revolutions and food security
Semester VI	
DSE-3 Paper 6(a): Geography of health and Welbeing	CO1: Detailed exposure of health geography and environment. CO2: In-depth knowledge of health risk and exposure. CO3: Understanding the impact of climate change and human health.
DSE-3 Paper 6(b): Political Geography	CO1: Learn the concept of nation and state and geopolitical theories. CO2: CO2: Understand the different dimensions of electoral geography and resource conflicts. CO3: CO3: Have sound knowledge of politics of displacement, focusing on dams and SEZ
DSE-4 Paper 6(a): Hydrology and Oceanography	CO1: Understand the basic components of hydrological cycle and learn best practices of integrated watershed management, CO2: Explain various components of water balance and management of river basins, CO3: Identify different types of soil, distribution and management of soil resources
DSE-4 Paper 6(b): Social Geography	CO1: Understand the peopling process of India CO2: Understand the geographies of welfare and well being. CO3: Understand the social geographies of Inclusion and Exclusion
Outcome in Skill Enhancement Course (SEC)	
(SEC) PAPER 3(a): Remote sensing (practical)	After completing the course, the student shall be able to: CO1: Trace and know evolution of GIS and Geosciences and roles of various intuitions in data sharing. CO2: Perform preparing different maps integrating spatial and no-spatial data. CO3: Professionally do interpretations and analysis of land use land cover maps

(SEC) PAPER 3(b): Advanced Spatial Statistical Techniques	<p>After completing the course, the student shall be able to:</p> <p>CO1: In depth understanding about the use of quantitative data in the geographical studies</p> <p>CO2: Detailed knowledge of statistical techniques to analyze the quantitative data.</p> <p>CO3: Understanding of statistical software package to enhance the students with quantitative analysis</p>
(SEC) PAPER 4(a): Geographical Information system (practical)	<p>After completing the course, the student shall be able to:</p> <p>CO1: Develop basic understanding and hands-on on GIS software and GPS.</p> <p>CO2: Understand GIS Data Structures and GIS Data Analysis ;</p> <p>CO3: Apply GIS for natural resource management, urban and land use land cover study</p>
(SEC) PAPER 4(b): Research methods (practical)	
(SEC) PAPER 5(a): Entrepreneurship	<p>After completing the course, the student shall be able to:</p> <p>CO1: Understand entrepreneurship as volition in context of India</p> <p>CO2: Gather knowledge and ideas on the existing support system for entrepreneurial orientation</p> <p>CO3: Understand enterprise formation process for gaining ideas</p> <p>CO4: Understand requirements of post-enterprise creation for effective operations of the business</p> <p>CO5: Gain knowledge on available growth strategies for implementing effective suitable strategy for expansion and growth</p>
(SEC) PAPER 5(b): Advertising	<p>After completing the course, the student shall be able to:</p> <p>CO1: Learn the concepts and techniques of advertising used in marketing</p> <p>CO2: Understand the major media decisions, media choice and scheduling.</p> <p>CO3: Comprehend various appeals and models used by the marketers for promoting their brands in the market.</p> <p>CO4: Measure advertising effectiveness with pre and post testing techniques.</p> <p>CO5: Know organizational arrangements for advertising in India.</p>
(SEC) PAPER 6(a): Personal Selling & Salesmanship	<p>After completing the course, the student will be able to:</p> <p>CO1: Explain the concepts of personal selling, roles and opportunities for sales persons.</p> <p>CO2: Understand the theories, models and approaches of selling.</p> <p>CO3: Comprehend the meaning of motivation in the context of personal selling.</p> <p>CO4: Describe the role of a salesperson in entire personal selling process in order to develop a customer oriented attitude in selling.</p> <p>CO5: Learn various sales reports and ethical issue in selling.</p>

(SEC) PAPER 6(b): Collective Bargaining and Negotiation Skills	<p>After completing the course, the student shall be able to:</p> <p>CO1: Identify issues in collective bargaining, its significance.</p> <p>CO2: Understand the levels, coverage and agreements of collective bargaining.</p> <p>CO3: Enable to liaison in negotiations</p> <p>CO4: Recognise the skills required for efficient negotiations.</p> <p>CO5: Administer the negotiation agreement and handle grievance management</p>
COURSE OUTCOME FOR GEOGRAPHY : GENERIC ELECTIVE (GE)	
Semester I	
Disaster management	<p>After completing the course, the student shall be able to:</p> <p>CO1: In depth understanding about the various disasters in the country.</p> <p>CO2: It will provide thorough understanding about the human responses to the disasters.</p> <p>CO3: It will highlight the responses and mitigation measures to both natural and manmade disasters.</p>
Geography of Tourism	<p>CO1: Equip with a basic understanding of nature and scope, trends and patterns of various types of tourisms.</p> <p>CO2: Have sound knowledge on geographical, environmental and socio-cultural aspects of tourism in India.</p> <p>CO3: Apply the principles of Geo-tourism and analyse the prospects and problems associated with pilgrimage tourism.</p>
Semester II	
Spatial Information Technology	<p>Upon successful completion of the course, the students:</p> <p>CO1: Will be familiar with the concept, components of SIT.</p> <p>CO2: Will gained knowledge on various data sources, structures, and their interpolation and modeling.</p> <p>CO3: Will acquire in-depth knowledge of various functions applied in SIT.</p> <p>CO4: Will gather detailed information on the application of SIT in various fields of mapping</p>
Regional Development	<p>CO1: To understand the concept of Region and Regional Planning.</p> <p>CO2: To familiarize the students with Theories and Models for Regional Planning.</p> <p>CO3: To develop understanding about concept of Development, Sustainable Development and different programmes and policies.</p>
Semester III	
Climate Change: Vulnerability and Adaptation	<p>CO1: Detailed exposure of climate change and related issues.</p> <p>CO2: In-depth knowledge of vulnerability of flora and fauna.</p> <p>CO3: Understanding the impact of climate change and its planning.</p>
Rural Development	<p>Upon successful completion of the course, the students:</p> <p>CO1: Will be acquainted with the need and approaches to rural development,</p>

	<p>CO2: Will gain knowledge on rural economic base especially about the significance of development of non-farm sector in rural areas,</p> <p>CO3: Will have in-depth knowledge of pre and post-independence period of rural development,</p> <p>CO4: Will be sensitized to understand the relevance of access to services like health, education in rural areas.</p>
Semester IV	
Industrial Geography	<p>After Studying, Students will be able to:</p> <p>CO1: Acquaint with the nature and scope of Industrial geography and theories of location of industries.</p> <p>CO2: Classify the typology of Industries and understand the physical, cultural, economic and demographic aspects with reference to mega industrial complexes of India.</p> <p>CO3: Assess the impacts of industrialization and industrial policy on India.</p>
Sustainable Development	<p>CO1: Understand the basic concept of sustainable resource development and differentiate between the Millennium development goals and Sustainable development goals.</p> <p>CO2: Assess the issues associated with the Inclusive Development.</p> <p>CO3: Explain the sustainable development policies and programmes.</p>

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

SUBJECT: Hindi for Honours	
PROGRAMME OUTCOME	<p>PO1: विद्यार्थी के आलोचनात्मक विवेक तथा रचनात्मक क्षमता को बढ़ाने के लिए</p> <p>PO2: साहित्य की समझ के साथ भाषा का ज्ञान एवं विद्यार्थियों को संवेदनात्मक क्षमता और ज्ञानात्मक संवेदन प्रदान करना</p> <p>PO3: विद्यार्थी को सैद्धान्तिक और व्यावहारिक दोनों रूप में सक्षम बनाना ।</p> <p>PO4: भाषा, साहित्य और संस्कृति के अध्ययन-विश्लेषण द्वारा इतिहास, समाजविज्ञान, मनोविज्ञान, दर्शन, भाषाविज्ञान आदि विषयों का तुलनात्मक ज्ञान विकसित करना ।</p> <p>PO5: भाषा, साहित्य, समाज और संस्कृतिपरक अध्ययन द्वारा विद्यार्थियों में शोध संबंधी क्षमता को विकसित करना ।</p>
PROGRAMME SPECIFIC OUT	<p>PSO1: 1) इस पाठ्यक्रम के माध्यम से से सीखने-सिखाने की प्रक्रिया में हिन्दी भाषा</p>

<p>COME</p> <p>For Hindi Honours</p>	<p>के आंतरिक स्तर से अब तक के बदलते रूपों की विस्तृत जानकारी प्राप्त की जा सकेगी ।</p> <p>PSO2: भाषा के सैद्धांतिक रूप के साथ साथ व्यावहारिक पक्ष को भी जाना जा सकेगा ।</p> <p>PSO3: उच्च शैक्षणिक स्तर पर हिन्दी भाषा किस प्रकार महत्वपूर्ण भूमिका निभा सकती है, इससे संबंधित परिणाम को प्राप्त किया जा सकेगा ।</p> <p>PSO4: छात्र अपनी भाषा को सीखने की प्रक्रिया में भाषागत मूल्यों को व्यावहारिक रूप से भी जान सकेंगे ।</p> <p>PSO5: व्यवसायिक क्षमता को बढ़ावा देने के लिए भाषा, अनुवाद, कम्प्यूटर जैसे विषयों को हिन्दी से जोड़कर पढ़ाना जिससे बाज़ार के लिए आवश्यक योग्यता का भी विकास किया जा सके।</p> <p>PSO6: हिन्दी के अतिरिक्त भारतीय साहित्य का ज्ञान भी अपेक्षित रहेगा जो छात्रों के व्यक्तित्व विकास में सहायक होगा तथा अभिव्यक्ति क्षमता का विकास भी किया जा सकेगा ।</p> <p>PSO7: साहित्य के सौन्दर्य, कला बोध के साथ वैचारिक मूल्यों को बढ़ावा देना।</p> <p>PSO8: साहित्य की विधाओं के माध्यम से विद्यार्थी की रचनात्मकता को दिशा देना । कविता, कहानी और नाटक जैसी विधाओं द्वारा विद्यार्थी की रचनात्मकता को प्रोत्साहित करना।</p> <p>PSO9: साहित्य के आदिकालीन संदर्भ से लेकर समकालीन रूप से परिचित कराना जिससे विद्यार्थी साहित्यकार और युगबोध के संबंध को परख और पहचान सके।</p> <p>PSO10: साहित्य विवेक का निर्माण।</p>
<p>COURSE OUTCOME FOR Hindi Honours</p> <p>1ST YEAR (PAPERWISE)</p>	
<p>Semester I</p>	
<p>हिन्दी भाषा और उसकी लिपि का इतिहास</p>	<p>CO1: उपयुक्त पाठ्यक्रम के माध्यम से हिन्दी भाषा के सैद्धांतिक पहलू के साथ व्यावहारिक रूप का ज्ञान प्राप्त किया जा सकेगा ।</p> <p>CO2: हिन्दी भाषा की उच्च शैक्षणिक स्तर की भूमिका के महत्वपूर्ण पक्ष को जाना जा सकेगा । कम्प्यूटर को हिन्दी भाषा से जोड़ने पर हिन्दी भाषा के व्यावहारिक ज्ञान को प्राप्त किया जा सकता है ।</p> <p>CO3: वैश्विक युग में भाषा को सिद्धांतों के साथ-साथ व्यावहारिक रूप से भी जोड़ना होगा। अतः यह पाठ्यक्रम वर्तमान संदर्भ के भी अनुकूल है ।</p> <p>CO4: भाषा के बदलते परिदृश्य को आरंभ से अब तक प्रक्रिया को समझना बहुत आवश्यक है । यह पाठ्यक्रम भाषा के आरंभ से वर्तमान को विविध आयामों में प्रस्तुत करता है जो विद्यार्थियों के लिए उपयोगी होगा ।</p>

	CO5: शिक्षा को रोजगार से जोड़ना अत्यंत अनिवार्य है। यह पाठ्यक्रम भाषा की इस मांग को भी प्रस्तुत करता है।
हिन्दी कविता (आदिकाल एवं भक्तिकालीन काव्य)	CO1: आदिकाल के परिवेश - राजनीतिक, सामाजिक सांस्कृतिक, धार्मिक परिस्थितियों से भली-भांति परिचित हो सकेंगे। CO2: आदिकाल में अमीर खुसरो के साहित्यिक और संगीत के क्षेत्र में योगदान से परिचित हो सकेंगे। CO3: भक्तिकाल हिन्दी स्वर्णयुग है। इसके अध्ययन से मानवीय और नैतिक मूल्यों का विकास होगा CO4: भक्तिकाल साहित्य सामंती व्यवस्था का विरोध हुआ, यह इस काव्य की विशेष उपलब्धि है।
Semester II	
हिन्दी साहित्य का इतिहास (आदिकाल और मध्यकाल)	CO1: हिन्दी साहित्य के इतिहास का ज्ञान CO2: इतिहास ग्रन्थों का विश्लेषण CO3: इतिहास निर्माण की पद्धति
हिन्दी कविता (रीतिकालीन काव्य)	CO1: हिन्दी के उत्तर-मध्यकालीन साहित्य का विशिष्ट परिचय प्राप्त होगा। CO2: ब्रजभाषा के समृद्ध साहित्य का रसस्वादन और आलोचनात्मक ज्ञान प्राप्त होगा।
COURSE OUTCOME FOR 2ND YEAR (PAPERWISE)	
Semester III	
हिन्दी साहित्य का इतिहास (आधुनिक काल)	CO1: विकास के क्रम में साहित्य के जरिए समाज और संस्कृति की पहचान के लिए साहित्येतिहास के अध्ययन का महत्व निर्विवाद है। CO2: साहित्येतिहास के अध्ययन का एक प्रयोजन साहित्य के विकास की गति और दिशा के साथ-साथ समाज के विकास को भी चिन्हित करना है। CO3: साहित्येतिहास के बिना साहित्य -विवेक का उचित विकास और निर्माण संभव नहीं। अतः साहित्य -विवेक के निर्माण के लिए साहित्येतिहास का अध्ययन जरूरी है।
हिन्दी कविता (आधुनिक काल छायावाद तक)	CO1: आधुनिक कविता की समझ विकसित होगी। CO2: साहित्यिकता और समकालीन परिवेश के मध्य संबंध का विश्लेषण। CO3: कविताओं के वाचन, लेखन, विश्लेषण और परिवेश की समझ विकसित होगी।
हिन्दी कहानी	CO1: हिन्दी कथा साहित्य का परिचय CO2: कहानी लेखन और प्रभाव का विश्लेषण CO3: प्रमुख कहानीकार और उनकी कहानी के माध्यम से कहानी की उपयोगिता और विश्लेषण की समझ
Semester IV	

भारतीय काव्यशास्त्र	CO7: संस्कृत काव्यशास्त्र का ज्ञान प्राप्त होगा
हिन्दी कविता (छायावाद के बाद)	CO1: इस पाठ्यक्रम के माध्यम से छात्र हिन्दी कविता को काल विशेष के संदर्भ में गहन रूप से जानकारी प्राप्त कर सकेंगे। CO2: उच्च शैक्षणिक स्तर पर हिन्दी कविता किस प्रकार महत्वपूर्ण भूमिका निभा सकती है, इस विषय में इस पाठ्यक्रम से गंभीरता से जाना जा सकता है। CO3: छात्र कविता सीखने के साथ वैचारिक मूल्यों को भी जान सकेंगे। CO4: कविता के दोनों पक्षों भाव सौन्दर्य और कला सौन्दर्य को जाना जा सकेगा। CO5: आज भूमंडलीकरण का युग है। हिन्दी कविता अन्य देशों में भी मानवीय आचरण को सुदृढ़ करने में महत्वपूर्ण भूमिका निभा सकती है। यह पाठ्यक्रम मानवीयता के विविध पहलुओं को हृदयंगम करने में समर्थ है।
हिन्दी उपन्यास	CO1: उपन्यास के विश्लेषण की पद्धति CO2: हिन्दी उपन्यास के उद्भव और विकास का ज्ञान CO3: प्रमुख लेखकों के उपन्यास का परिचय
COURSE OUTCOME FOR 3RD YEAR (PAPERWISE)	
Semester V	
पाश्चात्य काव्यशास्त्र	CO1: प्राचीन से आधुनिकता की ओर आते हुए विकसित हो रहे पश्चिमी काव्यशास्त्र चिंतन-धारा की समझ विकसित होगी CO2: नई विचारधाराओं और साहित्यिकता का ज्ञान प्राप्त होगा
हिन्दी नाटक/एकांकी	CO1: सम्बंधित नाटककारों के युग की सामाजिक-राजनीतिक-सांस्कृतिक-साहित्यिक-धार्मिक परस्थितियों को समझ पायेंगे। CO2: विद्यार्थियों में भारत की एकता और सामाजिक समरसता के भाव का विकास होगा। CO3: स्त्री-सशक्तिकरण के भाव को बल मिलेगा। CO4: नैतिक मूल्यों का विकास होगा। CO5: साहित्य, कला, प्रकृति और पर्यावरण के प्रति संवेदनशीलता विकसित होगी।
Semester VI	
हिन्दी आलोचना	CO1: विद्यार्थियों में आलोचना की सैद्धान्तिक और व्यावहारिक समझ विकसित होगी CO2: रचना के विश्लेषण की क्षमता विकसित होगी CO3: रचना के गुण-दोष का विवेचन करने योग्य बन सकेंगे CO4: रचना और जीवन के प्रति आलोचकीय विवेक का विकास होगा
हिन्दी निबंध और अन्य गद्य विधाएँ	CO1: कथेतर साहित्य का परिचय CO2: विश्लेषण और रचना प्रक्रिया की समझ CO3: प्रमुख हस्ताक्षरों का परिचय
Generic Elective Semester I	

GE-1: a) लोकप्रिय साहित्य	CO1: भारतीय लोकप्रिय और जनप्रिय साहित्य के करीब जा सकेंगे जो देश की आंतरिक धारा का आधार है। CO2: सामान्य पाठक वर्ग के अध्ययन का अवसर प्राप्त होगा।
GE-1: b) हिन्दी सिनेमा और उसका अध्ययन	CO1: हिन्दी सिनेमा, समाज और संस्कृति की समझ CO2: सिनेमा निर्माण, प्रसार और कैमरे की भूमिका आदि की व्यावहारिक समझ
Generic Elective Semester II	
GE-2: a) रचनात्मक लेखन	CO1: रचनात्मकता का विकास CO2: विभिन्न क्षेत्रों जैसे पत्रकारिता, मीडिया, विज्ञापन, सिनेमा, लेखन एवं कला के क्षेत्रों में रोजगार प्राप्त करने में सहायक
GE-2: b) पटकथा तथा संवाद लेखन	CO1: पटकथा क्या है समझेंगे। CO2: पटकथा और संवाद लेखन में दक्षता हासिल करेंगे। CO3: कहानी, उपन्यास आदि साहित्यिक विधाओं को पटकथा में रूपांतरित करना सीखेंगे। CO4: भविष्य में पटकथा लेखन को आजीविका का माध्यम बना सकेंगे।
Generic Elective Semester III	
GE-3: a) हिन्दी में व्यावहारिक अनुवाद	CO1: अनुवाद की रोजगारपरक क्षमता विकसित होगी CO2: क्षेत्र विशेष की माँग से परिचित होंगे
GE-3: b) भाषा और समाज	CO1: समाजभाषाविज्ञान का अध्ययन CO2: सम्प्रेषण की सामाजिक समझ CO3: भाषा के समाजशास्त्र का अध्ययन
Generic Elective Semester IV	
GE-4: a) हिन्दी का वैश्विक परिचय	CO1: हिन्दी की अंतर्राष्ट्रीय स्थिति का परिचय CO2: विकास के नए क्षेत्र : उपलब्धियाँ और चुनौतियाँ
GE-4: b) भाषा शिक्षण	CO1: भाषा शिक्षण की अवधारणा और महत्व से परिचित कराना। साथ ही भाषा शिक्षण की संकल्पनाओं और राष्ट्रीय, सामाजिक, शैक्षिक और संदर्भों का परिचय। CO2: विभिन्न भाषाई कौशलों के ज्ञानार्जन के उपरान्त विद्यार्थी शिक्षण, मीडिया, अभिनय आदि क्षेत्रों में अपनी प्रतिभा का विकास कर सकेंगे। CO3: वे शिक्षण और प्रशिक्षण के माध्यम से नई पद्धतियों का अनुसंधान करने की दिशा में अग्रसर होंगे।
DSE Semester V	

DSE-1 (i): हिन्दी की मौखिक और लोक- साहित्य परंपरा	CO1: भारतीय जीवन की लोकधारा का परिचय प्राप्त होगा CO2: पर्यटन, लोक संगीत और नृत्य में रुचि विकसित होगी
DSE-1 (ii): अस्मितामूलक विमर्श और हिन्दी साहित्य	CO1: अस्मितामूलक विमर्श का ज्ञान CO2: विभिन्न अस्मिताओं की समस्याओं और उसके परिवेश को समझना CO3: प्रमुख कृतियों का परिचय
DSE-1 (iii): भारतीय एवं पाश्चात्य रंगमंच सिद्धान्त	CO1: रंगमंच की विभिन्न पद्धतियाँ और उनके चिन्तकों से परिचय का अवसर प्राप्त होगा CO2: नाटक-रंगमंच का संबंध और नवीन विधाओं के विश्लेषण का अवसर प्राप्त होगा
DSE-1 (iv): हिन्दी भाषा का व्यावहारिक व्याकरण	CO1: यह पाठ्यक्रम हिन्दी भाषा को आधार रूप से व्यवस्थित करेगा । CO2: भाषागत रूप को शुद्ध करने का पूर्ण प्रयास करता है । CO3: आलोचनात्मक क्षमता का विकास हो सकेगा । CO4: हिन्दी भाषा के व्याकरणिक रूप को स्थिर किया जा सकेगा । CO5: भाषा का अनुशासनबद्ध होना अत्यन्त आवश्यक है । व्यावहारिक व्याकरण अपने सैद्धान्तिक रूप के साथ- साथ इसके प्रयोग रूप को भी मान्यता प्रदान करता है । CO6: मौखिक अभिव्यक्ति के मानक, अमानक रूपों को इस पाठ्यक्रम के माध्यम से जाना जा सकता है । CO7: हिन्दी भाषा को संतुलित रूप प्रदान करने में और सर्वमान्य भाषा का प्रयोग करने में यह पाठ्यक्रम सक्षम है।
DSE-1 (v): कोश विज्ञान : शब्दकोश और विश्वकोश	CO1: कोश के प्रकार, निर्माण, रखरखाव एवं प्रयोग की विधियों से परिचित हो पाएंगे।
DSE-1 (vi): भारतीय साहित्य की संछिप्त रूपरेखा	CO1: अखिल भारतीय साहित्य की समझ विकसित होगी CO2: एकसूत्रता में सांस्कृतिक विविधता की समझ
Semester VI	
DSE-2 (i): लोकनाट्य	CO1: पर्यटन, लोक-संगीत, विभिन्न नाट्य रूपों में रुचि जागृत होगी CO2: लोक-भावना और भारत-बोध के बीच संवाद होगा CO3: भारतीय लोक नाट्य की सैद्धान्तिक व व्यावहारिक जानकारी
DSE-2 (ii): हिन्दी की भाषिक विविधताएँ	CO1: प्रमुख रचनाकारों और प्रस्तुतियों से लाभान्वित होना CO2: विश्लेषण क्षमता CO3: साहित्यिकता की समझ विकसित करना CO4: पर्यटन, नृत्य-संगीत आदि में रुचि का अवसर
DSE-2 (iii):	CO1: भारतीय साहित्य का ज्ञान

भारतीय साहित्य : पाठपरक अध्ययन	CO2: व्यक्तित्व विकास में सहायक CO3: अभिव्यक्ति क्षमता का विकास
DSE-2 (iv): शोध-प्रविधि	CO1: विद्यार्थियों में शोध के प्रति जागरूकता को बढ़ा सकेंगे CO2: शोध के स्वरूप की व्यावहारिक समझ बढ़ेगी CO3: शोध में मौलिकता की अनिवार्यता को समझ सकेंगे CO4: व्यावहारिक शोध का प्रारूप तैयार करना सीख सकेंगे
DSE-2 (v): अवधारणात्मक साहित्यिक पद	CO1: इस पाठ्यक्रम के माध्यम से सीखने-सिखाने प्रक्रिया में भारतीय और पश्चिमी आलोचना सिद्धांतों के बीज शब्दों की विस्तृत जानकारी प्राप्त की जा सकेगी। CO2: साहित्य की आलोचना के प्रतिमानों में आने वाले पारिभाषिक शब्दों के विशिष्ट शब्दबोध को विस्तार से समझा जा सकता है। CO3: पारिभाषिक शब्दों के विश्लेषण के माध्यम से विद्यार्थी इन बीज शब्दों के मूल सिद्धांतों का भी सहज विश्लेषण कर पाने में समर्थ हो सकेंगे। CO4: अवधारणा मूलक शब्दों का ज्ञान प्राप्त करके विद्यार्थी आलोचना की सैद्धान्तिकता का सहज विश्लेषण कर सकेगा।
DSE-2 (vi): हिन्दी रंगमंच	CO1: रंगमंच के विकास के साथ-साथ विभिन्न शैलियों की जानकारी प्राप्त होगी CO2: प्रमुख विचारकों की रंग दृष्टि से अवगत हो पाएंगे CO3: पारंपरिक और आधुनिक रंगमंच की समझ विकसित होगी CO4: भारत बोध विकसित होगा
Skill Enhancement Course	
Semester III	
SEC-1: विज्ञापन और हिन्दी भाषा	CO1: विभिन्न माध्यमों के विज्ञापनों के अध्ययन - विश्लेषण का अवसर मिलेगा CO2: निर्माण और प्रभाव को सामाजिक आवश्यकताओं पर विश्लेषण करना CO3: इन क्षेत्रों में रोजगार प्राप्त करने की दक्षता
SEC-2: कम्प्यूटर और हिन्दी भाषा	CO1: कम्प्यूटर को हिन्दी माध्यम से सीख कर आत्मविश्वास से पूर्ण अनुभव। CO2: इस पाठ्यक्रम के माध्यम से सीखने-सिखाने माध्यम हिन्दी भाषा और कम्प्यूटर के आरंभिक स्तर से अब तक के बदलते रूप की विस्तृत जानकारी प्राप्त की जा सकेगी। CO3: हिन्दी भाषा के विभिन्न फॉन्ट सीखकर कम्प्यूटर पर सुगमता से कार्य कर सकेगा। CO4: हिन्दी भाषा में इंटरनेट और वेबसाइट्स का प्रयोग कर सकेगा। CO5: उच्च शैक्षणिक स्तर पर हिन्दी भाषा किस प्रकार महत्वपूर्ण भूमिका निभा सकती है, इससे संबंधित परिणाम को प्राप्त किया जा सकेगा। CO6: कम्प्यूटर में हिन्दी की चुनौतियाँ और संभावनाओं को जान पाएगा। CO7: ई-गवर्नेंस, ई-लर्निंग, एस.एम.एस.(SMS) की हिन्दी का प्रयोग कर पाएगा। CO8: दुनिया से परिचित हो जाएगा। CO9: राजभाषा के रूप में हिन्दी प्रगति को सुनिश्चित किया जा सकेगा
SEC-3: सोशल मीडिया	CO5: बाज़ार, सोशल मीडिया और समाज के संबंध की व्यावहारिक जानकारी
SEC-4:	CO1: अनुवाद की सैद्धान्तिक और व्यावहारिक जानकारी

अनुवाद-कौशल	CO2: विभिन्न क्षेत्रों के अनुवाद का विश्लेषणात्मक अध्ययन CO3: प्रयोगात्मक कार्य
Semester IV	
SEC-5: कार्यालयी हिन्दी	CO1: कार्यालयी भाषा की सैद्धान्तिक और व्यावहारिक जानकारी होगी CO2: हिन्दी की आवश्यकताओं और रोजगार क्षेत्रों की मांग का अनुमान कर सकेंगे
SEC-6: भाषाई दक्षता : समझ और संभाषण	CO1: भाषाई दक्षता के हर पहलू से परिचित हो सकेंगे । CO2: हिन्दी भाषा को समझने , उसके शुद्ध रूप , तकनीकी रूप और ज्ञानवृद्धि के साथ भाषा में दक्षता प्राप्त कर सकेंगे।
SEC-7: भाषा और समाज	CO1: भाषा और समुदाय को बदलते भारतीय परिवेश को जानना । CO2: भाषा और जातीयता के विविध रूपों का विश्लेषण करना, द्विभाषिकता और बहुभाषिकता के विविध प्रारूपों से अवगत होना तथा उनका संदर्भगत विवेचन । CO3: भाषा और संस्कृति के मूल बिन्दुओं की गहन जानकारी प्राप्त करना । CO4: भाषा सर्वेक्षण, उनके विविध रूप तथा भाषा नमूनों का विश्लेषण करना तथा भाषा के नवीन प्रयोग का अध्ययन करना ।
AECC for language courses	
हिन्दी भाषा और सम्प्रेषण	CO1: प्रभावी सम्प्रेषण का महत्व समझने के साथ-साथ विद्यार्थी रोजगार के विभिन्न क्षेत्रों हेतु लेखन, वाचन, पठन में भी सक्षम हो सकेंगे ।

SUBJECT: Hindi for बी.ए. प्रोग्राम	
PROGRAMME OUTCOME	<p>PO1: विद्यार्थी के आलोचनात्मक विवेक तथा रचनात्मक क्षमता को बढ़ाने के लिए</p> <p>PO2: साहित्य की समझ के साथ भाषा का ज्ञान एवं विद्यार्थियों को संवेदनात्मक क्षमता और ज्ञानात्मक संवेदन प्रदान करना</p> <p>PO3: विद्यार्थी को सैद्धान्तिक और व्यावहारिक दोनों रूप में सक्षम बनाना ।</p> <p>PO4: भाषा, साहित्य और संस्कृति के अध्ययन-विश्लेषण द्वारा इतिहास, समाजविज्ञान, मनोविज्ञान, दर्शन, भाषाविज्ञान आदि विषयों का तुलनात्मक ज्ञान विकसित करना ।</p> <p>PO5: भाषा, साहित्य, समाज और संस्कृतिपरक अध्ययन द्वारा विद्यार्थियों में शोध संबंधी क्षमता को विकसित करना ।</p>
PROGRAMME SPECIFIC OUTCOME For Hindi Honours	<p>PSO1: इस पाठ्यक्रम के माध्यम से सीखने-सिखाने की प्रक्रिया में हिन्दी भाषा के आंतरिक स्तर से अब तक के बदलते रूपों की विस्तृत जानकारी प्राप्त की जा सकेगी ।</p> <p>PSO2: भाषा के सैद्धान्तिक रूप के साथ साथ व्यावहारिक पक्ष को भी जाना जा सकेगा ।</p> <p>PSO3: उच्च शैक्षणिक स्तर पर हिन्दी भाषा किस प्रकार महत्वपूर्ण भूमिका निभा सकती है, इससे संबंधित परिणाम को प्राप्त किया जा सकेगा ।</p> <p>PSO4: छात्र अपनी भाषा को सीखने की प्रक्रिया में भाषागत मूल्यों को व्यावहारिक रूप से भी जान सकेंगे ।</p> <p>PSO5: व्यावसायिक क्षमता को बढ़ावा देने के लिए भाषा, अनुवाद, कम्प्यूटर जैसे विषयों को हिन्दी से जोड़कर पढ़ाना जिससे बाज़ार के लिए आवश्यक योग्यता का भी विकास किया जा सके ।</p> <p>PSO6: हिन्दी के अतिरिक्त भारतीय साहित्य का ज्ञान भी अपेक्षित रहेगा जो छात्रों के व्यक्तित्व विकास में सहायक होगा तथा अभिव्यक्ति क्षमता का विकास भी किया जा सकेगा ।</p> <p>PSO7: साहित्य के सौन्दर्य, कला बोध के साथ वैचारिक मूल्यों को बढ़ावा देना।</p> <p>PSO8: साहित्य की विधाओं के माध्यम से विद्यार्थी की रचनात्मकता को दिशा देना । कविता, कहानी और नाटक जैसी विधाओं द्वारा विद्यार्थी की रचनात्मकता को प्रोत्साहित करना।</p> <p>PSO9: साहित्य के आदिकालीन संदर्भ से लेकर समकालीन रूप से परिचित कराना जिससे विद्यार्थी साहित्यकार और युगबोध के संबंध को परख और पहचान सके।</p> <p>PSO10: साहित्य विवेक का निर्माण।</p>

COURSE OUTCOME FOR Hindi Honours 1ST YEAR (PAPERWISE)	
Semester I	
हिन्दी भाषा और साहित्य का इतिहास	CO1: इतिहास के प्रति आलोचनात्मक-विश्लेषणात्मक ज्ञान के द्वारा हिन्दी भाषा और साहित्य इतिहास को संतुलित रूप से प्रस्तुत किया जा सकेगा
आधुनिक भारतीय भाषा - हिन्दी भाषा और सम्प्रेषण	CO1: स्नातक स्तर के छात्रों को भाषायी सम्प्रेषण की समझ और संभाषण से संबंधित विभिन्न पक्षों से अवगत करवाया जाएगा। CO2: भाषा के शुद्ध उच्चारण , सामान्य लेखन, रचनात्मक लेखन तथा तकनीकी शब्द से अवगत हो सकेंगे। CO3: भाषा की समृद्धि के लिए वार्तालाप, भाषण, उसके पल्लवन, पुस्तक-समीक्षा, फिल्म-समीक्षा का भी अध्ययन कर सकेंगे।
Semester II	
हिन्दी कविता (मध्यकाल और आधुनिक काल)	CO1: कविताओं का अध्ययन-विश्लेषण करने की पद्धति सीख सकेंगे। CO2: साहित्य के सामाजिक-राजनीतिक-सांस्कृतिक पहलुओं की जानकारी प्राप्त होगी।
COURSE OUTCOME FOR 2ND YEAR (PAPERWISE)	
Semester III	
हिन्दी कथा साहित्य	CO1: कथा- साहित्य के विकास का परिचय। CO2: प्रमुख उपन्यास और कहानियों का अध्ययन।
Semester IV	
अन्य गद्य विधाएँ	CO1: अन्य गद्य विधाओं की स्पष्ट समझ विकसित होगी CO2: आलोचनात्मक समझ विकसित होगी
COURSE OUTCOME FOR 3RD YEAR (PAPERWISE)	
Semester V	
DSE-1: हिन्दी भाषा का व्यावहारिक व्याकरण	CO1: अनुवाद की सैद्धान्तिक और व्यावहारिक जानकारी CO2: विभिन्न क्षेत्रों के अनुवाद का विश्लेषणात्मक अध्ययन CO3: प्रयोगात्मक कार्य
DSE-2: हिन्दी की मौखिक साहित्य और	CO1: मौखिक साहित्य का परिचय CO2: प्रमुख रूपों का परिचय CO3: संस्कृति और लोक-जीवन व संस्कृति के विश्लेषण की क्षमता

उसकी परंपरा	
DSE-3: हिन्दी रंगमंच	CO1: रंगमंच के विकास के साथ - साथ विभिन्न शैलियों की जानकारी प्राप्त होगी CO2: प्रमुख विचारकों की रंग दृष्टि से अवगत हो पाएंगे CO3: पारंपरिक और आधुनिक रंगमंच की समझ विकसित होगी CO4: भारत बोध विकसित होगा
Semester VI	
DSE-4: साहित्य चिंतन	CO1: साहित्य और समाज की पारस्परिक अर्थवत्ता और महत्ता के साथ-साथ आलोचनात्मक विवेक का निर्माण CO2: साहित्य की व्याख्या के लिए शास्त्रीय सिद्धांतों का चिंतन करना CO3: सैद्धान्तिक सोच और समझ के स्तर को समृद्ध करते हुए साहित्य के साथ अन्य कलाओं की समझ विकसित करना
DSE-5: कोश विज्ञान : शब्दकोश और विश्वकोश	CO1: कोश के प्रकार, निर्माण, रखरखाव एवं प्रयोग की विधियों से परिचित हो पाएंगे। CO2: विभिन्न कोशों की जानकारी होगी CO3: निर्माण, प्रसार और तकनीक की समझ विकसित होगी
DSE-6: विशेष अध्ययन: एक प्रमुख साहित्यकार	CO1: कबीर, तुलसीदास, प्रेमचंद, निराला CO2: मानवीय और नैतिक मूल्यों का विकास होगा
Generic Elective Semester V	
GE-1 अनुवाद : व्यवहार और सिद्धान्त	CO1: अनुवाद के विभिन्न क्षेत्रों की आवश्यकता को समझने में मदद मिलेगी CO2: सैद्धान्तिक और व्यावहारिक ज्ञान निर्मित होगा
GE-2: जनपदीय साहित्य	CO1: लोक संस्कृति की समझ विकसित होगी CO2: पर्यटन, साहित्य और बोलियों की जानकारी मिलेगी CO3: लोक साहित्य के अध्ययन विश्लेषण की जानकारी
Generic Elective Semester VI	
GE-3: अस्मितामूलक विमर्श और हिन्दी साहित्य	CO1: अस्मितामूलक विमर्श का ज्ञान CO2: विभिन्न अस्मिताओं की समस्याओं और उसके परिवेश को समझना CO3: प्रमुख कृतियों का परिचय
GE-4 हिन्दी सिनेमा और उसका अध्ययन	CO3: हिन्दी सिनेमा, समाज और संस्कृति की समझ CO4: सिनेमा निर्माण, प्रसार और कैमरे की भूमिका आदि की व्यावहारिक समझ
Skill Enhancement Course	

Semester III	
SEC-1: रचनात्मक लेखन	CO1: रचनात्मकता का विकास CO2: विभिन्न क्षेत्रों जैसे पत्रकारिता, मीडिया, विज्ञापन, सिनेमा, लेखन एवं कला के क्षेत्रों में रोजगार प्राप्त करने में सहायक CO3: प्रिंट एवं इलेक्ट्रॉनिक माध्यमों के लिए लेखन की ओर भी वे अग्रसर होंगे।
SEC-2: भाषा शिक्षण	CO1: विभिन्न भाषाई कौशलों के ज्ञानार्जन के उपरान्त विद्यार्थी शिक्षण, मीडिया, अभिनय आदि क्षेत्रों में अपनी प्रतिभा का विकास कर सकेंगे। वे शिक्षण और प्रशिक्षण के माध्यम से नई पद्धतियों का अनुसंधान करने की दिशा में अग्रसर होंगे।
SEC-3: कार्यालयी हिन्दी	CO1: कार्यालयी भाषा की सैद्धान्तिक और व्यावहारिक जानकारी होगी CO2: हिन्दी की आवश्यकताओं और रोजगार क्षेत्रों की मांग का अनुमान कर सकेंगे CO3: टिप्पण, प्रारूपण और संप्रेषण आवश्यकताओं की समझ विकसित होगी
Semester IV	
SEC-4: भाषाई दक्षता	CO1: भाषाई दक्षता के हर पहलू से परिचित हो सकेंगे। CO2: कार्य कुशलता में वृद्धि। CO3: विषय के संप्रेषण एवं पल्लवन की कुशलता का विकास।
SEC-5: विज्ञापन और हिन्दी भाषा	CO1: विज्ञापन लेखन की दृष्टि से भाषा दक्षता CO2: विज्ञापन निर्माण की पूरी प्रक्रिया को समझना CO3: विज्ञापन बाज़ार में विभिन्न माध्यमों की पहुँच और प्रसार क्षमता से परिचित होना CO4: कॉपी लेखन आदि कार्य के लिए तैयार होना
SEC-6: कम्प्यूटर और हिन्दी भाषा	CO10: कम्प्यूटर को हिन्दी माध्यम से सीख कर आत्मविश्वास से पूर्ण अनुभव। CO11: सैद्धान्तिक और व्यावहारिक ज्ञान विकसित होगा
AECC for language courses	
हिन्दी भाषा और संप्रेषण	CO2: प्रभावी संप्रेषण का महत्व समझने के साथ-साथ विद्यार्थी रोजगार के विभिन्न क्षेत्रों हेतु लेखन, वाचन, पठन में भी सक्षम हो सकेंगे।

	B.A. (Hons) History
PROGRAMME SPECIFIC OUT COME	B.A. History Honours was introduced within three years (1970-1971) of the establishment of the college. The department has a History Society named DHAROHAR which organizes various awareness programmes related to historical learning and also organizes trips for the students in and around Delhi. From a philosophical perspective, the past is inaccessible to us or as far as it is accessible, it is at least not available to us in the same way the present is available to us. History is a creation; it is not mere

	copying
COURSE OUTCOME FOR I YEAR	
Semester I	
HISTORY OF INDIA-1	<p>CO1: After completing the course the students will be able to understand the significance of and role of environment in history and become an aware citizen towards protection of environment.</p> <p>CO2: They will be able to understand the trajectory of prehistory in India's past and transition to proto-history from prehistory along with their characteristic features.</p> <p>CO3: The students will be able to understand the pre and early historic technological development and their contribution in the development of human civilization in India.</p> <p>CO4: They will also be able to understand the significance of regions in history and the issues related to them.</p>
Social Formations And Cultural Patterns of the Ancient World	<p>On completion of this course, the students will be able to:</p> <p>CO1: Describe key moments in human evolution and the development of various subsistence patterns</p> <p>CO2: Explain the differences between various forms of early human societies.</p> <p>CO3: Delineate the significance of early food production and other factors that propelled the gradual development of urban civilizations</p> <p>CO4: Analyse the features of early urban civilizations and their interaction with nomadic pastoralists.</p> <p>CO5: Analyse the role of developing metal technology in human societies</p>
Semester II	
History of India-II	<p>CO1: After completing this course, the students will be able to understand the processes and the stages of various types of state systems like monarchy, republics, centralized states and the process of the beginning of feudalization in early India.</p> <p>CO2: They will be able to know the features and stages of civilization in ancient Indian history. They will also be familiar with the process of urbanization and deurbanization & monetization and demonetization in early India.</p> <p>CO3: This paper will also familiarize the students with the process of social changes along with progress in literature, science, art and architecture.</p>
Social formations and patterns of the Ancient and Medieval World	<p>CO1: Identify the key historical features of Classical Greece and Rome.</p> <p>CO2: Explain the emergence of medieval polities and feudal institutions.</p> <p>CO3: Explain the trends in the medieval economy and their impact on social, cultural and religious life.</p>

	<p>CO4: Analyse the rise of Islam and the transition to state formation in West Asia</p> <p>CO5: Discuss the development of various spiritual, literary and broader urban traditions</p>
COURSE OUTCOME FOR II YEAR	
Semester III	
History of India-III(c750-1200)	<p>After finishing the course, a learner would be able to:-</p> <p>CO1: Critically assess the major debates among scholars about various changes that took place with the onset of early medieval period in India.</p> <p>CO2: Explain, in an interconnected manner, the processes of state formation, agrarian expansion, proliferation of caste and urban as well as commercial processes.</p> <p>CO3: Discuss the major currents of development in the cultural sphere, namely bhakti movement, Puranic Hinduism, Tantricism, architecture and art as well as the emergence of a number 'regional' languages.</p>
Rise of the Modern West-I	<p>On completion of this course, students will be able to:</p> <p>CO1: Outline important transitions that took place in Europe and marked a significant break from earlier economic, social and political conditions.</p> <p>CO2: Explain the process by which major transitions unfolded in Europe's economy, state forms, social structure and cultural life</p> <p>CO3: Critically analyse the linkages between Europe's political economy and trading structure and those of the colonised world.</p> <p>CO4: Evaluate the developments in social, cultural and religious trends and their connections with major economic transitions and changing dynamics of state formation</p>
History of India-IV(c 1200-1500)	<p>At the end of the course, learners would be:</p> <p>CO1: Familiar with the different kinds of sources available for writing histories of various aspects of life during the thirteenth to the fifteenth centuries.</p> <p>CO2: Able to critically evaluate the multiple perspectives from which historians have studied the politics, cultural developments and economic trends in India during the period of study.</p> <p>CO3: Appreciate the ways in which technological changes, commercial developments and challenges to patriarchy by certain women shaped the times.</p>
Semester IV	
Rise of the Modern West-II	<p>On completion of this course, students will be able to:</p> <p>CO1: Identify key developments in Europe during the 17th and 18th centuries.</p> <p>CO2: Explain the political and intellectual trends of this time</p>

	<p>period.</p> <p>CO3: Contextualize the elements of modernity developing in social, political and intellectual realms</p> <p>CO4: Discuss the features of Europe's political economy and the emergence of capitalist industrialization</p>
History of India-V(c 1500-1600)	<p>At the conclusion of the course, the students shall:</p> <p>CO1: Be able to critically evaluate major sources available in Persian, Sanskrit, Braj Bhasha, Avadhi, Tamil and Telugu languages for the period under study.</p> <p>CO2: Compare, discuss and examine the varied scholarly perspectives on the issues of the establishment of Mughal state and consolidation of its power</p> <p>CO3: Explore the changes and continuities in the sphere of agrarian relations, land revenue regimes, commerce, Sufism, etc.</p>
History of India-VI(c1750-1857)	<p>On completion of this paper, the students will be able to:</p> <p>CO1: Outline key developments of the 18th century in the Indian subcontinent.</p> <p>CO2: Explain the establishment of Company rule and important features of the early colonial regime</p> <p>CO3: Explain the peculiarities of evolving colonial institutions and their impact</p> <p>CO4: Discuss the social churning on questions of tradition, reform, etc. during first century of British colonial rule</p> <p>CO5: Assess the issues of landed elite, and those of struggling peasants, tribals and artisans during the Company Raj.</p>
CORSE OUTCOME FOR III YEAR	
Semester V	
History of Modern Europe-I	<p>On completing this course, the students will be able to:</p> <p>CO1: Identify what is meant by the French Revolution</p> <p>CO2: Trace short-term and long-term repercussions of revolutionary regimes and Empire-building by France</p> <p>CO3: Explain features of revolutionary actions and reactionary politics of threatened monarchical regimes.</p> <p>CO4: Delineate diverse patterns of industrialization in Europe and assess the social impact of capitalist industrialization</p> <p>CO5: Analyse patterns of resistance to industrial capital and the emerging political assertions by new social classes.</p>
History of India-VII(c 1600-1750)	<p>CO1: After successful completion of the course, the students will be able to:</p> <p>CO2: Describe the major social, economic, political and cultural developments of the time.</p> <p>CO3: Examine, in broad strokes, the varied body of contemporaneous literature available in Persian and non-Persian languages.</p> <p>CO4: Explain the religious and intellectual ferment of the</p>

	<p>seventeenth and the eighteenth centuries especially with regard to art, literature and architecture.</p> <p>CO5: Appreciate and express the continued expansion and dynamism of maritime trade in India.</p>
Semester VI	
History of India-VIII(c1857-1950)	<p>CO1: After successful completion of the course, the students will be able to:</p> <p>CO2: Identify how different regional, religious and linguistic identities developed in the late 19th and early 20th centuries</p> <p>CO3: Outline the social and economic facets of colonial India and their influence on different trends of politics.</p> <p>CO4: Explain the various forms of anti-colonial struggles in colonial India</p> <p>CO5: Analyse the complex developments leading to communal violence and Partition</p> <p>CO6: Discuss the negotiations for independence, the key debates on the Constitution and need for socio-economic restructuring soon after Independence.</p>
History of Modern Europe-II	<p>On completion of this course, students will be able to:</p> <p>CO1: Trace varieties of nationalisms and the processes by which new nation-states were carved out.</p> <p>CO2: Discuss the peculiarities of the disintegration of large empires and remaking of Europe's map</p> <p>CO3: Deliberate on the meaning of imperialism and the manifestations of imperialist rivalry and expansion in the 19th and early 20th century.</p> <p>CO4: Analyse the conflict between radical and conservative forces, and the gradual consolidation of ultra-nationalist and authoritarian regimes in Europe.</p> <p>CO5: Contextualise major currents in the intellectual sphere and arts.</p>
Discipline Specific Elective Paper	
DSE-1 Paper 5(a): History of the USA: Independence to Civil War	<p>CO1: The course will enable the students to explain the evolving and changing contours of USA and its position in world politics. This course will provide the students rigorous conceptualization in international studies.</p> <p>CO2: The written assignments and presentations will improve and develop the written expression, analytical and critical skills of the students.</p>
DSE-1 Paper 5(b): History of the USSR: From Revolution to World War II(1917-1945)	<p>CO1: The course studies the history of the USSR from the two revolutions of 1917 to the end of the WW II. It looks at the various challenges faced by the Bolsheviks and the steps taken to resolve these issues.</p> <p>CO2: It also traces the evolution of new institutions and new ways of organizing production both in the factory and at the farm. Important foreign policy issues like the setting up of the</p>

	Comintern, Soviet foreign policy and the Soviet Union's involvement and role in the World War II are also evaluated.
DSE-1 Paper 5(c): History of Africa(c 1500-1960)	On completion of this course, students will be able to: CO1: Progress beyond stereotypes on the African continent and outline major shifts in African history. CO2: Explain elements of change and continuity in African politics, economy, society and cultural milieu from the 16th to 20th centuries. CO3: Contextualise the impact of colonialism on the African continent. Explain social protest and anti-colonial resistance in Africa, as well as practices of 'transculturation'. CO4: Discuss the dilemmas and contradictions emerging from the post-independence economic, social, political and cultural milieu.
DSE-1 Paper 5(d): Gender in Indian History up to 1500	CO1: The course should hone students' skills at analysing historical processes from the vantage of gender and also locate gender within larger socio-historical frames such as class and varna. CO2: This would eventually help students unravel complexities of early and medieval India. This course will motivate students to study unexplored arenas and subjects through gendered lens. CO3: The written assignments will help students to further streamline their arguments.
DSE-2 Paper 5(e): History of Modern China (1840-1960)	On successful completion of this course students should be able to: CO1: Explain China's engagement with the challenges posed by imperialism, and the trajectories of transition from feudalism to a bourgeois/ capitalist modernity. CO2: To locate these historical transitions in light of other contemporaneous trajectories into a global modernity CO3: Analyse significant historio graphical shifts in Chinese history, especially with reference to the discourses of nationalism, imperialism, and communism CO4: Investigate the political, economic, social and cultural disruptions caused by the breakdown of the centuries old Chinese institutions and ideas, and the recasting of tradition to meet modernist challenges. CO5: Describe the genesis and trace the unique trajectories of the Chinese Communist Revolution. CO6: Locate the rise of China in the spheres of Asian and world politics respectively.
DSE-2 Paper 5(f): History of South East Asia up to the 16th century	CO1: Students opting for this course shall have to demonstrate a comprehensive understanding of pre-modern Southeast Asian history. CO2: They shall be expected to demonstrate a good understanding of the processes of state formation, the localization and

	<p>spread of religious traditions like Islam and Buddhism, the impact of the European presence on local society, the maritime activity of local society and polity and the developments in the economic and architectural history of the region.</p> <p>CO3: In tutorial discussions and class presentations students will be expected to demonstrate the critical and comparative insights they have developed while studying the region.</p> <p>CO4: They shall be tested on their understanding of the diverse changes experienced across the region during this period. Students shall be able to summaries and present an outline the diverse historiographical views that have defined the history of the region.</p>
DSE-2 Paper 5(g): Global Environmental Practices	<p>After completing this course, students should be able to –</p> <p>CO1: Critique an understanding of environmental concerns based on a narrow scientific/technological perspective</p> <p>CO2: Discuss environmental issues within a social- political framework</p> <p>CO3: Examine the role of social inequality, i.e. unequal distribution of and unequal access to environmental resources. This is critical in gaining an understanding of the environmental crisis of the world - from the global to the local</p> <p>CO4: Examine the complexities of resource distribution and inequalities of resource use, locating these within specific social contexts, with reference to case studies regarding water rights and forest rights</p> <p>CO5: Locate solutions to environmental problems within a framework of greater democratisation of resource use</p> <p>CO6: Problematised (or critique?) the notion of a pristine past - of perfect balance between human societies and nature in pre-modern times.</p>
DSE-3 Paper 6(a): History Of The USA: Reconstruction To New Age Politics	<p>CO1: The course will enable the students to explain the history of USA in the international context.</p> <p>CO2: This course will provide the students training and skill in understanding and analyzing American internal politics and its power and influence in the international arena.</p> <p>CO3: The written assignments and presentations will improve and develop the writing, analytical and critical skills of the students.</p>
DSE-3 Paper 6(b): SEMESTER-VI History of the USSR: the Soviet Experience(1945-1991)	<p>Upon successful completion of the course students will have the knowledge and skill to:</p> <p>CO1: Outline and explain key developments in the history of the USSR between 1945 and 1991.</p> <p>CO2: Critically analyse the Soviet political system and its global impact</p>

	<p>CO3: Co-relate the various developments to culture and literary growth.</p> <p>CO4: Explain the origins, developments and the end of the Cold War.</p> <p>CO5: Analyse the factors leading to economic slowdown, disintegration of the Soviet Union and the formation of Confederation of Independent States.</p>
DSE-3 Paper 6(c): History of the Latin America,c 1500-1950	<p>On completion of this course, students will be able to:</p> <p>CO1: Progress beyond stereotypes on Latin America and outline major shifts in Latin American history.</p> <p>CO2: Explain elements of change and continuity in Latin American politics, economy, society and cultural milieu from the 16th to 20th centuries.</p> <p>CO3: Contextualise the impact of colonialism on Latin America.</p> <p>CO4: Explain social protest and anti-colonial resistance in Latin America, as well as practices of ‘transculturation’.</p> <p>CO5: Discuss the dilemmas and contradictions emerging from the post-independence economic, social, political and cultural milieu.</p>
DSE-4 Paper 6(d): History of the modern Japan & Korea(1868-1950)	<p>Upon successful completion of this course, students will have the knowledge and skills to:-</p> <p>CO1: Explain Japan’s attempts to create new institutional structures and recast traditions to encounter challenges of the west.</p> <p>CO2: Analyse historiographical shifts in Japanese history in the context of global politics.</p> <p>CO3: Examine the divergent pathways to modernity followed by Japan.</p> <p>CO4: Examine distinct perspectives on imperialism and nationalism in East Asia, and understand how historiographical approaches are shaped by their contexts.</p> <p>CO5: Conceptualise how these distinct histories can be rooted in common cultural traditions.</p> <p>CO6: Locate and contextualise the history of Japan in world politics.</p> <p>CO7: Critically discuss contemporary international studies with much greater clarity based on the knowledge of history and culture of Japan.</p>
DSE-4 Paper 6(e): Modern southeast Asia: 17th – 20th century	<p>CO1: Students opting for this course shall have to demonstrate a comprehensive understanding of nineteenth and twentieth century Southeast Asian history. They shall be expected to demonstrate a good understanding of colonial state and society, in addition to a comprehensive understanding of the maritime and agrarian economy of the region.</p> <p>CO2: Tutorial discussions and class presentations shall help the students demonstrate the critical and comparative insights</p>

	<p>they have developed while studying the region. They shall be tested on their understanding of how colonialism, new forms of knowledge, Euro-centric notions of modernity and ideas of race defined local religion, politics and shaped modern South-east Asia as we see it today.</p> <p>CO3: Students shall be able to outline and debate the diverse historiographical views on the colonial state, the transformation of the local agrarian and labour economy, popular movements and peasant revolts, and locate their own view-points within this grid of perspectives</p>
DSE-4 Paper 6(f): The making of Contemporary India(1950-1990)	CO1: Students will be able to comprehend wide ranging topics of compelling contemporary interest in the context of India from the 1950s to the 1990s.
COURSE OUTCOME FOR SKILL ENHANCEMENT COURSE(SEC)	
(SEC) PAPER 3(a): Understanding Heritage	<p>CO1: The course will help students to know the complex character of heritage. This course will make them aware of numerous arenas where heritage generates avenue for revenue generation.</p> <p>CO2: Site visit to heritage site will make them appreciate the cultural diversity.</p> <p>CO3: Site visit will also acquaint them with the popular appreciation and appropriation of heritage.</p>
(SEC) PAPER 3(b): Archives and Museums	<p>CO1: The aim of this course is to make the students familiar with the structure and functioning of archives and museums with a view to understand how history is written.</p> <p>CO2: The special focus of the paper will be India and it will enlarge on the relationship between the reading, writing and interpretation of history and the preservation and display of its manuscripts, art objects and heritage. It will show how carefully archives and museums organise their materials to create particular interpretations of the past.</p> <p>CO3: The paper will be of particular value to those who are interested seeking careers as archivists or working in museums, art galleries and keepers of private and public collections.</p>
(SEC) PAPER 4(a): Indian Art and Architecture	CO1: This course aims to provide an understanding of the Indian art forms from ancient to contemporary times, fostering appreciation of its diversity and plurality of aesthetic richness. The course begins with how Indian art was perceived in the west and the construction of the orientalist canon, laying stress on the primacy of religion and race in Indian art and superiority of Western aesthetics. The nationalist response, underlining the transcendental and metaphysical aspects of Indian art, giving it the 'Indianess'

	<p>are explored next.</p> <p>CO2: New concerns in Indian art studies regarding its social context complete the historiographical issues and sets the stage for what follows. The last three units deal with three vital manifestations of Indian art, keeping in view the transitions in terms of style, material, historical contexts, regional variations, elite/popular art, patterns of patronage, representation of gender and the study of iconography of various works of art.</p>
(SEC) PAPER 4(b): Understanding Popular Culture	<p>CO1: The course will enable students to grasp significant aspects of popular culture in the Indian context. They would be able to understand differences in cultural types as well as would be able to assess the impact of types of cultural expressions on society.</p> <p>CO2: By identifying themes and characters belonging to the various cultural forms and by visiting an exhibition/fair/festival, projects may be made which is an essential part of this course. This will help them in understanding the various nuances of popular culture.</p>
COURSE OUTCOME FOR GENERIC ELECTIVE (GE)	
(GE) PAPER 1: Delhi through the ages	<p>After completing the course, the student shall be able to:</p> <p>CO1: The study of Delhi will introduce students to different kinds of sources -- archaeological, architectural and a variety of textual materials. Students will learn how to use these materials and correlate their sometimes discordant information.</p> <p>CO2: Through the study of a city which was also a capital it will teach students to analyze processes of urbanization and state formation. But the focus on the city will also teach them the difficulties in appropriating narratives of the state with the history of particular localities.</p> <p>CO3: The course underlines the need to read the history of the city creatively without subsuming it within the state.</p>
History of science and technology	<p>After completing the course, the student shall be able to</p> <p>CO1: Critique the prevalent dominant understanding of science and technology.</p> <p>CO2: Discuss the complex relations between science, technology and society.</p> <p>CO3: Examine the role of politics associated with scientific and technological developments and its economics in the capitalist economy</p> <p>CO4: Examine the character of 'dual use' technologies.</p> <p>CO5: various initiatives taken by government for promotion of science and technology.</p>
(GE) PAPER 2: Issues in the	<p>CO1: First of all, students of this course will acquire a broad overview of contemporary world history. It will enable them</p>

contemporary world	<p>to understand the evolving polities, societies and cultures of an increasingly global world.</p> <p>CO2: It expects to impart a historical sense to the students to enable them to comprehend key current issues in a better way. Through relevant case studies and critical engagements, they will also acquire skills to understand and analyse diverse social movements and cultural trends.</p> <p>CO3: The assignments and presentations will help improve their written expressions and communication skills</p>
Cultural diversity in India	<p>CO1: The Course will help students to understand at least five major components of India's diverse cultural traditions.</p> <p>CO2: They will be able to identify the complex processes that define differences and co-existence of multiple communities in the subcontinent. CO3: The written assignment, field engagement and tutorial discussions will help develop skills for comprehension and written expression.</p>
(GE) PAPER 3: Perspectives on environmental history	<p>After completing this course, students should be able to :</p> <p>CO1: Critique an understanding of environmental concerns based on a narrow scientific/technological perspective.</p> <p>CO2: Discuss environmental issues within a social and political (or social scientific?) framework.</p> <p>CO3: Examine the role of social inequality. How does unequal distribution of and unequal access to environmental resources help understand the environmental crisis of the world - from the global to the local.</p> <p>CO4: Examine the complexities of resource distribution and inequalities of resource use, locating these within specific social contexts, with reference to case studies regarding water rights and forest rights</p> <p>CO5: Locate solutions to environmental problems within a framework of greater democratisation of resource use.</p> <p>CO6: Problematising (or critique?) the notion of a pristine past - of perfect balance between human societies and nature in pre-modern times.</p>
The making of contemporary India	<p>CO1: Students will be able to comprehend wide ranging topics of compelling contemporary interest in the context of India from the 1950s to the 1990s since various themes and debates of the period have been adequately covered.</p>
(GE) PAPER 4: Religion and religiosity	<p>On successful completion of the course, the students will be able to:</p> <p>CO1: Describe the basic chronological, spatial and substantive contours of each of the religious traditions as well as certain intellectual currents that questioned them.</p> <p>CO2: Analyse and articulate the long-term changes that each religious tradition undergoes in a dynamic relationship with its own past, with non-religious aspects of life, and with other religious traditions.</p>

	<p>CO3: Identify and describe the formation of religious boundaries, identities and the scope for the liminal spaces in between.</p> <p>CO4: Appreciate, examine and relate to the debates on the ways in which modern Indian state and its constitution must deal with the issue of plurality of religious beliefs and practices.</p>
Inequality and difference	<p>After completing this course, students should be able to:</p> <p>CO1: Critique the prevalent dominant understanding of Caste, Gender, and Tribe.</p> <p>CO2: Discuss the complex relations between differences and inequalities.</p> <p>CO3: Examine the inherent politics in the creation of inequalities and differences.</p> <p>CO4: Appreciate various initiatives taken by government to prohibit caste-gender atrocities and uplift of deprived sections of society and its limitations.</p>

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

SUBJECT: Life Science	
<p>PROGRAMME SPECIFIC OUTCOME</p> <p>For Botany</p>	<p>PSO1: Students of the B.Sc. Life Sciences programme will learn to use scientific logic as they explore a wide range of contemporary subjects spanning various basic and applied aspects life sciences.</p> <p>PSO2: Students will appreciate the biological diversity of plant and animals and compounds in them to be able to describe/explain the processes used by microorganisms for their replication, survival, and interaction with their environment, hosts, and host populations.</p> <p>PSO3: They will become aware of the important role of plant and animals in ecosystem functioning.</p> <p>PSO4: Students will gain knowledge of various biotechnological applications of plants and animals and will learn of industrially important natural products produced by them.</p> <p>PSO5: Students will become familiar with scientific methodology, hypothesis generation and testing, design and execution of experiments. Students will develop the ability to think critically and to read and analyze scientific literature.</p> <p>PSO6: Students will acquire and demonstrate proficiency in good laboratory practices in biological sciences and be able to explain the theoretical basis and practical skills</p>

	<p>of the tools/technologies commonly used to study this field.</p> <p>PSO7: Students will develop proficiency in the quantitative skills necessary to analyze biological problems (e.g., arithmetic, algebra, and statistical methods as applied to biology)</p> <p>PSO8: Students will develop strong oral and written communication skills through the effective Presentation of experimental results as well as through seminars.</p> <p>PSO9: Graduates of the B.Sc. Programme in Life Sciences will make the students to understand and evaluate the impact of new research discoveries in the life sciences, and will be able to stimulate to think on wide range of careers, including biological and medical research in higher education institutions as well as careers in public and global health, scientific writing, environmental organizations, and food, pharmaceuticals and biotechnology industries.</p>
For Chemistry	
<p>PROGRAMME SPECIFIC OUT COME</p> <p>For Zoology</p>	<p>PSO1: Zoology is one of the most fundamental branches of biology to be studied at undergraduate level.</p> <p>PSO2: It is required to learn and understand about animal diversity and to appreciate their variability in relation to their morphology, anatomy and behavior.</p> <p>PSO3: The course will also provide an opportunity to learn and understand about evolution.</p> <p>PSO4: Students will be able to appreciate evolutionary parameters using various bioinformatics and computational tools used in modern sciences. The course further enhances understanding of classical genetics to comprehend distribution of various traits among populations, their inheritance, ethnicity and students can correlate these aspects with contemporary and modern subjects like genomics, metagenomics and genome editing tools.</p> <p>PSO5: Skills gained in practical and theory will be helpful in designing holistic public health strategies for social welfare.</p> <p>PSO6: Studying zoology as a part of life science course, further enhance knowledge of applied subjects to hone students' skills to build a career and become an entrepreneur in the field of aquatic biology, sericulture, apiculture etc. After completion of this course, students could contribute as policy makers in</p>

	wild life conservation, and environment protection.
COURSE OUTCOME FOR I YEAR	
Semester I	
CC-Botany I: Biodiversity (Microbes, Algae, Fungi and Archegoniate)	CO1: Understand the world of fungi, and pathogens of plants CO2: Appreciate the characteristics of the fungi CO3: Understand the ecological and economic significance of lichen CO4: Understand the application of mycology in various fields of economic and ecological significance CO5: Understand the economic and pathological importance of fungi, bacteria and viruses CO6: Identify common plant diseases and their control measures
CC-Chemistry I: Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons	CO1: Solve the conceptual questions using the knowledge gained by studying the quantum mechanical model of the atom, quantum numbers, electronic configuration, radial and angular distribution curves, shapes of s, p, and d orbitals, and periodicity in atomic radii, ionic radii, ionization energy and electron affinity of elements. CO2: Draw the plausible structures and geometries of molecules using radius ratio rules, VSEPR theory and MO diagrams (homo- & hetero-nuclear diatomic molecules). CO3: Understand and explain the differential behavior of organic compounds based on fundamental concepts learnt. CO4: Formulate the mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved. CO5: Learn and identify many organic reaction mechanisms including free radical substitution, electrophilic addition and electrophilic aromatic substitution.
CC-Zoology I: Animal Diversity	CO1: Distinguish between major phyla of animals through a demonstrated understanding of their taxonomic classification and diversity. CO2: Describe the distinguishing characteristics of all major phyla. CO3: Understand the fundamental differences among animal body plans and relate them to function, taxonomic classification, and evolutionary relationships among phyla. CO4: Illustrate lifecycles, structure, function and reasons for importance of few representative organisms from

	<p>different groups of animals.</p> <p>CO5: Identify anatomical structures from prepared tissues.</p> <p>CO6: Observe living animals in the environment and relate observations to theory from the course.</p> <p>CO7: Recognize major animal phyla and animals on the basis of their external characteristics.</p>
Semester II	
CC-Botany II: Plant Ecology and Taxonomy	<p>CO1: Knowledge regarding anatomy equipped the students to identify different types of tissues and make them able to correlate their physiology in a better way.</p> <p>CO2: This will also help them to understand how different plant tissue evolve and modify their structure and functions with respect to their environment.</p> <p>CO3: Knowledge regarding embryology makes them understand how reproduction play significant role in defining population structure, natural diversity and sustainability of ecosystem in a better way.</p>
CC-Chemistry II: Chemical Energetics, Equilibria & Functional Group Organic	<p>CO4: Understand the laws of thermodynamics, thermochemistry and equilibria.</p> <p>CO5: Understand concept of pH and its effect on the various physical and chemical properties of the compounds.</p> <p>CO6: Use the concepts learnt to predict feasibility of chemical reactions and to study the behaviour of reactions in equilibrium.</p> <p>CO7: Understand the fundamentals of functional group chemistry through the study of methods of preparation, properties and chemical reactions with underlying mechanism.</p> <p>CO8: Use concepts learnt to understand stereochemistry of a reaction and predict the reaction outcome</p> <p>CO9: Design newer synthetic routes for various organic compounds.</p>
CC- Zoology II: Comparative Anatomy and Developmental Biology of Vertebrates	<p>CO10: Critically think and analyse the significance of morphological traits that vertebrates possess and understand the position of humans in evolutionary history.</p> <p>CO11: Understand the events that lead to formation of a multicellular organism from a single fertilized egg, the zygote. The students acquire basic knowledge of the cellular processes of development and the molecular mechanisms underlying these.</p> <p>CO12: Able to describe the general patterns and sequential developmental stages during embryogenesis. The students understand how the developmental processes lead to establishment of body plan of multicellular organisms.</p>

	<p>CO13: Discuss the general mechanisms involved in morphogenesis and explain how different cells and tissues interact in a coordinated way to form various tissues and organs.</p> <p>CO14: Learn the importance of latest techniques like stem cell therapy, in vitro fertilization and amniocentesis etc. to be applied for human welfare.</p> <p>CO15: Become aware of teratogens responsible for the rise of congenital abnormalities globally.</p> <p>CO16: Comprehend the concept of gene activation, determination, induction, differentiation, morphogenesis, intercellular communication, cell movements and cell death</p>
COURSE OUTCOME FOR II YEAR	
Semester III	
CC- Botany III: Plant Anatomy and Embryology	CO1: After successful completion of the course the student shall have adequate knowledge about the basic principles of environment and taxonomy.
CC- Chemistry III: Conductance, Electrochemistry & Functional Group Organic Chemistry-II	<p>CO1: Explain the concepts of different types of binary solutions-miscible, partially miscible and immiscible along with their applications.</p> <p>CO2: Explain the thermodynamic aspects of equilibria between phases and draw phase diagrams of simple one component and two component systems.</p> <p>CO3: Explain the factors that affect conductance, migration of ions and application of conductance measurement.</p> <p>CO4: Understand different types of galvanic cells, their Nernst equations, measurement of emf, calculations of thermodynamic properties and other parameters from the emf measurements.</p> <p>CO5: Understand and demonstrate how the structure of biomolecules determines their chemical properties, reactivity and biological uses.</p> <p>CO6: Design newer synthetic routes for various organic compounds.</p>
CC- Zoology III: Physiology and Biochemistry	<p>CO1: Comprehend and analyze problem based questions.</p> <p>CO2: Develop investigative, communicative, analytical and personal skills with respect to the subject. Recognize and explain how all physiological systems work in unison to maintain homeostasis in the body and feedback loops control the same.</p> <p>CO3: Synthesize ideas to make connection between knowledge of physiology and real world situations, including healthy life style decisions and homeostatic imbalances i.e. how physiological mechanisms adapt</p>

	<p>in response to various external and internal stimuli in order to maintain health.</p> <p>CO4: Know the role of regulatory systems viz. endocrine and nervous systems and their amalgamation in maintaining various physiological processes.</p> <p>CO5: Understand the concepts of biochemistry and interaction of biomolecules with each other to bring about life processes.</p> <p>CO6: Appreciate the role of enzymes in metabolic pathways.</p> <p>CO7: Learn control of enzyme activity, its mechanism of action and how a drug might inhibit the enzyme.</p>
Semester IV	
CC-Botany IV: Plant Physiology and Metabolism	<p>CO1: The students are able to correlate morphology, anatomy, cell structure and biochemistry with plant functioning.</p> <p>CO2: The link between theory and practical syllabus is established, and the employability of youth would be enhanced. The youth can also begin small-scale enterprises.</p>
CC-Chemistry IV: Chemistry of s- and p-block elements, States of matter and Chemical Kinetics	<p>CO1: Understand the chemistry and applications of s- and p-block elements.</p> <p>CO2: Derive ideal gas law from kinetic theory of gases and explain why the real gases deviate from ideal behaviour.</p> <p>CO3: Explain Maxwell-Boltzmann distribution, critical constants and viscosity of gases.</p> <p>CO4: Explain the properties of liquids especially surface tension and viscosity.</p> <p>CO5: Explain symmetry elements, crystal structure specially NaCl, KCl and CsCl</p> <p>CO6: Define rate of reactions and the factors that affect the rates of reaction.</p> <p>CO7: Understand the concept of rate laws e.g., order, molecularity, half-life and their determination</p> <p>CO8: Learn about various theories of reaction rates and how these account for experimental observations.</p>
CC-Zoology IV: Genetics and Evolutionary Biology	<p>CO1: The course has been designed with an aim that knowledge of the principles of inheritance is essential for a deeper understanding of the varied branches of the biological sciences like microbiology, evolutionary biology, genomics and metagenomics.</p> <p>CO2: Analysis of pedigree will lead to development of analytical skills and critical thinking enabling the students to present the conclusion of their findings in a scientific manner.</p>

	<p>CO3: Field studies can be conducted and case histories of families can be collected. This will not only help the students in hypothesis formulating and testing but will also teach them an essential skill of data collection.</p> <p>CO4: Students can prepare reports and present their findings in posters or oral presentations. This will help them to upgrade their data presentation and communication skills.</p>
COURSE OUTCOME FOR III YEAR	
Semester V & VI	
Discipline Specific Elective Papers in Botany	
Economic Botany and Biotechnology	CO1: Understanding of morphology and processing and economic value of plant sources of cereals, legumes, spices, oil, rubber, timber and medicines.
Cell and Molecular Biology	<p>CO1: This course will be able to demonstrate foundational knowledge in understanding of:</p> <p>CO2: The relationship between the properties of macromolecules, their cellular activities and biological responses.</p> <p>CO3: Understanding of Cell metabolism, chemical composition, physiochemical and functional organization of organelle Contemporary approaches in modern cell and molecular biology.</p> <p>CO4: Understanding of nucleic acid, organization of DNA in prokaryotes and Eukaryotes, DNA replication mechanism, genetic code and transcription process.</p> <p>CO5: Processing and modification of RNA and translation process, function and regulation of expression.</p> <p>CO6: Application in biotechnology</p>
Analytical Techniques in Plant Sciences	CO1: Understanding of principles and use various methods, tools and techniques used in plant sciences such as light microscopy, confocal transmission and electron microscopy, centrifugation, spectrophotometry, chromatography, x-ray diffraction technique and chromatography techniques
Bioinformatics	<p>CO1: With a working knowledge of the practical and theoretical concepts of bioinformatics, you will be well qualified to progress onto advanced graduate study.</p> <p>CO2: The portfolio of skills developed on the programme is also suited to academic research or work within the bioinformatics industry as well as range of commercial settings.</p>
Discipline Specific Elective Papers in Chemistry	
Applications of Computers in Chemistry	CO1: Have knowledge of most commonly used commands and library functions used in QBASIC programming.

	<p>CO2: Develop algorithm to solve problems and write corresponding programs in BASIC for performing calculations involved in laboratory experiments and research work.</p> <p>CO3: Use various spreadsheet software to perform theoretical calculations and plot graphs</p>
Analytical Methods in Chemistry	<p>CO1: Perform experiment with accuracy and precision.</p> <p>CO2: Develop methods of analysis for different samples independently.</p> <p>CO3: Test contaminated water samples.</p> <p>CO4: Understand basic principle of instrument like Flame Photometer, UV-vis spectrophotometer.</p> <p>CO5: Learn separation of analytes by chromatography.</p> <p>CO6: Apply knowledge of geometrical isomers and keto enol tautomers to analysis.</p> <p>CO7: Determine composition of soil.</p> <p>CO8: Estimate macronutrients using Flame photometry.</p>
Molecular Modelling & Drug Design	<p>CO1: Understand theoretical background of computational techniques and selective application to various molecular systems.</p> <p>CO2: Learn Energy minimization methods through use of different force fields.</p> <p>CO3: Learn ESP Plots by suitable soft wares, electron rich and electron deficient sites,</p> <p>CO4: Compare computational and experimental results and explain deviations.</p> <p>CO5: Carry out Molecular dynamics (MD) and Monte Carlo (MC) simulations on several molecules and polymers.</p> <p>CO6: Learn QSAR properties and their role in molecular modelling, cheminformatics and drug discovery.</p> <p>CO7: Perform Optimization of geometry parameters of a molecule (such as shape, bond length and bond angle) through use of software like Chem Sketch and Argus Lab in interesting hands-on exercises.</p>
Novel Inorganic Solids	<p>CO1: Understand the mechanism of solid-state synthesis.</p> <p>CO2: Explain about the different characterization techniques and their principle.</p> <p>CO3: Understand the concept of nanomaterials, their synthesis and properties.</p> <p>CO4: Explain the mechanism of growth of self-assembled nanostructures.</p> <p>CO5: Appreciate the existence of bioinorganic nanomaterials.</p> <p>CO6: Explain the importance of composites, conducting polymers and their applications.</p> <p>CO7: Understand the usage of solid materials in various</p>

	instruments, batteries, etc. which would help them to appreciate the real life importance of these materials
Polymer Chemistry	<p>CO1: Know about history of polymeric materials and their classification</p> <p>CO2: Learn about different mechanisms of polymerization and polymerization techniques</p> <p>CO3: Evaluate kinetic chain length of polymers based on their mechanism</p> <p>CO4: Differentiate between polymers and copolymers</p> <p>CO5: Learn about different methods of finding out average molecular weight of polymers</p> <p>CO6: Differentiate between glass transition temperature (T_g) and crystalline melting point (T_m)</p> <p>CO7: Determine T_g and T_m</p> <p>CO8: Know about solid and solution properties of polymers</p> <p>CO9: Learn properties and applications of various useful polymers in our daily life.</p>
Research Methodology for Chemistry	<p>CO1: Learn how to identify research problems.</p> <p>CO2: Evaluate local resources and need for addressing the research problem</p> <p>CO3: Find out local solution.</p> <p>CO4: Know how to communicate the research findings.</p>
Green Chemistry	<p>CO1: Understand the twelve principles of green chemistry and will build the basic understanding of toxicity, hazard and risk of chemical substances.</p> <p>CO2: Understand stoichiometric calculations and relate them to green chemistry metrics. They will learn about atom economy and how it is different from percentage yield.</p> <p>CO3: Learn to design safer chemical, products and processes that are less toxic, than current alternatives. Hence, they will understand the meaning of inherently safer design for accident prevention and the principle "what you don't have can't harm you"</p> <p>CO4: Understand benefits of use of catalyst and bio catalyst, use of renewable feed stock which helps in energy efficiency and protection of the environment, renewable energy sources, importance of reactions in various green solvents.</p> <p>CO5: Appreciate the use of green chemistry in problem solving skills, critical thinking and valuable skills to innovate and find out solution to environmental problems. Thus the students are able to realise that chemistry can be used to solve rather than cause environmental problems.</p>
Industrial Chemicals &	CO1: The different toxic gases and their toxicity hazards

Environment	CO2: Safe design systems for large scale production of industrial gases. CO3: Manufacturing processes, handling and storage of inorganic chemicals. CO4: Hazardous effects of the inorganic chemicals on human beings and vegetation. CO5: The requirement of ultra-pure metals for the semiconducting technologies CO6: Composition of air, various air pollutants, effects and control measures of air pollutants. CO7: Different sources of water, water quality parameters, impacts of water pollution, water treatment. CO8: Different industrial effluents and their treatment methods. CO9: Different sources of energy. CO10: Generation of nuclear waste and its disposal. CO11: Use of biocatalyst in chemical industries.
Inorganic Materials of Industrial Importance	CO1: Learn the composition and applications of the different kinds of glass. CO2: Understand glazing of ceramics and the factors affecting their porosity. CO3: Give the composition of cement and discuss the mechanism of setting of cement. CO4: Explain the suitability of fertilizers for different kinds of crops and soil. CO5: Explain the process of formulation of paints and the basic principle behind the protection offered by the surface coatings. CO6: Explain the principle, working and applications of different batteries. CO7: List and explain the properties of engineering materials for mechanical construction used in day to day life. CO8: Explain the synthesis and properties of nano-dimensional materials, various semiconductor and superconductor oxides.
Instrumental Methods of Analysis	CO1: Handle analytical data CO2: Understand basic components of IR, FTIR, UV-Visible and Mass spectrometer. CO3: Interpret of IR, FTIR, UV-visible spectra and their applications. CO4: Understand the use of single and double beam instruments. CO5: Learn separations techniques like Chromatography. CO6: Learn elemental analysis, NMR spectroscopy, Electroanalytical Methods, Radiochemical Methods,

	X-ray analysis and electron spectroscopy.
Chemistry of d-block elements, Quantum Chemistry and Spectroscopy	<p>CO1: Understand chemistry of d and f block elements, Latimer diagrams, properties of coordination compounds and VBT and CFT for bonding in coordination compounds</p> <p>CO2: Understand basic principles of quantum mechanics: operators, eigen values, averages, probability distributions.</p> <p>CO3: Understand and use basic concepts of microwave, IR and UV-VIS spectroscopy for interpretation of spectra.</p> <p>CO4: Explain Lambert-Beer's law, quantum efficiency and photochemical processes.</p>
Organometallics, Bioinorganic chemistry, Polynuclear hydrocarbons and UV, IR Spectroscopy	<p>CO1: Understand the chemistry and applications of 3d elements including their oxidation states and important properties of the familiar compounds potassium dichromate, potassium permanganate and potassium ferrocyanide</p> <p>CO2: Use IR data to explain the extent of back bonding in carbonyl complexes</p> <p>CO3: Get a general idea of toxicity of metal ions through the study of Hg^{2+} and Cd^{2+} in the physiological system</p> <p>CO4: Understand the fundamentals of functional group chemistry, polynuclear hydrocarbons and heterocyclic compounds through the study of methods of preparation, properties and chemical reactions with underlying mechanism.</p> <p>CO5: Gain insight into the basic fundamental principles of IR and UV-Vis spectroscopic techniques.</p> <p>CO6: Use basic theoretical principles underlying UV-visible and IR spectroscopy as a tool for functional group identification in organic molecules.</p>
Molecules of life	<p>CO1: Learn and demonstrate how the structure of biomolecules determines their chemical properties, reactivity and biological uses.</p> <p>CO2: Gain an insight into mechanism of enzyme action and inhibition.</p> <p>CO3: Understand the basic principles of drug-receptor interaction and SAR.</p> <p>CO4: Understand biological processes like replication, transcription and translation.</p> <p>CO5: Demonstrate an understanding of metabolic pathways, their inter-relationship, regulation and energy production from biochemical processes.</p>
Discipline Specific Elective Papers in Zoology	
Applied Zoology	CO1: Understand the concept of host, definitive host,

	<p>intermediate host, parasitism, symbiosis, commensalism, reservoir, zoonosis.</p> <p>CO2: Know about epidemiology of diseases; i.e., transmission, prevention and control of diseases. Understand pathogenicity of Protozoan and parasitic helminths.</p> <p>CO3: Learn about the concept of pest and pest status.</p> <p>CO4: Understand the difference between various types of pests and extent of damage caused by them.</p> <p>CO5: Gain knowledge about important pests of crops, fruits, vegetables, stored grains and insects of medical importance.</p> <p>CO6: Analysis of varied types of control measures for management of pest populations and list suitable control measures, specific for every pest.</p> <p>CO7: Preservation and artificial insemination in cattle; Induction of early puberty and synchronization of estrus in cattle.</p> <p>CO8: General idea about poultry farming.</p>
Animal Biotechnology	<p>CO1: Use or demonstrate the basic techniques of biotechnology like DNA isolation, PCR, transformation, restriction digestion etc.</p> <p>CO2: Make a strategy to manipulate genetic structure of an organism for the improvement in any trait or its well-being based on the techniques learned during this course.</p> <p>CO3: Understand better the ethical and social issues regarding GMOs.</p> <p>CO4: Use the knowledge for designing a project for research and execute it.</p>
Reproductive Biology	<p>CO1: Get in-depth understanding of morphology, anatomy and histology of male and female reproductive organs.</p> <p>CO2: Know different processes in reproduction starting from germ cell formation to fertilization and consequent pregnancy, parturition and lactation.</p> <p>CO3: Compare estrous and menstrual cycles and their hormonal regulation.</p> <p>CO4: Comprehend the interplay of various hormones in the functioning and regulation of the male and female reproductive systems.</p> <p>CO5: Know about the diagnosis and management of infertility, including latest methods, technologies and infrastructure in assisted reproduction.</p> <p>CO6: Practically understand the modern methods in contraception and their use in family planning strategies.</p>

	CO7: Translate their understanding into development of products like non-hormonal contraceptives; contribute to drug discovery programmes as well as neonatal and maternal health programmes and work with family planning teams to understand the needs and preferences of individuals belonging to lower socioeconomic groups.
Aquatic Biology	CO1: Know the physico-chemical environment, and its role in aquatic ecosystem. CO2: Learn about adaptations exhibited by organisms to survive in these typical conditions. CO3: Realize how human activities influence the physicochemical environment of water bodies, and devastating impact it has on aquatic organisms. CO4: Learn about the laws governing the use of freshwater systems, as well as the local, state, federal, and international agencies that enforce these laws to protect endangered and vulnerable species. CO5: Understand and apply relevant scientific principles in the area of aquatic biology and educate others or work to conserve our natural resources.
Immunology	CO6: Describe the basic mechanisms, distinctions and functional interplay of innate and adaptive immunity CO7: Define the cellular/molecular pathways of humoral/cell-mediated adaptive responses including the role of Major Histocompatibility Complex CO8: Explain the cellular and molecular aspects of lymphocyte activation, homeostasis, differentiation, and memory CO9: Understand the molecular basis of complex, humoral (Cytokines and Complement) and cellular processes involved in inflammation and immunity, in states of health and disease CO10: Describe basic and state-of-the-art experimental methods and technologies CO11: Integrate knowledge of each subsystem to see their contribution to the functioning of higher-level systems in health and disease including basis of vaccination, autoimmunity, immunodeficiency, hypersensitivity and tolerance
	CO1: Identify different insects and classify them based on their morphology and behaviour CO2: Describe the host-pathogen relationships and the role of the host reservoir on transmission of parasite CO3: Explain various modes of transmission of parasite by insect vectors

	<p>CO4: Recognize various possible modern tools and methodologies for laboratory diagnosis, surveillance and treatment of diseases</p> <p>CO5: Define various terms related to insect transmitted diseases such as vectorial capacity, mechanical and biological transmission, host specificity etc.</p> <p>CO6: Identify the risk groups and characterize them on the basis of exposure risk</p> <p>CO7: Explain control methods of insect vector diseases including spreading awareness on public health programs and mitigating insect borne diseases</p> <p>CO8: Employ the use of advanced management strategies in disease control with respect to parasite evolution</p>
Skill Enhancement Course in Botany	
Bio fertilizers	<p>CO1: The student would have a deep understanding of ecofriendly fertilizers. They will be able to understand the growth and multiplication conditions of useful microbes such as Rhizobium, cyanobacteria, mycorrhizae, Azotobactor etc, their role in mineral cycling and nutrition to plants.</p> <p>CO2: They can also think of the methods of decomposition of biodegradable waste and convert into the compost</p>
Medicinal Botany	<p>CO1: An appreciation of the contribution of medicinal plants to traditional and modern medicine and the importance of holistic mode of treatment of the Indian traditional systems of medicine.</p> <p>CO2: To develop an understanding of the constraints in promotion and marketing of medicinal plants.</p> <p>CO3: Transforming the knowledge into skills for promotion of traditional medicines</p> <p>CO4: Developing entrepreneurship skills to establish value addition products, botanical extracts and isolation of bioactive compounds.</p>
Ethnobotany	<p>CO1: Students would have an understanding of the treasure, value and usefulness of the natural products and their efficient use by the local communities as food and medicine and their conservation practices.</p>
Intellectual Property Right	<p>CO1: Students would have deep understanding of patents copyrights, their importance.</p> <p>CO2: They can think about the importance of traditional knowledge, bio-prospecting, biopiracy.</p> <p>CO3: They would gain the knowledge of farmers rights and the importance on indigenous plant varieties, concept of novelty and biotechnological inventions</p>
Skill Enhancement Course in Chemistry	
IT Skills for Chemists	<p>CO1: Become familiar with the use of computers</p>

	CO2: Use software for tabulating data, plotting graphs and charts, carry out statistical analysis of the data. CO3: Solve chemistry problems and simulate graphs. CO4: Prepare documents that will incorporate chemical structure, chemical equations, mathematical expressions from chemistry.
Basic Analytical Chemistry	CO1: Handle analytical data CO2: Determine composition and pH of soil, which can be useful in agriculture CO3: Do quantitative analysis of metal ions in water CO4: Separate mixtures using separation techniques CO5: Estimate macro nutrients using Flame photometry
Chemical Technology & Society	CO1: Understand the use of basic chemistry to chemical engineering CO2: Learn and use various chemical technology used in industries CO3: Develop scientific solutions for societal needs
Chemoinformatics	CO4: Have a comprehensive understanding of drug discovery process and techniques including structure-activity relationship, quantitative structure activity relationship and the use of chemoinformatics in this, including molecular modelling and docking studies. CO5: Appreciate role of modern computation techniques in the drug discovery process and perform their own modelling studies.
Business Skills for Chemists	CO1: Learn basics skills of of business and project management. CO2: Understand the process of product development and business planning that includes environmental compliancy. CO3: Learn the process by which technical innovations are conceived and converted into successful business ventures. CO4: Understand the intellectual property rights and patents which drive business viability and commercialization of innovation. CO5: Relate to the importance of chemistry in daily life, along with the employment and business opportunities. They will effectively use the skills to contribute towards the well-being of the society and derive commercial value.
Intellectual Property Rights	CO1: Learn theoretical concepts of evolution of Intellectual Property Laws, and to differentiate between the different kinds of IP. CO2: Know the existing legal framework relating to IP in India.

	<p>CO3: Comprehend the value of IP and its importance in their respective domains.</p> <p>CO4: This course may motivate the students to make their career in multifaceted field of intellectual property rights.</p>
Analytical Clinical Biochemistry	<p>CO1: Understand and establish how the structure of biomolecules determines their reactivity and biological uses.</p> <p>CO2: Understand the basic principles of drug-receptor interaction and structure activity relation (SAR).</p> <p>CO3: Gain an insight into concept of heredity through biological processes like replication, transcription and translation.</p> <p>CO4: Demonstrate an understanding of the biochemistry of diseases.</p> <p>CO5: Understand the application of chemistry in biological systems.</p>
Green Methods in Chemistry	<p>CO1: Get idea of toxicology, environmental law, energy and the environment</p> <p>CO2: Think to design and develop materials and processes that reduce the use and generation of hazardous substances in industry.</p> <p>CO3: Think of chemical methods for recovering metals from used electronics materials.</p> <p>CO4: Get ideas of innovative approaches to environmental and societal challenges.</p> <p>CO5: Know how chemicals can have an adverse/potentially damaging effect on human and vegetation.</p> <p>CO6: Critically analyse the existing traditional chemical pathways and processes and creatively think about bringing environmentally benign reformations in these protocols.</p> <p>CO7: Convert biomass into valuable chemicals through green technologies.</p>
Pharmaceutical Chemistry	<p>CO1: Gain insight into retro-synthesis approach in relation to drug design and drug discovery.</p> <p>CO2: Learn synthetic pathways of major drug classes.</p> <p>CO3: Understand the fermentation process and production of ethanol, citric acids, antibiotics and some classes of vitamins.</p>
Chemistry of Cosmetics & Perfumes	<p>CO1: Learn basic of cosmetics, various cosmetic formulation, ingredients and their roles in cosmetic products.</p> <p>CO2: Learn the use of safe, economic and body-friendly cosmetics</p> <p>CO3: Prepare new innovative formulations.</p>

Pesticide Chemistry	CO1: Students will be able to learn about the basic role of pesticide in everyday life, various ingredients and their role in controlling the pest. Students can also educate the farmers/gardeners to choose the appropriate pesticides for their crop production.
Fuel Chemistry	<p>CO1: The course covers both conventional petroleum-based fuels, and alternative & renewable fuels, including gaseous fuels.</p> <p>CO2: The students will learn the chemistry that underpins petroleum fuel technology, will understand the refining processes used to produce fuels and lubricants and will know how differences in chemical composition affect properties of fuels and their usage in different applications.</p> <p>CO3: The course will also cover origin of petroleum, crude oil, composition, different refining processes employed industrially to obtain different fractions of petroleum. Further, course will cover various alternative and renewable fuels like Biofuels (Different generations), Gaseous Fuels (e.g. CNG, LNG, CBG, Hydrogen etc.).</p> <p>CO4: The course will also cover fuel product specifications, various test methods used to qualify different types of fuels as well characterization methods.</p> <p>CO5: Review of energy scenario (Global & India), Energy sources (renewable and non-renewable). Types of Crude Oils, Composition and Properties. Crude oil assay</p>
Skill Enhancement Course in Zoology	
Apiculture	<p>CO1: Learn about the various species of honey bees in India, their social organization and importance.</p> <p>CO2: Be aware about the opportunities and employment in apiculture – in public, private and government sector.</p> <p>CO3: Gain thorough knowledge about the techniques involved in bee keeping and honey production.</p> <p>CO4: Know about various products obtained from beekeeping sector and their importance.</p> <p>CO5: Develop entrepreneurial skills necessary for self-employment in beekeeping sector.</p> <p>CO6: Enhance collaborative learning and communication skills through practical sessions, team work, group discussions, assignments and projects.</p>
Aquarium Fish Keeping	<p>CO1: Acquire knowledge about different kinds of fishes, their compatibility in aquarium.</p> <p>CO2: Become aware of Aquarium as commercial, decorative and of scientific studies.</p>

	<p>CO3: Develop personal skills on maintenance of aquarium.</p> <p>CO4: Know about the basic needs to set up an aquarium, i.e., dechlorinated water, reflector, filters, scavenger, aquatic plants etc. and the ways to make it cost-effective.</p>
Medical Diagnostics	<p>CO5: Gain knowledge about various infectious, non-infectious and lifestyle diseases, tumors and their diagnosis.</p> <p>CO6: Understand the use of histology and biochemistry of clinical diagnostics and learn about the molecular diagnostic tools and their relation to precision medicine.</p> <p>CO7: Develop their skills in various types of tests and staining procedure involved in hematology, clinical biochemistry and will know the basics of instrument handling.</p> <p>CO8: Learn scientific approaches/techniques used in the clinical laboratories to investigate various diseases and will be skilled to work in research laboratories.</p> <p>CO9: Gain knowledge about common imaging technologies and their utility in the clinic to diagnose a specific disease.</p>
Public Health and Hygiene	<p>CO1: Get familiarised with various aspects of environmental risks and hazards.</p> <p>CO2: Sensitize about the climate change due to human activities.</p> <p>CO3: Be aware about the various impacts of environmental degradation on human health through case studies and modes of prevention.</p> <p>CO4: Learn about the nuclear and chemical disasters and their aftereffects through cases studies.</p> <p>CO5: Know about the various waste management technologies and their utility.</p> <p>CO6: Learn about diagnosis of various diseases and methods to prevent them.</p> <p>CO7: Be sensitized enough to understand the importance of conservation of nature for betterment of human race and all living beings.</p>
Sericulture	<p>CO1: Learn about the history of sericulture and silk route.</p> <p>CO2: Recognize various species of silk moths in India, and Exotic and indigenous races.</p> <p>CO3: Be aware about the opportunities and employment in sericulture industry – in public, private and government sector.</p> <p>CO4: Gain thorough knowledge about the techniques involved in silkworm rearing and silk reeling.</p>

	<p>CO5: Develop entrepreneurial skills necessary for self-employment in mulberry and seed</p> <p>CO6: production and be apprised about practicing sericulture as a profit-making enterprise.</p> <p>CO7: Enhance collaborative learning and communication skills through practical sessions, team</p> <p>CO8: work, group discussions, assignments and projects.</p>
	CO9:
<p>PROGRAMME SPECIFIC OUTCOME</p> <p>For Zoology SEC</p>	<p>PSO1. Students undertaking skill enhancement courses like aquaculture, sericulture and apiculture will inculcate skills involved in rearing fish, bees and silk moth which would help them in starting their own ventures and generating self-employment making them successful entrepreneurs.</p> <p>PSO2. Acquired skills in diagnostic testings, haematology, histopathology, staining procedures etc. used in clinical and research laboratories will provide them opportunity to work in diagnostic or research laboratory.</p> <p>PSO3. Deep understanding of different physiological systems and methods available to measure vital physiological parameters and to comprehend the mechanism behind occurrence of different life threatening disease via laboratory examination, assessment of basic physiological functions by interpreting physiological charts will help to find their career options.</p> <p>PSO4. Students undertaking wild life management courses would gain expertise in identifying key factors of wild life management and be aware about different techniques of estimating, remote sensing and Global positioning of wild life. This course will motivate students to pursue a career in the field of wildlife conservation and management.</p>

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

SUBJECT: Mathematics for Honours	
PROGRAMME OUTCOME	<p>PO1: To develop the ability to think critically, logically and analytically.</p> <p>PO2: Student will able to use mathematical reasoning in everyday life.</p> <p>PO3: Introduce the students to a number of interesting and useful ideas in preparations for career oriented Government and</p>

	<p>private sectors.</p> <p>PO4: Research-related skills like capability to design and define problems, formulate hypotheses, test hypotheses and analysis through mathematical arguments.</p> <p>PO5: Student will learn about ICT and ICT based problem solving tools and techniques for mathematical as well as ethical issues.</p>
<p>PROGRAMME SPECIFIC OUT COME</p> <p>For Mathematics Honours</p>	<p>PSO1: Communicate mathematics effectively by written, computational and graphic means.</p> <p>PSO2: Create mathematical ideas from basic axioms.</p> <p>PSO3: Gauge the hypothesis, theories, techniques and proofs provisionally.</p> <p>PSO4: Utilize mathematics to solve theoretical and applied problems by critical understanding, analysis and synthesis.</p> <p>PSO5: Identify applications of mathematics in other disciplines and in the real-world, leading to enhancement of career prospects in a plethora of fields and research.</p>
<p>COURSE OUTCOME FOR Maths Hons.</p> <p>1ST YEAR (PAPERWISE)</p>	
<p>Semester I</p>	
<p>Calculus</p>	<p>This course will enable the students to:</p> <p>CO6: Learn first and second derivative tests for relative extrema and apply the knowledge in problems in business, economics and life sciences.</p> <p>CO7: Sketch curves in a plane using its mathematical properties in the different coordinate systems of reference.</p> <p>CO8: Compute area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.</p> <p>CO9: Understand the calculus of vector functions and its use to develop the basic principles of planetary motion</p>
<p>Algebra</p>	<p>This course will enable the students to:</p> <p>CO8: Employ De Moivre's theorem in a number of applications to solve numerical problems.</p> <p>CO9: Learn about equivalent classes and cardinality of a set.</p> <p>CO10: Use modular arithmetic and basic properties of congruences.</p> <p>CO11: Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix.</p>

	CO12: Find eigenvalues and corresponding eigenvectors for a square matrix.
Semester II	
Real Analysis	<p>This course will enable the students to:</p> <p>CO5: Understand many properties of the real line \mathbb{R}, including completeness and Archimedean properties.</p> <p>CO6: Learn to define sequences in terms of functions from \mathbb{N} to a subset of \mathbb{R}.</p> <p>CO7: Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.</p> <p>CO8: Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.</p>
Differential Equations	<p>The course will enable the students to:</p> <p>CO6: Learn basics of differential equations and mathematical modeling.</p> <p>CO7: Formulate differential equations for various mathematical models.</p> <p>CO8: Solve first order non-linear differential equations and linear differential equations of higher order using various techniques.</p> <p>CO9: Apply these techniques to solve and analyze various mathematical models.</p>
COURSE OUTCOME FOR 2ND YEAR (PAPERWISE)	
Semester III	
Theory of Real Functions	<p>This course will enable the students to:</p> <p>CO8: Have a rigorous understanding of the concept of limit of a function.</p> <p>CO9: Learn about continuity and uniform continuity of functions defined on intervals.</p> <p>CO10: Understand geometrical properties of continuous functions on closed and bounded intervals.</p> <p>CO11: Learn extensively about the concept of differentiability using limits, leading to a better understanding for applications.</p> <p>CO12: Know about applications of mean value theorems and Taylor's theorem.</p>
Group	The course will enable the students to:

Theory-I	<p>CO7: Recognize the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups, etc.</p> <p>CO8: Link the fundamental concepts of groups and symmetrical figures.</p> <p>CO9: Analyze the subgroups of cyclic groups and classify subgroups of cyclic groups.</p> <p>CO10: Explain the significance of the notion of cosets, normal subgroups and factor groups.</p> <p>CO11: Learn about Lagrange's theorem and Fermat's Little theorem.</p> <p>CO12: Know about group homomorphisms and group isomorphisms.</p>
Multivariate Calculus	<p>This course will enable the students to:</p> <p>CO1: Learn the conceptual variations when advancing in calculus from one variable to multivariable discussion.</p> <p>CO2: Understand the maximization and minimization of multivariable functions subject to the given constraints on variables.</p> <p>CO3: Learn about inter-relationship amongst the line integral, double and triple integral formulations.</p> <p>CO4: Familiarize with Green's, Stokes' and Gauss divergence theorems.</p>
Semester IV	
Partial Differential Equations	<p>The course will enable the students to:</p> <p>CO5: Formulate, classify and transform first order PDEs into canonical form.</p> <p>CO6: Learn about method of characteristics and separation of variables to solve first order PDE's.</p> <p>CO7: Classify and solve second order linear PDEs.</p> <p>CO8: Learn about Cauchy problem for second order PDE and homogeneous and nonhomogeneous wave equations.</p> <p>CO9: Apply the method of separation of variables for solving many well-known second order PDEs.</p>
Riemann Integration and Series of Functions	<p>The course will enable the students to:</p> <p>CO6: Learn about some of the classes and properties of Riemann integrable functions, and the applications of the Fundamental theorems of integration.</p> <p>CO7: Know about improper integrals including, beta and gamma functions.</p> <p>CO8: Learn about Cauchy criterion for uniform convergence and Weierstrass M-test for uniform convergence.</p> <p>CO9: Know about the constraints for the inter-changeability of</p>

	<p>differentiability and integrability with infinite sum.</p> <p>CO10: Approximate transcendental functions in terms of power series as well as, differentiation and integration of power series.</p>
Ring Theory and Linear Algebra-I	<p>The course will enable the students to:</p> <p>CO7: Learn about the fundamental concept of rings, integral domains and fields.</p> <p>CO8: Know about ring homomorphisms and isomorphisms theorems of rings.</p> <p>CO9: Learn about the concept of linear independence of vectors over a field, and the dimension of a vector space.</p> <p>CO10: Basic concepts of linear transformations, dimension theorem, matrix representation of a linear transformation, and the change of coordinate matrix.</p>
COURSE OUTCOME FOR 3RD YEAR (PAPERWISE)	
Semester V	
Metric Spaces	<p>The course will enable the students to:</p> <p>CO5: Learn various natural and abstract formulations of distance on the sets of usual or unusual entities. Become aware one such formulations leading to metric spaces.</p> <p>CO6: Analyse how a theory advances from a particular frame to a general frame.</p> <p>CO7: Appreciate the mathematical understanding of various geometrical concepts, viz. balls or connected sets etc. in an abstract setting.</p> <p>CO8: Know about Banach fixed point theorem, whose far-reaching consequences have resulted into an independent branch of study in analysis, known as fixed point theory.</p> <p>CO9: Learn about the two important topological properties, namely connectedness and compactness of metric spaces.</p>
Group Theory-II	<p>The course shall enable students to:</p> <p>CO4: Learn about automorphisms for constructing new groups from the given group.</p> <p>CO5: Learn about the fact that external direct product applies to data security and electric circuits.</p> <p>CO6: Understand fundamental theorem of finite abelian groups.</p> <p>CO7: Be familiar with group actions and conjugacy in S_n.</p> <p>CO8: Understand Sylow theorems and their applications in checking nonsimplicity.</p>
DSE-1 (i): Numerical	<p>The course will enable the students to:</p>

Analysis	<p>CO6: Learn some numerical methods to find the zeroes of nonlinear functions of a single</p> <p>CO7: variable and solution of a system of linear equations, up to a certain given level of precision.</p> <p>CO8: Know about methods to solve system of linear equations, such as Gauss–Jacobi, Gauss–Seidel and SOR methods.</p> <p>CO9: Interpolation techniques to compute the values for a tabulated function at points not in the table.</p> <p>CO10: Applications of numerical differentiation and integration to convert differential equations into difference equations for numerical solutions.</p>
DSE-1 (ii): Mathematical Modeling and Graph Theory	<p>The course will enable the students to:</p> <p>CO5: Know about power series solution of a differential equation and learn about Legendre’s and Bessel’s equations.</p> <p>CO6: Use of Laplace transform and inverse transform for solving initial value problems.</p> <p>CO7: Learn about various models such as Monte Carlo simulation models, queuing models and linear programming models.</p> <p>CO8: Understand the basics of graph theory and learn about social networks, Eulerian and Hamiltonian graphs, diagram tracing puzzles and knight’s tour problem.</p>
DSE-1 (iii): Programming Mathematics C++ for	<p>After completion of this paper, student will be able to:</p> <p>CO4: Understand and apply the programming concepts of C++ which is important to mathematical investigation and problem solving.</p> <p>CO5: Learn about structured data-types in C++ and learn about applications in factorization of an integer and understanding Cartesian geometry and Pythagorean triples.</p> <p>CO6: Use of containers and templates in various applications in algebra.</p> <p>CO7: Use mathematical libraries for computational objectives.</p> <p>CO8: Represent the outputs of programs visually in terms of well formatted text and plots.</p>
DSE-2 (i): Probability Theory and Statistics	<p>This course will enable the students to:</p> <p>CO5: Learn about probability density and moment generating functions.</p> <p>CO6: Know about various univariate distributions such as Bernoulli, Binomial, Poisson, gamma and exponential distributions.</p> <p>CO7: Learn about distributions to study the joint behavior of two random variables.</p> <p>CO8: Measure the scale of association between two variables,</p>

	<p>and to establish a formulation helping to predict one variable in terms of the other, i.e., correlation and linear regression.</p> <p>CO9: Understand central limit theorem, which helps to understand the remarkable fact that: the empirical frequencies of so many natural populations, exhibit a bell-shaped curve, i.e., a normal distribution.</p>
DSE-2 (ii): Discrete Mathematics	<p>After the course, the student will be able to:</p> <p>CO4: Understand the notion of ordered sets and maps between ordered sets.</p> <p>CO5: Learn about lattices, modular and distributive lattices, sublattices and homomorphisms between lattices.</p> <p>CO6: Become familiar with Boolean algebra, Boolean homomorphism, Karnaugh diagrams, switching circuits and their applications.</p> <p>CO7: Learn about basics of graph theory, including Eulerian graphs, Hamiltonian graphs.</p> <p>CO8: Learn about the applications of graph theory in the study of shortest path algorithms.</p>
DSE-2 (iii): Cryptography and network Security	<p>After the course, the student will be able to:</p> <p>CO1: Understand the fundamentals of cryptography and computer security attacks.</p> <p>CO2: Learn about various ciphers and data encryption standard.</p> <p>CO3: Review basic concepts of number theory and finite fields.</p> <p>CO4: Learn about advanced encryption standard.</p> <p>CO5: Understand the fundamentals of RSA and elliptic curve cryptography.</p> <p>CO6: Encrypt and decrypt messages using block ciphers, sign and verify messages using well known signature generation and verification algorithms.</p>
Semester VI	
Complex Analysis	<p>The completion of the course will enable the students to:</p> <p>CO6: Learn the significance of differentiability of complex functions leading to the understanding of Cauchy–Riemann equations.</p> <p>CO7: Learn some elementary functions and evaluate the contour integrals.</p> <p>CO8: Understand the role of Cauchy–Goursat theorem and the Cauchy integral formula.</p> <p>CO9: Expand some simple functions as their Taylor and Laurent series, classify the nature of singularities, find residues and apply Cauchy Residue theorem to evaluate integrals.</p>

Ring Theory and Linear Algebra-II	<p>The completion of the course will enable the students to:</p> <p>CO7: Learn the significance of differentiability of complex functions leading to the understanding of Cauchy–Riemann equations.</p> <p>CO8: Learn some elementary functions and evaluate the contour integrals.</p> <p>CO9: Understand the role of Cauchy–Goursat theorem and the Cauchy integral formula.</p> <p>CO10: Expand some simple functions as their Taylor and Laurent series, classify the nature</p> <p>CO11: of singularities, find residues and apply Cauchy Residue theorem to evaluate integrals.</p>
DSE-3 (i): Mathematical Finance	<p>On completion of this course, the student will be able to:</p> <p>CO7: Know the basics of financial markets and derivatives including options and futures.</p> <p>CO8: Learn about pricing and hedging of options, as well as interest rate swaps.</p> <p>CO9: Learn about no-arbitrage pricing concept and types of options.</p> <p>CO10: Learn stochastic analysis (Ito formula, Ito integration) and the Black–Scholes model.</p> <p>CO11: Understand the concepts of trading strategies and valuation of currency swaps.</p>
DSE-3 (ii): Introduction to Information Theory and Coding	<p>This course will enable the students to:</p> <p>CO5: Learn about the basic concepts of information theory.</p> <p>CO6: Know about basic relationship among different entropies and interpretation of Shannon’s fundamental inequalities.</p> <p>CO7: Learn about the detection and correction of errors while transmission.</p> <p>CO8: Representation of a linear code by matrices.</p> <p>CO9: Learn about encoding and decoding of linear codes.</p>
DSE-3 (iii): Biomathematics	<p>Apropos conclusion of the course will empower the student to:</p> <p>CO7: Learn the development, analysis and interpretation of bio mathematical models such as population growth, cell division, and predator-prey models.</p> <p>CO8: Learn about the mathematics behind heartbeat model and nerve impulse transmission model.</p> <p>CO9: Appreciate the theory of bifurcation and chaos.</p> <p>CO10: Learn to apply the basic concepts of probability to molecular evolution and genetics.</p>
DSE-4 (i): Number Theory	<p>This course will enable the students to:</p> <p>CO5: Learn about some fascinating discoveries related to the</p>

	<p>properties of prime numbers, and some of the open problems in number theory, viz., Goldbach conjecture etc.</p> <p>CO6: Know about number theoretic functions and modular arithmetic.</p> <p>CO7: Solve linear, quadratic and system of linear congruence equations.</p> <p>CO8: Learn about public key crypto systems, in particular, RSA.</p>
DSE-4 (ii): Linear Programming and Applications	<p>This course will enable the students to:</p> <p>CO5: Learn about the graphical solution of linear programming problem with two variables.</p> <p>CO6: Learn about the relation between basic feasible solutions and extreme points.</p> <p>CO7: Understand the theory of the simplex method used to solve linear programming problems.</p> <p>CO8: Learn about two-phase and big-M methods to deal with problems involving artificial variables.</p> <p>CO9: Learn about the relationships between the primal and dual problems.</p> <p>CO10: Solve transportation and assignment problems.</p> <p>CO11: Apply linear programming method to solve two-person zero-sum game problems.</p>
DSE-4 (iii): Mechanics	<p>The course will enable the students to:</p> <p>CO5: Know about the concepts in statics such as moments, couples, equilibrium in both two and three dimensions.</p> <p>CO6: Understand the theory behind friction and center of gravity.</p> <p>CO7: Calculate moments of inertia of areas and rigid bodies.</p> <p>CO8: Know about conservation of mechanical energy and work-energy equations.</p> <p>CO9: Learn about translational and rotational motion of rigid bodies.</p>
SEC-1: LaTeX and HTML	<p>After studying this course the student will be able to:</p> <p>CO5: Create and typeset a LaTeX document.</p> <p>CO6: Typeset a mathematical document using LaTeX.</p> <p>CO7: Learn about pictures and graphics in LaTeX.</p> <p>CO8: Create beamer presentations.</p> <p>CO9: Create web page using HTML.</p>
SEC-2: Computer Algebra Systems and Related Software	<p>This course will enable the students to:</p> <p>CO6: Use of computer algebra systems (Mathematica/MATLAB/ Maxima/Maple etc.) as a calculator, for plotting functions and animations</p> <p>CO7: Use of CAS for various applications of matrices such as solving system of equations and finding eigenvalues and</p>

	<p>eigenvectors.</p> <p>CO8: Understand the use of the statistical software R as calculator and learn to read and get data into R.</p> <p>CO9: Learn the use of R in summary calculation, pictorial representation of data and exploring relationship between data.</p> <p>CO10: Analyze, test, and interpret technical arguments on the basis of geometry.</p>
Generic	
Semester I	
GE-1: Calculus	<p>This course will enable the students to:</p> <p>CO5: Sketch the curves in Cartesian and polar coordinates as well as learn techniques of sketching the conics.</p> <p>CO6: Visualize three dimensional figures and calculate their volumes and surface areas.</p> <p>CO7: Understand limits, continuity and derivatives of functions of several variable and vector-valued functions.</p>
GE-1: Analytic Geometry and Theory of Equations	<p>After completion of this paper, the students will be able to:</p> <p>CO1: Classify and sketch conics four different types of conic sections – the circle, the ellipse, the hyperbola and the parabola – in Cartesian and polar coordinates.</p> <p>CO2: Visualize three dimensional objects – spheres and cylinders – using vectors.</p> <p>CO3: Understand the properties of roots of polynomial equations.</p>
Semester II	
GE-2: Linear Algebra	<p>This course will enable the students to:</p> <p>CO1: Visualize the space \mathbb{R}_n in terms of vectors and the interrelation of vectors with matrices, and their application to computer graphics.</p> <p>CO2: Familiarize with concepts in vector spaces, namely, basis, dimension and minimal spanning sets.</p> <p>CO3: Learn about linear transformations, transition matrix and similarity.</p> <p>CO4: Learn about orthogonality and to find approximate solution of inconsistent system of linear equations.</p>
GE-2: Discrete Mathematics	<p>This course will enable the students to:</p> <p>CO1: Understand the basic principles of logic, set theory, lattices and Boolean algebra.</p> <p>CO2: Understand the ideas of mathematical induction and basic counting techniques.</p> <p>CO3: Proficiently construct logical arguments and rigorous proofs.</p>

Semester III	
GE-3: Differential Equations	<p>The student will be able to:</p> <p>CO1: Solve the exact, linear and Bernoulli equations and find orthogonal trajectories.</p> <p>CO2: Apply the method of variation of parameters to solve linear differential equations.</p> <p>CO3: Formulate and solve various types of first and second order partial differential equations.</p>
GE-3: Linear Programming and Game Theory	<p>This course will enable the students to:</p> <p>CO1: Learn about the simplex method used to find optimal solutions of linear optimization problems subject to certain constraints.</p> <p>CO2: Write the dual of a linear programming problem.</p> <p>CO3: Solve the transportation and assignment problems.</p> <p>CO4: Learn about the solution of rectangular games using graphical method and using the solution of a pair of associated prima-dual linear programming problems.</p>
Semester IV	
GE-4: numerical Methods	<p>After completion of this course, students will be able to:</p> <p>CO1: Find the consequences of finite precision and the inherent limits of numerical methods.</p> <p>CO2: Appropriate numerical methods to solve algebraic and transcendental equations.</p> <p>CO3: Solve first order initial value problems of ODE's numerically using Euler methods.</p>
GE-4: Elements of Analysis	<p>This course will enable the students to:</p> <p>CO1: Understand the real numbers and their basic properties.</p> <p>CO2: Be familiar with convergent and Cauchy sequences.</p> <p>CO3: Test the convergence and divergence of infinite series of real numbers.</p> <p>CO4: Learn about power series expansion of some elementary functions.</p>

SUBJECT: Mathematics for Physical Sciences	
PROGRAMME OUTCOME	<p>PO1: To develop the ability to think critically, logically and analytically.</p> <p>PO2: Student will able to use mathematical reasoning in everyday life.</p> <p>PO3: Introduce the students to a number of interesting and useful ideas in preparations for career oriented Government and private sectors.</p> <p>PO4: Research-related skills like capability to design and define</p>

	<p>problems, formulate hypotheses, test hypotheses and analysis through mathematical arguments.</p> <p>PO5: Student will learn about ICT and ICT based problem solving tools and techniques for mathematical as well as ethical issues.</p>
<p>PROGRAMME SPECIFIC OUTCOME</p> <p>For Mathematics in Physical Science/B.A. Programme</p>	<p>PSO1: Solve problems using a broad range of significant mathematical techniques, including calculus, algebra, geometry, analysis, numerical methods, differential equations, probability and statistics along with hands-on learning through CAS and LaTeX.</p> <p>PSO2: Analyze quantitative data using statistical analysis techniques.</p> <p>PSO3: Combine the principles of physics and chemistry, as supported by mathematics to describe the foundational concepts of the physical world and apply these concepts to new situations.</p> <p>PSO4: Apply the techniques of mathematics to understand experimental observations and predict outcomes.</p> <p>PSO5: Collaborate with others, including multidisciplinary groups, to solve scientific problems, and to recognize ethical issues in each respective profession.</p>
<p>COURSE OUTCOME FOR Mathematics in Physical Science/B.A. Programme</p> <p>1ST YEAR (PAPERWISE)</p>	
<p>Semester I</p>	
<p>Calculus and Matrices</p>	<p>This course will enable the students to:</p> <p>CO1: Define and use fundamental concepts of calculus including limits, continuity and differentiability.</p> <p>CO2: Solve systems of linear equations and find eigenvalues and corresponding eigenvectors for a square matrix, and check for its diagonalizability.</p> <p>CO3: Perform operations with various forms of complex numbers to solve equations.</p>
<p>Semester II</p>	
<p>Calculus and Geometry</p>	<p>This course will enable the students to:</p> <p>CO1: This course will enable the students to:</p> <p>CO2: Sketch curves in a plane using its mathematical properties in the different coordinate systems of reference.</p> <p>CO3: Compute area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.</p> <p>CO4: Be well-versed with conics and quadric surfaces so that they should able to relate the shape of real-life objects with the</p>

	curves/conics.
COURSE OUTCOME FOR 2ND YEAR (PAPERWISE)	
Semester III	
Algebra	<p>This course will enable the students to:</p> <p>CO1: Recognize the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups etc.</p> <p>CO2: Explain the significance of the notion of cosets, normal subgroups, and factor groups.</p> <p>CO3: Understand the fundamental concepts of rings, fields and integral domains.</p> <p>CO4: Know about vector spaces over a field, and linear transformations.</p>
Semester IV	
Real Analysis	<p>The course will enable the students to:</p> <p>CO1: Be familiar with the concept of sequences, series and recognize convergent, divergent, bounded, Cauchy and monotone sequences.</p> <p>CO2: Test the convergence and divergence of series using ratio test, root test and Leibnitz test.</p> <p>CO3: Understand the concepts of pointwise and uniform convergence.</p> <p>CO4: Understand Riemann integrability of continuous and monotone functions.</p>
Skill Enhancement Paper	
Semester III	
SEC-1: Computer Algebra Systems	<p>The course will enable the students to:</p> <p>CO1: Use CAS as a calculator and for plotting functions.</p> <p>CO2: Understand the role of CAS finding roots of polynomials and solving general equations.</p> <p>CO3: Employ CAS for computing limits, derivatives, and computing definite and indefinite integrals.</p> <p>CO4: Use CAS to understand matrix operations and to find eigenvalues of matrices.</p>
Skill Enhancement Paper	
Semester IV	
SEC-2: Mathematical Typesetting System:	<p>The course will enable the students to:</p> <p>CO1: Learn to create and typeset a LaTeX document.</p>

LaTeX	CO2: Typeset a mathematical document using LaTeX. CO3: Learn about pictures and graphics in LaTeX. CO4: Create beamer presentations.
COURSE OUTCOME FOR 3RD YEAR (PAPERWISE)	
Semester V	
DSE-1 (i): Differential Equations	The course will enable the students to: CO1: Solve the exact, linear and Bernoulli equations and find orthogonal trajectories. CO2: Apply the method of variation of parameters to solve linear differential equations. CO3: Formulate and solve various types of first and second order partial differential equations.
DSE-1 (ii): Mechanics and Discrete Mathematics	The course shall enable students to: CO1: Learn about friction, centre of gravity, work and potential energy in statics. CO2: Know about various topics in dynamics such as simple harmonic motion, simple pendulum and projectile motion. CO3: Know about various types of graphs such as complete and bipartite graphs. CO4: Understand graphs, their types and its applications in study of shortest path algorithms.
Skill Enhancement Paper Semester V	
SEC-3: Transportation and network Flow Problems	This course will enable the students to: CO1: Formulate and solve transportation problems. CO2: Learn to solve assignment problems using Hungarian method. CO3: Solve travelling salesman problem. CO4: Learn about network models and various network flow problems. CO5: Learn about project planning techniques namely, CPM and PERT.
Semester VI	
DSE-2 (i): Numerical Methods	The completion of the course will enable the students to: CO1: Find the consequences of finite precision and the inherent limits of numerical methods. CO2: Appropriate numerical methods to solve algebraic and transcendental equations. CO3: Solve first order initial value problems of ODE's numerically

	using Euler methods.
DSE-2 (ii): Probability Theory and Statistics	<p>The completion of the course will enable the students to:</p> <p>CO1: Basic probability axioms and familiar with discrete and continuous random variables.</p> <p>CO2: To measure the scale of association between two variables, and to establish a formulation helping to predict one variable in terms of the other, i.e., correlation and linear regression.</p> <p>CO3: Central limit theorem, which helps to understand the remarkable fact that: the empirical frequencies of so many natural populations, exhibit a bell-shaped curve.</p>
Skill Enhancement Paper Semester VI	
SEC-4: Statistical Software: R	<p>CO1: Be familiar with R syntax and use R as a calculator.</p> <p>CO2: Understand the concepts of objects, vectors and data types. Know about summary commands and summary table in R.</p> <p>CO3: Visualize distribution of data in R and learn about normality test.</p> <p>CO4: Plot various graphs and charts using R.</p>

SUBJECT: Mathematics for B.A. Programme	
PROGRAMME OUTCOME	<p>PO1: To develop the ability to think critically, logically and analytically.</p> <p>PO2: Student will able to use mathematical reasoning in everyday life.</p> <p>PO3: Introduce the students to a number of interesting and useful ideas in preparations for career oriented Government and private sectors.</p> <p>PO4: Research-related skills like capability to design and define problems, formulate hypotheses, test hypotheses and analysis through mathematical arguments.</p> <p>PO5: Student will learn about ICT and ICT based problem solving tools and techniques for mathematical as well as ethical issues.</p>
PROGRAMME SPECIFIC OUT COME For Mathematics in B.A. Programme	<p>PSO1: Solve problems using a broad range of significant mathematical techniques, including calculus, algebra, geometry, analysis, numerical methods, differential equations, probability and statistics along with hands-on learning through CAS and LaTeX.</p> <p>PSO2: Analyze quantitative data using statistical analysis techniques.</p> <p>PSO3: Combine the principles of physics and chemistry, as supported by mathematics to describe the foundational concepts of the</p>

	<p>physical world and apply these concepts to new situations.</p> <p>PSO4: Apply the techniques of mathematics to understand experimental observations and predict outcomes.</p> <p>PSO5: Collaborate with others, including multidisciplinary groups, to solve scientific problems, and to recognize ethical issues in each respective profession.</p>
COURSE OUTCOME FOR Mathematics in B.A. Programme 3RD YEAR (PAPERWISE)	
Semester V	
GE-1: General Mathematics - I	<p>The course will enable the students to:</p> <p>CO1: Learn about the contributions of the ancient Indian mathematicians in the field of algebra, geometry, trigonometry, calculus and astronomy.</p> <p>CO2: Know more about prime numbers, Fermat's last theorem, Latin and magic squares.</p> <p>CO3: Understand the various types of matrices, operations of matrices, and Cramer's rule to solve a system of linear equations.</p>
Semester VI	
GE-2: General Mathematics- II	<p>The course shall enable students to:</p> <p>CO1: Learn about the contributions of remarkable mathematicians in the field of algebra, analysis, number theory, calculus, analytic geometry, differential equations and mechanics.</p> <p>CO2: Understand basics of graph theory, functions and their graphs, perspective geometry and its uses in art, fractals and Fibonacci sequences with applications.</p> <p>CO3: Learn about types of symmetry and patterns by looking at monuments/buildings/ornamental art.</p> <p>CO4: Solve systems of linear equations using Gauss elimination and Gauss-Jordan methods, and rank of matrices</p>

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

SUBJECT: NAME OF SUBJECT- Music	
PROGRAMME OUTCOME	PO1. Students develop skills that prepare them for careers

	<p>in musical performance and private teaching of performance and advanced study and independent practice.</p> <p>PO2. Students will gain advanced skills in and understanding of analysis of music.</p>
PROGRAMME SPECIFIC OUT COME	<p>Each student in this program, regardless of concentration, is expected to:</p> <p>PSO1: Demonstrate competence in musicianship, to include: aural skills, and knowledge and application of music theory;</p> <p>PSO2: Demonstrate competence in musical performance on his/her primary instrument, with particular emphasis on technical precision;</p> <p>PSO3: Students will gain knowledge and understanding of historical musical styles, compositional techniques, and performance practices of various style periods.</p>
COURSE OUTCOME FOR I YEAR	
Semester I	
DSC 1 (A) Theory : Fundamentals of Indian Music	<p>CO1: The student has learnt and understood the definitions of the radical musical phrases and is able to effectively communicate the same.</p> <p>CO2: Gained qualitative knowledge on the study of important melodic terminology, which was successfully displayed.</p> <p>CO3: The students attained erudition of musical instruments such as the Tanpura and Sitar and skillfully illustrated their various sections.</p> <p>CO4: They acquired cognition about the biographies of renowned musicians, thereby deriving influence from their musical pursuits.</p> <p>CO5: Accurately exemplified the prescribed Ragas and Talas which further illuminated their Practical demonstration.</p>
DSC 1(B) Practical : Performance & Viva –Voce	<p>CO1: The students gained profeciency in learning the five rudimentary Alankars and adeptly demonstrated them, thereby attaining a firm grasp on the accuracy of Swaras.</p> <p>CO2: They effeciently displayed their mastery over Swarmalika in one of the prescribed Ragas, which became the fulcrum to learning the intrinsic nature of the Raga.</p> <p>CO3: They skillfully exhibited Drut Khayals in the two specified Ragas. This became a preamble to</p>

	<p>acquiring performance skills.</p> <p>CO4: Students achieved disphering of the twelve musical notes by the ear, giving them a resilient hold on the Swaras.</p> <p>CO5: They brilliantly recited the Thekas with their Dugun and Tali-Khali in the given Talas, achieving a stable foothold on rhythm.</p> <p>CO6: Students obtained understanding of the fundamental knowledge of playing the Tanpura and Harmonium which is become a core for further learning and self reliance.</p> <p>CO7: The practical file carrying 25 marks for internal assessment was well presented with illustrations of Ragas, notations of traditional compositions, Talas with Dugun, Tigun and Chaugun. This also became a valuable note file for references.</p>
Semester II	
DSC 2 (A) Theory : Basics of Indian Musicology	<p>CO1: The students comprehended and ably illustrated the terminology of the rudimentary principles of musicology.</p> <p>CO2: They acquired instruction on the lives of illustrious musicians, eventually gaining inspiration from their musical journeys.</p> <p>CO3: With the study of the specified Ragas and Talas, the students amply assimilated their tutions and meticulously exemplified their learning.</p> <p>CO4: The students gained fundamental knowledge of the Harmonium and Tabla, which they deftly sketched and labelled.</p>
DSC 2 (B) Practical : Performance & Viva –Voce	<p>CO1: The students learnt to perform and skillfully illuminated various aspects in the requisite ragas.□</p> <p>CO2: They adeptly demonstrated traditional compositions in Vilambit and Madhya laya Khayals/Maseetkhani and Razakhani Gats, Alaaps and Taans, thus developing their performance capabilities.</p> <p>CO3: They learnt to perform the Swarmalika – giving them a strong foothold of Swaras with Laya, as well as the Lakshangeet - which irradiated the salient features of the raga, making their performance more explicit.</p> <p>CO4: The students learnt to identify ragas and talas by the ear, which helped them to decipher various compositions and ragas by listening.□</p> <p>CO5: They were able to effectively recite and</p>

	<p>demonstrate their learning of the suggested talas, with their divisions – Tali, Khali and Dugun. Giving them a distinct command on rhythm.</p> <p>CO6: Students learnt to play the Talas - Keherwa on the Tabla, which they exhibited with a practical display.</p>
B.A. (PROG.) HINDUSTANI MUSIC (VOCAL/INSTRUMENTAL)	<p>CO1: The student has learnt and understood the definitions of the radical musical phrases and is able to effectively communicate the same.</p> <p>CO2: Gained qualitative knowledge on the study of important melodic terminology, which was successfully displayed.</p> <p>CO3: The students attained erudition of musical instruments such as the Tanpura and Sitar and skilfully illustrated their various sections.</p> <p>CO4: They acquired cognition about the biographies of renowned musicians, thereby deriving influence from their musical pursuits.</p> <p>CO5: Accurately exemplified the prescribed Ragas and Talas which further illuminated their Practical demonstration.</p>
COURSE OUTCOME FOR II YEAR	
Semester III	
DSC 3 (A) Theory: Theory of Indian Music, Ancient Granthas & Contribution of musicologists.	<p>CO1: The study of the elements and forms of Indian music have opened new horizons and created interest amongst the students for the subject.</p> <p>CO2: Writing of the Bhakthande Swarlipi Paddhati taught them the importance and value of traditional style of writing musical notations.</p> <p>CO3: They have also learned to write Talas and compositions in notation with minute details.</p> <p>CO4: The visually challenged students are given an option of attempting either writing of notation or an essay on a general topic.</p> <p>CO5: Detailed study of the Ragas enables them to attain proficiency in the subject.</p> <p>CO6: The study of Vedic music, Natyashastra and Brihaddeshi has given a speculative insight to the students to understand the origin and development of Indian Music.</p> <p>CO7: Life and contribution of great musicians and musicologists are a source of constant inspiration for the students.</p>
DSC 3 (B) Practical:	<p>CO1: The student is able to give a practical demonstration of the prescribed Ragas and Talas</p>

Performance & Viva-Voce	<p>with improvisation and also learnt folk Music and Dhun.</p> <p>CO2: They have been taught the customary and traditional Gayaki of Dhrupad-Dhamaar.</p> <p>CO3: Reciting the Thekas of the Talas and playing basic Talas has enabled them to get acquainted with the rhythmic patterns.</p> <p>CO4: The practical file with details of each topic covered in the syllabus has taught the students the art of systematic documentation and presentation.</p>
Semester IV	
DSC 4 (A) Theory: Theory of Indian Music, Medieval Granthas & Contribution of Musicians & Musicologists.	<p>CO1: The indepth knowledge of the semi-classical forms like Thumri, Dadra, Tappa is imparted.</p> <p>CO2: Elaborate knowledge of the popular Ragas-Bageshree, Bhupali and Bhimpalasi is given.</p> <p>CO3: Students are able to recite the Thekas and their Dugun, Tigun and Chaugun recitation of many Talas.</p> <p>CO4: They attain knowledge of significant Granthas with special reference to their time period. □</p>
DSC 4 (B) Practical: Performance & Viva –Voce	<p>CO1: The student acquire proficiency in singing Vilambit and Drut Khayals, Dhrupad, Dhamar thereby elaborating them through Alaap, Taan and Layakari respectively.</p> <p>CO2: The students of instrumental music skillfully play various Gat with Taan and Jhala.</p> <p>CO3: They understand the significance of the Raga.</p> <p>CO4: They get the understanding of folk music by singing Lokgeet or playing folk-dhun.</p> <p>CO5: They obtain the basic knowledge of Harmonium or any other instrument playing which facilitates their musical learning process.</p>
Semester V	
DSE 1 (A) Theory: Theory of Indian Music and study of ancient Granthas and Ragas	<p>CO1: The students have obtained wisdom and understood the musical references and instruments found in the epic Ramayan and its relevance to present time.</p> <p>CO2: With the indepth study of the ancient text, Sangeet Ratnakar by Pt. Sharangdev, the students gained a deep insight into the origin of Indian music.</p> <p>CO3: The general study of Matang Muni's Granth Brihaddeshi provided an axis to the students who are now able to communicate the result of studies undertaken on this ancient treatise.</p> <p>CO4: Students have understood the concept of Margi and Desi sangeet and are able to demonstrate its</p>

	significance in modern times.
DSE 1 (B) Practical: Performance & Viva-Voce	<p>CO1: The student is able to give a practical demonstration of the prescribed Ragas and Talas with improvisation and also learnt folk Music and Dhun.</p> <p>CO2: They have been taught the customary and traditional Gayaki of Dhrupad-Dhamaar. □</p> <p>CO3: Reciting the Thekas of the Talas and playing basic Talas has enabled them to get acquainted with the rhythmic patterns.</p> <p>CO4: The practical file with details of each topic covered in the syllabus has taught the students the art of systematic documentation and presentation.</p>
Semester VI	
DSE 2 (A) Theory: Musicology and Study of Ragas and Talas	<p>CO1: Students have acquired knowledge and understood the musical references found in the epic Mahabharata.</p> <p>CO2: Gained proficiency in the comparative study of the two major notation systems, which has provided them with virtual understanding of the two methods.</p> <p>CO3: Achieved discernment on the classification of instruments – such as a) String instruments, b) Drum instruments, c) Wind instruments, and d) Percussion instruments.</p> <p>CO4: Imbined erudition of the importance of Raga Lakshanas and are able to apply the same to the definition of Ragas.</p> <p>CO5: They have understood the assets and flaws of the performing musicians which they employ to their advantage during performances.</p> <p>CO6: Acquired cognition of writing notations of traditional compositions and further developing their skills to independently read and learn authentic compositions on their own.</p> <p>CO7: Visually challenged students have engaged their mind to writing on prescribed topics, thereby developing their expression and learning better skills for declaration. □</p>
DSE 2 (B) Practical: Performance & Viva –Voce	<p>CO1: The students have gained competence in demonstrating the Vilambit & Madhyalaya Khayals/ Maseetkhani and Razakhani Gats, their Alaps, Taans, variations in the traditional compositions of the prescribed Ragas, thereby developing performance skills.</p> <p>CO2: They accomplish erudition and ability of</p>

	<p>performing Dhrupad/ Dhamar and demonstrating their Dugun, Tigun and Chaugun.</p> <p>CO3: The students are able to skillfully display their understanding of the prescribed Talas different Laya.</p> <p>CO4: They have acquired the judgement of desciphering the various Ragas and Talas by listening and observing.</p> <p>CO5: Having learnt the basic technique of playing the Harmonium, the students exhibit a vivid view of sound and placement of notes. This has empowered them to independently play and learn songs and compositions. □</p>
B.A. (PROG.) HINDUSTANI MUSIC (VOCAL/INSTRUMENTAL)	
SKILL ENHANCEMENT COURSE	
Semester III	
<p>Sec 1:</p> <p>Theory: Elements of Indian Music</p>	<p>CO1: The students have attained knowledge of the basic terminology related to the field of music.</p> <p>CO2: They have gained inspiration by studying about the life of great musicians and their musical journeys.</p> <p>CO3: They have acquired the information and apply their minds to express their views regarding varied aspects of this fine art.</p> <p>CO4: They have demonstrated their assimilated skill of engaging with the swaras in different permutation and combination by singing/playing various Alankars, Swarmalika, Ragas and Talas.</p> <p>CO5: Acquired knowledge of various musical instruments understood their structural section with labelling their diagrams.</p> <p>CO6: Field visits to All India Radio/ Sangeet Natak Akademi enhance their mental expanse regarding the contribution of these institutions in preserving and propagating Indian Music.</p>
Performance & Viva –Voce	<p>CO1: Singing of Swaramalika gave them the foundation of the Raga sung in a specific meter.</p> <p>CO2: The training of Alankars in the the particular Ragas of the prescribed syllabus made the student understand Swaras.</p> <p>CO3: Playing of basic five Alankars of the pure notes on Harmonium/Sitar and playing or singing any composition/National Anthem had their fingers nimbly on the instruments.</p> <p>CO4: Elementary knowledge of the most widely used Teentala in the Classical Music is taught on Tabla. The students have learnt the baithak- the sitting</p>

	<p>posture and correct placement of hands on Tabla.</p> <p>CO5: Students have learnt to display their acquired knowledge by preparing a written file regarding all their practical learnings.</p> <p>CO6: The students assimilate the qualities of eminent musicians and musicologists by reading about their musical pursuits and life history.</p> <p>CO7: They have obtained the knowledge method of writing various khayals, Dhamar, Dhrupad and Gats in the Prevalent notation system.</p>
Semester IV	
SEC 2: General Concept of Indian Music	<p>CO1: The students got acquainted with the basics of music. 'Nada' and its various aspects like pitch, timber and intensity.</p> <p>CO2: They gained knowledge of Swaras and their place in Ragas.</p> <p>CO3: They imbibed the concept of ascending and descending order of swaras in Ragas and also their main identifying phrases.</p> <p>CO4: They were inspired with studying about the life and contribution of famous musicians. □</p> <p>CO5: The students were equipped with the knowledge of Ragas and Talas.</p> <p>CO6: Various Lakshanas were taught by making them learn about Lakshan Geet of the Ragas.</p> <p>CO2: Students understood various segments of Tabla by sketching its diagram and labelling.</p>
Practical : Performance & Viva –Voce	<p>CO1: The students have understood the swaras of Ragas by singing and playing Alankars in those notes.</p> <p>CO2: They further enhanced their grip on the Raga by learning its ascending, descending and unique phrases and also learnt rendering of Swarmalika/ Lakshangeet/ Razakhani Gat.</p> <p>CO3: Their ability to understand the rhythmic aspect is inculcated with playing of the Tala on Tabla.</p> <p>CO4: The students have developed the skill to play bhajan/patriotic song/any other song on harmonium.</p> <p>CO5: A practical file with details of Ragas, notation of compositions & Talas with dugun, Tigun, Chaugun is well learnt and prepared by the students.</p>
Semester V	
SEC-3 Theory: Various Aspects of Indian Musicology	<p>CO1: The student acquired knowledge of various musical terms.</p> <p>CO2: The students are made aware of the life and contributions of Bismillah Khan. They are able to</p>

	<p>distinguish between Raag and Thaata.</p> <p>CO3: The student learnt to express their opinion through essay writing on different topics.</p> <p>CO4: The student has learnt to write the theoretical aspects of Ragas and Talas.</p> <p>CO5: Sketching and classifying the various segments of instruments has lucified their concept of the same.</p> <p>CO6: Essential learning is acquired by preparing a project on famous music personalities, musical instruments and dance forms.</p>
Practical: Performance & Viva –Voce	<p>CO1: The students gained proficiency in learning the five rudimentary Alankars and adeptly demonstrated them, thereby getting a firm grasp on the accuracy of Swaras.</p> <p>CO2: They efficiently displayed their mastery over Swarmalika in one of the prescribed ragas, which became the fulcrum to learning the intrinsic nature of the Raga.</p> <p>CO3: They skillfully exhibited Drut Khayals in two of the specified Ragas. This became a preamble to acquiring performance skills.</p> <p>CO4: Students achieved disphering of the twelve musical notes by the ear, giving them a strong hold on the Swaras.</p> <p>CO5: They brilliantly recited the Thekas with their Dugun and Tali-Khali in the given Talas, achieving a firm grasp on rhythm.</p> <p>CO6: Students obtained understanding of the fundamental knowledge of playing the Tanpura and Harmonium which become a core for further learning and self reliance.</p> <p>CO7: The practical file carrying 25 marks for internal assessment was well prescribed with illustrations of Ragas, notations of traditional compositions, Talas with Dugun, Tigun and Chaugun. This also became a valuable note file for learning theory and reference</p>
Semester VI	
SEC 4: General Study of Indian Music	<p>CO1: The student gains knowledge regarding the elementary musical terminologies.</p> <p>CO2: The student studies about the life and the musical journey of Pt. Bhimsen Joshi.</p> <p>CO3: The student is trained about the structural aspect of the basic Ragas and Talas.</p> <p>CO4: The student learns to express their opinion through essay writing on different topics.</p>

	<p>CO5: By writing the alankars student gain knowledge of Swaras.</p> <p>CO6: Through the writing of Talas, they gain the knowledge of Rhythm.</p> <p>CO7: By preparing project on folk music, musicians and dance. They have understood the culture of different states of India.</p>
B.A. (PROG.) HINDUSTANI MUSIC (VOCAL/INSTRUMENTAL)	
GENERIC ELECTIVE	
Semester V	
GE1: General Theory of Indian Music & Musicians	<p>CO1: The student is imparted the basic knowledge of Sangeet, Nada and its characteristics, Swaras, Shruti, Saptak, Raga and Tala.</p> <p>CO2: The student has learnt the attributes of good musicians by studying their biographies and making a project on them.</p> <p>CO3: He has learnt the Alankars, Ragas and Talas.</p> <p>CO4: Theoretical aspect of different Dance forms is taught.</p> <p>CO5: They have been made aware of the Karnatak music terms also.</p> <p>CO6: Student explores new avenues of music along with its relation to culture and its propagation through media.</p>
Practical: Performance & Viva –Voce	<p>CO1: By learning the Ragas and Talas, the students become proficient in performance of Indian classical music.</p> <p>CO2: The student prepares a practical file of Ragas and Talas so as to be able to understand and depict them thoroughly.</p> <p>CO3: The student also learns the Saraswati Vandana and National Anthem which can be performed on relevant functions.</p>
Semester VI	
GE 2: Principles of Indian Music	<p>CO1: The student has gained knowledge about various basic elements of musicology.</p> <p>CO2: By studying the biographies of musicians.</p> <p>CO3: Has learnt to illustrate the Ragas and Talas.</p> <p>CO4: Gained awareness about different classical dance forms.</p> <p>CO5: Obtained information about various parts of the Indian classical instruments.</p> <p>CO6: Understood the role of Music Festivals and All India Radio in promotion of Music through writing of essays.</p>
Practical: Performance	<p>CO1: The students are able to give a practical</p>

&Viva –Voce	demonstration of Ragas and Talas.
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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

NAME OF SUBJECT- PHYSICS HONS	
PROGRAMME OUTCOME	<p>PO1: Physics is an experimental and theoretical science that studies systematically the laws of nature operating at length scales from the sub-atomic domains to the entire universe.</p> <p>PO2: The scope of Physics as a subject is very broad. The latest addition to Physics pedagogy incorporated in the LOCF framework is computational physics, which involves adaptation of Physics problems for algorithmic solutions, and modelling and simulation of physical phenomenon.</p> <p>PO3: The elective modules of the framework offer students choice to gain knowledge and expertise in more specialized domains of Physics like Nuclear and Particle physics, Nanophysics, Astronomy and Astrophysics, etc. and interdisciplinary subject areas like Biophysics, Geophysics, Environmental Physics, Medical Physics, etc.</p> <p>PO4: The physics-based knowledge and skills learnt by students also equip them to be successful in careers other than research and teaching in Physics.</p>
PROGRAMME SPECIFIC OUT COME	<p>UG educational program in Physics aims to:</p> <p>PSO1: Create the facilities and learning environment in educational institutions to consolidate the knowledge acquired at +2 level, motivate students to develop a deep interest in Physics, and to gain a broad and balanced knowledge and understanding of physical concepts, principles and theories of Physics.</p> <p>PSO2: Provide opportunities to students to learn, design and perform experiments in lab, gain an understanding of laboratory methods, analysis of observational data and report writing, and acquire a deeper understanding of concepts, principles and theories learned in the classroom through laboratory demonstration, and computational problems and modelling.</p> <p>PSO3: Develop the ability in students to apply the knowledge and skills they have acquired to get to the solutions of specific theoretical and applied problems</p>

	<p>in Physics.</p> <p>PSO4: To prepare students for pursuing the interdisciplinary and multidisciplinary higher education and/or research in interdisciplinary and multidisciplinary areas, as Physics is among the most important branches of science necessary for interdisciplinary and multidisciplinary research.</p> <p>PSO5: To prepare students for developing new industrial technologies and theoretical tools for applications in diverse branches of the economic life of the country, as Physics is one of the branches of science which contribute directly to technological development; and it has the most advanced theoretical structure to make quantitative assessments and predictions, and</p> <p>PSO6: In light of all of the above to provide students with the knowledge and skill base that would enable them to undertake further studies in Physics and related areas, or in interdisciplinary/multidisciplinary areas, or join and be successful in diverse professional streams including entrepreneurship.</p> <p>Skill Enhancement Courses</p> <p>PSO1: Skill Enhancement papers are intended to help students develop skills which may or may not be directly applicable to physics learning.</p> <p>PSO2: These courses introduce an element of diversity of learning environments and expectations. Efforts should be made that students gain adequate 'hands-on' experience in the desired skills.</p> <p>PSO3: The theory parts of these courses are intended to help students get prepared for such experiences. Since the assessment of these courses is largely college based, teachers should make full use of it to design novel projects.</p> <p>Generic Elective</p> <p>PSO1: Physics GE papers are taken by students of other honours courses. Most of these students would have studied physics at the school level, so these courses are not meant to be introductory.</p> <p>PSO2: However, the teaching of these courses should be oriented to expose the non-physics students to the wonders of physics. Basic level projects that focus on real life applications of physics can be a useful means to generate student interest and motivate them for self-study.</p>
COURSE OUTCOME FOR I YEAR	

Semester I	
Mathematical Physics-I	<p>CO1: Understand the concept of gradient of scalar field and divergence and curl of vector fields.</p> <p>CO2: Perform line, surface and volume integration and apply Green's, Stokes' and Gauss's Theorems to compute these integrals.</p> <p>CO3: Apply curvilinear coordinates to problems with spherical and cylindrical symmetries.</p> <p>CO4: Understand elementary probability theory and the properties of discrete and continuous distribution functions.</p> <p>CO5: In the laboratory course, the students will be able to design, code and test simple programs in C++ in the process of solving various problems.</p>
Mechanics	<p>Upon completion of this course, students are expected to</p> <p>CO1: Understand laws of motion and their application to various dynamical situations.</p> <p>CO2: Learn the concept of inertial reference frames and Galilean transformations. Also, the concept of conservation of energy, momentum, angular momentum and apply them to basic problems.</p> <p>CO3: Understand translational and rotational dynamics of a system of particles.</p> <p>CO4: Apply Kepler's laws to describe the motion of planets and satellite in circular orbit.</p> <p>CO5: Understand concept of Geosynchronous orbits</p> <p>CO6: Explain the phenomenon of simple harmonic motion.</p> <p>CO7: Understand special theory of relativity - special relativistic effects and their effects on the mass and energy of a moving object.</p> <p>CO8: In the laboratory course, the student shall perform experiments related to mechanics: compound pendulum, rotational dynamics (Flywheel), elastic properties (Young Modulus and Modulus of Rigidity), fluid dynamics, estimation of random errors in the observations etc.</p>
Semester II	
Electricity and Magnetism	<p>CO1: Demonstrate the application of Coulomb's law for the electric field, and also apply it to systems of point charges as well as line, surface, and volume distributions of charges.</p> <p>CO2: Demonstrate an understanding of the relation</p>

	<p>between electric field and potential, exploit the potential to solve a variety of problems, and relate it to the potential energy of a charge distribution.</p> <p>CO3: Apply Gauss's law of electrostatics to solve a variety of problems.</p> <p>CO4: Calculate the magnetic forces that act on moving charges and the magnetic fields due to currents (Biot-Savart and Ampere laws)</p> <p>CO5: Understand the concepts of induction and self-induction, to solve problems using Faraday's and Lenz's laws.</p> <p>CO6: Understand the basics of electrical circuits and analyze circuits using Network Theorems.</p> <p>CO7: In the laboratory course the student will get an opportunity to verify network theorems and study different circuits such as RC circuit, LCR circuit. Also, different methods to measure low and high resistance, capacitance, self-inductance, mutual inductance, strength of a magnetic field and its variation in space will be learnt.</p>
Waves and Optics	<p>CO1: Understand Simple harmonic oscillation and superposition principle.</p> <p>CO2: Understand different types of waves and their velocities: Plane, Spherical, Transverse, Longitudinal.</p> <p>CO3: Understand Concept of normal modes in transverse and longitudinal waves: their frequencies and configurations.</p> <p>CO4: Understand Interference as superposition of waves from coherent sources derived from same parent source.</p> <p>CO5: Demonstrate basic concepts of Diffraction: Superposition of wavelets diffracted from aperture, understand Fraunhofer and Fresnel Diffraction.</p> <p>CO6: In the laboratory course, student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment can be learnt first hand. The motion of coupled oscillators, study of Lissajous figures and behaviour of transverse, longitudinal waves can be learnt in this laboratory course.</p>
COURSE OUTCOME FOR II YEAR	
Semester III	
Mathematical Physics-II	CO1: Represent a periodic function by a sum of harmonics

	<p>using Fourier series and their applications in physical problems such as vibrating strings etc.</p> <p>CO2: Obtain power series solution of differential equation of second order with variable coefficient using Frobenius method.</p> <p>CO3: Understand properties and applications of special functions like Legendre polynomials, Bessel functions and their differential equations and apply these to various physical problems such as in quantum mechanics.</p> <p>CO4: Learn about gamma and beta functions and their applications.</p> <p>CO5: Solve linear partial differential equations of second order with separation of variable method.</p> <p>CO6: In the laboratory course, the students will learn the basics of the Scilab software/Python interpreter and apply appropriate numerical method to solve selected physics problems both using user defined and inbuilt functions from Scilab/Python. They will also learn to generate and plot Legendre polynomials and Bessel functions and verify their recurrence relation.</p>
Thermal Physics	<p>CO1: Comprehend the basic concepts of thermodynamics, the first and the second law of thermodynamics.</p> <p>CO2: Understand the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.</p> <p>CO3: Know about reversible and Irreversible processes.</p> <p>CO4: Learn about Maxwell's relations and use them for solving many problems in Thermodynamics</p> <p>CO5: Understand the concept and behavior of ideal and real gases.</p> <p>CO6: Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law, equipartition of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.</p> <p>CO7: In the laboratory course, the students are expected to do some basic experiments in thermal Physics, viz., determination of Mechanical Equivalent of Heat (J), coefficient of thermal conductivity of good and bad conductor, temperature coefficient of resistance, variation of thermo-emf of a thermocouple with temperature difference at its two junctions and calibration of a thermocouple.</p>
Digital Systems and Applications	<p>CO1: Course learning begins with the basic understanding of active and passive components. It then builds the</p>

	<p>concept of Integrated Chips (IC): its classification and uses.</p> <p>CO2: Differentiating the Analog and Digital circuits, the concepts of number systems like Binary,BCD, Octal and hexadecimal are developed to elaborate and focus on the digital systems.</p> <p>CO3: Sequential Circuits: Basic memory elements Flips-Flops, shift registers and 4-bits counters leading to the concept of RAM, ROM and memory organization.</p> <p>CO4: Timer circuits using IC 555 providing clock pulses to sequential circuits and develop multivibrators.</p> <p>CO5: Introduces to basic architecture of processing in an Intel 8085 microprocessor and to Assembly Language.</p> <p>CO6: Also impart understanding of working of CRO and its usage in measurements of voltage, current, frequency and phase measurement.</p> <p>CO7: In the laboratory students will learn to construct both combinational and sequential circuits by employing NAND as building blocks and demonstrate Adders, Subtractors, Shift Registers, and multivibrators using 555 ICs. They are also expected to use μP 8085 to demonstrate the same simple programme using assembly language and execute the programme using a μP kit.</p>
Semester IV	
Mathematical Physics III	<p>CO1: Determine continuity, differentiability and analyticity of a complex function, find the derivative of a function and understand the properties of elementary complex functions.</p> <p>CO2: Work with multi-valued functions (logarithmic, complex power, inverse trigonometric function) and determine branches of these functions</p> <p>CO3: Evaluate a contour integral using parametrization, fundamental theorem of calculus and Cauchy's integral formula.</p> <p>CO4: Find the Taylor series of a function and determine its radius of convergence.</p> <p>CO5: Determine the Laurent series expansion of a function in different regions, find the residues and use the residue theory to evaluate a contour integral and real integral.</p> <p>CO6: Understand the properties of Fourier and Laplace transforms and use these to solve boundary value problems.</p>

	CO7: In the laboratory course, the students will learn the basics of the Scilab software/Python interpreter and apply appropriate numerical method to solve selected physics problems both using user defined and inbuilt functions from Scilab/Python.
Elements of Modern Physics	<p>CO1: Main aspects of the inadequacies of classical mechanics as well as understanding of the historical development of quantum mechanics.</p> <p>CO2: Formulation of Schrodinger equation and the idea of probability interpretation associated with wave-functions.</p> <p>CO3: The spontaneous and stimulated emission of radiation, optical pumping and population inversion. Three level and four level lasers. Ruby laser and He-Ne laser in details. Basic lasing</p> <p>CO4: The properties of nuclei like density, size, binding energy, nuclear forces and</p> <p>CO5: structure of atomic nucleus, liquid drop model and nuclear shell model and</p> <p>CO6: mass formula.</p> <p>CO7: Decay rates and lifetime of radioactive decays like alpha, beta, gamma decay. Neutrino, its properties and its role in theory of beta decay.</p> <p>CO8: Fission and fusion: Nuclear processes to produce nuclear energy in nuclear reactor and stellar energy in stars.</p> <p>CO9: In the laboratory course, the students will get opportunity to measure Planck's constant, verify photoelectric effect, determine e/m of electron, Ionization potential of atoms, study emission and absorption line spectra. They will also find wavelength of Laser sources by single and Double slit experiment, wavelength and angular spread of He-Ne Laser using plane diffraction grating.</p>
Analog Systems and Applications	<p>CO1: Rectifier diodes, Zener diode, photodiode etc</p> <p>CO2: NPN and PNP transistors: Characteristics of different configurations, biasing, stabilization and their applications.</p> <p>CO3: CE and two stage RC coupled transistor amplifier using h-parameter model of the transistor.</p> <p>CO4: Designing of different types of oscillators and their stabilities.</p> <p>CO5: Ideal and practical op-amps: Characteristics and applications.</p> <p>CO6: In the laboratory course, the students will be able to study characteristics of various diodes and BJT. They</p>

	will be able to design amplifiers, oscillators and DACs. Also different applications using Op-Amp will be designed.
COURSE OUTCOME FOR III YEAR	
Semester V	
Quantum Mechanics & Applications	<p>CO1: Methods to solve time-dependent and time-independent Schrodinger equation.</p> <p>CO2: Quantum mechanics of simple harmonic oscillator.</p> <p>CO3: Non-relativistic hydrogen atom: spectrum and eigenfunctions.</p> <p>CO4: Angular momentum: Orbital angular momentum and spin angular momentum.</p> <p>CO5: Bosons and fermions - symmetric and anti-symmetric wave functions.</p> <p>CO6: Application to atomic systems</p> <p>CO7: In the laboratory course, with the exposure in computational programming in the computer lab, the student will be in a position to solve Schrodinger equation for ground state energy and wave functions of various simple quantum mechanical one-dimensional and three dimensional potentials.</p>
Solid State Physics	<p>CO1: Elucidate the concept of lattice, crystals and symmetry operations.</p> <p>CO2: Understand the elementary lattice dynamics and its influence on the properties of materials.</p> <p>CO3: Describe the main features of the physics of electrons in solids: origin of energy bands, and their influence electronic behavior.</p> <p>CO4: Explain the origin of dia-, para-, and ferro-magnetic properties of solids.</p> <p>CO5: Explain the origin of the dielectric properties exhibited by solids and the concept of polarizability.</p> <p>CO6: Understand the basics of phase transitions and the preliminary concept and experiments related to superconductivity in solid.</p> <p>CO7: In the laboratory students will carry out experiments based on the theory that they have learned to measure the magnetic susceptibility, dielectric constant, trace hysteresis loop. They will also employ to four probe methods to measure electrical conductivity and the hall set up to determine the hall coefficient of a semiconductor.</p>
Semester VI	
Electromagnetic Theory	<p>CO1: Apply Maxwell's equations to deduce wave equation, electromagnetic field energy, momentum and angular momentum density.</p>

	<p>CO2: Understand electromagnetic wave propagation in unbounded media: Vacuum, dielectric medium, conducting medium, plasma.</p> <p>CO3: Understand electromagnetic wave propagation in bounded media: reflection and transmission coefficients at plane interface in bounded media.</p> <p>CO4: Understand polarization of Electromagnetic Waves: Linear, Circular and Elliptical Polarization. Production as well as detection of waves in laboratory.</p> <p>CO5: Learn the features of planar optical wave guide.</p> <p>CO6: Understand the fundamentals of propagation of electromagnetic waves through optical fibres.</p>
Statistical Mechanics	<p>CO1: Understand the concepts of microstate, macrostate, phase space, thermodynamic probability and partition function.</p> <p>CO2: Understand the use of Thermodynamic probability and Partition function for calculation of thermodynamic variables for physical system (Ideal gas, finite level system).</p> <p>CO3: Difference between the classical and quantum statistics</p> <p>CO4: Understand the properties and Laws associated with thermal radiation.</p> <p>CO5: Apply the Fermi- Dirac distribution to model problems such as electrons in solids and white dwarf stars</p> <p>CO6: Apply the Bose-Einstein distribution to model problems such as blackbody radiation and Helium gas.</p> <p>CO7: In the laboratory course, with the exposure in computer programming and computational techniques, the student will be in a position to perform numerical simulations for solving the problems based on Statistical Mechanics</p>
DISCIPLINE SPECIFIC ELECTIVE (DSE)	
Experimental Techniques	<p>CO1: Learn the measurement systems, errors in measurements and statistical treatment of data.</p> <p>CO2: About Noise and signal, signal to noise ratio, different types of noises and their identification.</p> <p>CO3: Concept of electromagnetic interference and necessity of grounding.</p> <p>CO4: Understand principle of working and industrial applications of various transducers like Electrical, Thermal and Mechanical systems commonly used to measure Temperature and Position in industry.</p>

	<p>CO5: Develop an understanding of construction and working of different measuring instruments.</p> <p>CO6: Develop an understanding of construction, working and use of different AC and DC bridges and its applications.</p>
Advanced Mathematical Physics – I	<p>CO1: Understand algebraic structures in n-dimension and basic properties of the linear vector spaces.</p> <p>CO2: Represent Linear Transformations as matrices and understand basic properties of matrices.</p> <p>CO3: Apply vector spaces and matrices in the quantum world.</p> <p>CO4: Learn basic properties of Cartesian and general tensors with physical examples such as moment of inertia tensor, energy momentum tensor, stress tensor, strain tensor etc.</p> <p>CO5: Learn how to express the mathematical equations for the Laws of Physics in their co-variant forms.</p> <p>CO6: In the laboratory course, the students are expected to solve the problems using the Scilab/C++/Python computer language: Eigenvalues and Eigenvectors of given matrix, determination of wave functions for stationary states as eigenfunctions, eigen energy values of Hermitian differential operators, Lagrangian formulation in classical dynamics etc.</p>
Nuclear and Particle Physics	<p>CO1: To be able to understand the basic properties of nuclei as well as knowledge of experimental determination of the same, the concept of binding energy, its various dependent parameters, N-Z curves and their significance</p> <p>CO2: To appreciate the formulations and contrasts between different nuclear models such as Liquid drop model, Fermi gas model and Shell Model and evidences in support.</p> <p>CO3: Knowledge of radioactivity and decay laws. A detailed analysis, comparison and energy kinematics of alpha, beta and gamma decays.</p> <p>CO4: Familiarization with different types of nuclear reactions, Q- values, compound and direct reactions.</p> <p>CO5: To know about energy losses due to ionizing radiations, energy losses of electrons, gamma ray interactions through matter and neutron interaction with matter. Through the section on accelerators students will acquire knowledge about Accelerator facilities in India along with a comparative study of a range of detectors and accelerators which are building blocks of modern day science.</p>

Physics of Devices and Communication	<p>CO1: Develop the basic knowledge of semiconductor device physics and electronic circuits along with the practical technological considerations and applications.</p> <p>CO2: Understand the operation of devices such as UJT, JFET, MOS, various bias circuits of MOSFET, Charge coupled Devices and Tunnel Diode.</p> <p>CO3: Learn to analyze MOSFET circuits and develop an understanding of MOSFET I-V characteristics and the allowed frequency limits.</p> <p>CO4: Learn the IC fabrication technology involving the process of diffusion, implantation, oxidation and etching with an emphasis on photolithography and electron-lithography.</p> <p>CO5: Apply concepts for the regulation of power supply by developing an understanding of various kinds of RC filters classified on the basis of allowed range of frequencies.</p> <p>CO6: Learn basic principles of phase locked loop (PLL) and understand its operation.</p> <p>CO7: Gain understanding of Digital Data serial and parallel Communication Standards. Knowledge of USB standards and GPIB.</p> <p>CO8: Understand different blocks in communication system, need of modulation, modulation processes and different modulation schemes.</p>
Astronomy and Astrophysics	<p>CO1: Different types of telescopes, diurnal and yearly motion of astronomical objects, and astronomical coordinate systems and their transformations.</p> <p>CO2: Brightness scale for stars, types of stars, their structure and evolution on HR diagram.</p> <p>CO3: Components of Solar System and its evolution</p> <p>CO4: The large scale structure of the Universe and its history</p> <p>CO5: Distribution of chemical compounds in the interstellar medium and astrophysical conditions necessary for the emergence and existence of life.</p>
Atmospheric Physics	<p>CO1: Learn and understand structure of temperature profiles and fine scale features in the troposphere using observations.</p> <p>CO2: Understand Atmospheric waves: surface water waves, atmospheric gravity waves, acoustic waves etc</p> <p>CO3: Learn remote sensing techniques such as radar, lidar, and satellite to explore atmospheric processes.</p> <p>CO4: Understand properties of aerosols, their radiative and</p>

	health effects.
Biological Physics	<p>CO1: Know basic facts about biological systems, including single cells, multicellular organisms and ecosystems from a quantitative perspective.</p> <p>CO2: Gain familiarity with various biological processes at different length and time scales, including molecular processes, organism level processes and evolution.</p> <p>CO3: Be able to apply the principles of physics from areas such as mechanics, electricity and magnetism, thermodynamics, statistical mechanics, and dynamical systems to understand certain living processes.</p> <p>CO4: Gain a systems level perspective on organisms and appreciate how networks of interactions of many components give rise to complex behavior.</p> <p>CO5: Perform mathematical and computational modelling of certain aspects of living systems.</p>
Embedded systems - Introduction to Microcontroller	<p>CO1: Know the major components that constitute an embedded system.</p> <p>CO2: Understand what is a microcontroller, microcomputer embedded system.</p> <p>CO3: Describe the architecture of a 8051 microcontroller.</p> <p>CO4: Write simple programs for 8051 microcontroller in C language.</p> <p>CO5: Understand key concepts of 8051 microcontroller systems like I/O operations, interrupts, programming of timers and counters.</p> <p>CO6: Interface 8051 microcontroller with peripherals</p> <p>CO7: Understand and explain concepts and architecture of embedded systems</p> <p>CO8: Implement small programs to solve well-defined problems on an embedded platform.</p> <p>CO9: Develop familiarity with tools used to develop an embedded environment</p> <p>CO10: Learn to use the Arduino Uno (an open source microcontroller board) in simple applications.</p> <p>CO11: In the laboratory, students will program 8051 microcontroller and Arduino to perform various experiments.</p>
Linear Algebra and Tensor Analysis	<p>CO1: Understand algebraic structures in n-dimension and basic properties of the linear vector spaces.</p> <p>CO2: Represent Linear Transformations as matrices and understand basic properties of matrices.</p> <p>CO3: Apply vector spaces and matrices in the quantum world.</p> <p>CO4: Learn basic properties of Cartesian and general</p>

	<p>tensors with physical examples such as moment of inertia tensor, energy momentum tensor, stress tensor, strain tensor, geometrical applications etc.</p> <p>CO5: Learn how to express the mathematical equations for the Laws of Physics in their co-variant forms.</p>
Nano Materials and Applications	<p>CO1: Explain the role of confinement on the density of state function and so on the various properties exhibited by nanomaterials compared to bulk materials.</p> <p>CO2: Explain various methods for the synthesis/growth of nanomaterials including top down and bottom up approaches.</p> <p>CO3: Analyze the data obtained from the various characterization techniques</p> <p>CO4: Explain the concept of Quasi-particles such as excitons and how they influence the optical properties.</p> <p>CO5: Explain the Interger Quantum Hall Effect and the concept of Landau Levels, and edge states in conductance quantization.</p> <p>CO6: Explain the conductance quantization in 1D structure and its difference from the 2DEG system.</p>
Communication System	<p>CO1: Understand of fundamentals of electronic communication system and electromagnetic communication spectrum with an idea of frequency allocation for radio communication system in India.</p> <p>CO2: Gain an insight on the use of different modulation and demodulation techniques used in analog communication</p> <p>CO3: Learn the generation and detection of a signal through pulse and digital modulation techniques and multiplexing.</p> <p>CO4: Gain an in-depth understanding of different concepts used in a satellite communication system.</p> <p>CO5: Study the concept of Mobile radio propagation, cellular system design and understand mobile technologies like GSM and CDMA.</p> <p>CO6: Understand evolution of mobile communication generations 2G, 3G, and 4G with their characteristics and limitations.</p> <p>CO7: In the laboratory course, students will apply the theoretical concepts to gain hands on experience in building modulation and demodulation circuits; Transmitters and Receivers for AM and FM. Also to construct TDM, PAM, PWM, PPM and ASK, PSK and FSK modulator and verify their results.</p>

Medical Physics	<p>CO1: Gain a broad and fundamental understanding of Physics while developing particular expertise in medical applications.</p> <p>CO2: Learn about the human body, its anatomy, physiology and BioPhysics, exploring its performance as a physical machine.</p> <p>CO3: Learn diagnostic and therapeutic applications like the ECG, Radiation Physics, X-ray technology, ultrasound and magnetic resonance imaging.</p> <p>CO4: Gain knowledge with reference to working of various diagnostic tools, medical imaging techniques</p> <p>CO5: Understand interaction of ionizing radiation with matter - its effects on living organisms and its uses as a therapeutic technique and also radiation safety practices.</p> <p>CO6: Gain functional knowledge regarding need for radiological protection and the sources of an approximate level of radiation exposure for treatment purposes.</p> <p>CO7: In the laboratory course, the student will be exposed to the workings of various medical devices and getting familiarized with various detectors used in medical imaging, medical diagnostics. The hands-on experience will be very useful for the students from job perspective.</p>
Applied Dynamics	<p>CO1: Demonstrate understanding of the concepts that underlay the study of dynamical systems.</p> <p>CO2: Understand fractals as self-similar structures.</p> <p>CO3: Learn various forms of dynamics and different routes to chaos.</p> <p>CO4: Understand basic Physics of fluids and its dynamics theoretically and experimentally and by computational simulations</p> <p>CO5: In the Lab course, students will be able to perform Simulations/Lab experiments on: coupled Oscillators, Simulation of Simple Population, Predator-Prey Dynamics, Simple genetic circuits, rate equations for some simple chemical reactions, Fractal Formation in Deterministic Fractals, Fluid Flow Models.</p>
Digital Signal Processing	<p>CO1: Learn basic discrete-time signal and system types, convolution sum, impulse and frequency response concepts for linear time-invariant (LTI) systems.</p> <p>CO2: Understand use of different transforms and analyze the discrete time signals and systems.</p> <p>CO3: Realize the use of LTI filters for filtering different</p>

	<p>real world signals. The concept of transfer</p> <p>CO4: Learn to solve Difference Equations.</p> <p>CO5: Develop an ability to analyze DSP systems like linear-phase, FIR, IIR, All-pass, averaging and notch Filter etc.</p> <p>CO6: Understand the discrete Fourier transform (DFT) and realize its implementation using FFT techniques.</p>
Physics of Earth	<p>CO1: Have an overview of structure of the earth as well as various dynamical processes occurring on it.</p> <p>CO2: Develop an understanding of evolution of the earth.</p> <p>CO3: Apply physical principles of elasticity and elastic wave propagation to understand modern global seismology as a probe of the Earth's internal structure.</p> <p>CO4: Understand the origin of magnetic field, Geodynamics of earthquakes and the description of seismic sources; a simple but fundamental theory of thermal convection; the distinctive rheological behaviour of the upper mantle and its top.</p> <p>CO5: Explore various roles played by water cycle, carbon cycle, nitrogen cycles in maintaining steady state of earth leading to better understanding of the contemporary dilemmas (climate change, bio diversity loss, population growth, etc.) disturbing the Earth</p> <p>CO6: In the tutorial section, through literature survey on the various aspects of health of Earth, project work / seminar presentation, the students will be able to appreciate need to 'save' Earth.</p>
Advanced Mathematical Physics-II	<p>CO1: Understand variational principle and its applications: Geodesics in two and three dimensions, Euler Lagrange Equation and simple problems in one and two dimensions.</p> <p>CO2: Acquire basic concept of Hamiltonian, Hamilton's principle and Hamiltonian equation of motion, Poisson and Lagrange brackets.</p> <p>CO3: Learn elementary group theory: definition and properties of groups, subgroups, Homomorphism, isomorphism, normal and conjugate groups, representation of groups, Reducible and Irreducible groups.</p> <p>CO4: Learn the theory of probability: Random variables and probability distributions, Expectation values and variance.</p>
Classical Dynamics	<p>CO1: Understand the physical principle behind the derivation of Lagrange and Hamilton equations, and</p>

	<p>the advantages of these formulations.</p> <p>CO2: Understand small amplitude oscillations.</p> <p>CO3: Understand the intricacies of motion of particle in central force field. Critical thinking and problem-solving skills</p> <p>CO4: Recapitulate and learn the special theory of relativity extending to Four – vectors.</p> <p>CO5: Learn the basics of fluid dynamics, streamline and turbulent flow, Reynolds’s number, coefficient of viscosity and Poiseuille’s equation.</p>
SKILL-ENHANCEMENT COURSES (SEC)	
SEC1: Physics Workshop Skills	<p>CO1: Learning measuring devices like Vernier callipers, Screw gauge, travelling microscope and Sextant for measuring various length scales.</p> <p>CO2: Acquire skills in the usage of multimeters, soldering iron, oscilloscopes, power supplies and relays.</p> <p>CO3: Developing mechanical skill such as casting, foundry, machining, forming and welding and will become familiar with common machine tools like lathe, shaper, drilling, milling, surface machines and Cutting tools.</p> <p>CO4: Getting acquaintance with prime movers: Mechanism, gear system, wheel, Fixing of gears with motor axle. Lever mechanism. Lifting of heavy weight using lever. braking systems, pulleys.</p>
SEC 2: Computational Physics Skills	<p>CO1: Use computers for solving problems in Physics.</p> <p>CO2: Prepare algorithms and flowcharts for solving a problem.</p> <p>CO3: Use Linux commands on terminal</p> <p>CO4: Use an unformatted editor to write sources codes.</p> <p>CO5: Learn “Scientific Word Processing”, in particular, using LaTeX for preparing articles, papers etc. which include mathematical equations, picture and tables.</p> <p>CO6: Learn the basic commands of Gnuplot.</p>
SEC 3: Electrical circuits and Network Skills	<p>CO1: Demonstrate good comprehension of basic principles of electricity including ideas about voltage, current and resistance.</p> <p>CO2: Develop the capacity to analyze and evaluate schematics of power efficient electrical circuits while demonstrating insight into tracking of interconnections within elements while identifying current flow and voltage drop.</p> <p>CO3: Gain knowledge about generators, transformers and electric motors. The knowledge would include interfacing aspects and consumer defined control of speed and power.</p>

	<p>CO4: Acquire capacity to work theoretically and practically with solid-state devices.</p> <p>CO5: Delve into practical aspects related to electrical wiring like various types of conductors and cables, wiring-Star and delta connections, voltage drop and losses.</p> <p>CO6: Measure current, voltage, power in DC and AC circuits, acquire proficiency in fabrication of regulated power supply.</p> <p>CO7: Develop capacity to identify and suggest types and sizes of solid and stranded cables, conduit lengths, cable trays, splices, crimps, terminal blocks and solder.</p>
SEC 4: Basic Instrumentation Skills	<p>CO1: The student is expected to have the necessary working knowledge on accuracy, precision, resolution, range and errors/uncertainty in measurements.</p> <p>CO2: Course learning begins with the basic understanding of the measurement and errors in measurement. It then familiarizes about each and every specification of a multimeter, multimeters, multivibrators, rectifiers, amplifiers, oscillators and high voltage probes and their significance with hands on mode.</p> <p>CO3: Explanation of the specifications of CRO and their significance. Complete explanation of CRT.</p> <p>CO4: Students learn the use of CRO for the measurement of voltage (DC and AC), frequency and time period. Covers the Digital Storage Oscilloscope and its principle of working.</p> <p>CO5: Students learn principles of voltage measurement. Students should be able to understand the advantages of electronic voltmeter over conventional multimeter in terms of sensitivity etc. Types of AC millivoltmeter should be covered.</p> <p>CO6: Covers the explanation and specifications of Signal and pulse Generators: low frequency signal generator and pulse generator. Students should be familiarized with testing and specifications.</p> <p>CO7: Students learn about the working</p>
SEC 5: Renewable Energy and Energy harvesting	<p>CO1: Knowledge of various sources of energy for harvesting</p> <p>CO2: Understand the need of energy conversion and the various methods of energy storage</p> <p>CO3: A good understanding of various renewable energy systems, and its components.</p> <p>CO4: Knowledge about renewable energy technologies,</p>

	<p>different storage technologies, distribution grid, smart grid including sensors, regulation and their control.</p> <p>CO5: Design the model for sending the wind energy or solar energy plant.</p> <p>CO6: The students will gain hand on experience of: (i) different kinds of alternative energy sources, (ii) conversion of vibration into voltage using piezoelectric materials,</p> <p>CO7: (iii) conversion of thermal energy into voltage using thermoelectric modules.</p>
SEC 6: Engineering Design and Prototyping/Technical Drawing	<p>CO1: Understanding the concept of a sectional view – visualizing a space after being cut by a plane. How The student will be able to draw and learn proper techniques for drawing an aligned section.</p> <p>CO2: Understanding the use of spatial visualization by constructing an orthographic multi view drawing.</p> <p>CO3: Drawing simple curves like ellipse, cycloid and spiral, Orthographic projections of points, lines and of solids like cylinders, cones, prisms and pyramids etc.</p> <p>CO4: Using Computer Aided Design (CAD) software and AutoCAD techniques.</p>
SEC 7: Radiation Safety	<p>CO1: Awareness and understanding the hazards of radiation and the safety measures to guard against these hazards.</p> <p>CO2: Learning the basic aspects of the atomic and nuclear Physics, specially the radiations that originate from the atom and the nucleus.</p> <p>CO3: Having a comprehensive knowledge about the nature of interaction of matter with radiations like gamma, beta, alpha rays, neutrons etc. and radiation shielding by appropriate materials.</p> <p>CO4: Knowing about the units of radiations and their safety limits, the devises to detect and measure radiation.</p> <p>CO5: Learning radiation</p>
SEC 8: Applied Optics	<p>CO1: Understand basic lasing mechanism qualitatively, types of lasers, characteristics of laser light and its application in developing LED, Holography.</p> <p>CO2: Gain concepts of Fourier optics and Fourier transform spectroscopy.</p> <p>CO3: Understand basic principle and theory of Holography.</p> <p>CO4: Grasp the idea of total internal reflection and learn the characteristics of optical fibers.</p>

SEC 9: Weather Forecasting	CO1: Acquire basic knowledge of the elements of the atmosphere, its composition at various heights, variation of pressure and temperature with height. CO2: Learn basic techniques to measure temperature and its relation with cyclones and anti-cyclones. CO3: Knowledge of simple techniques to measure wind speed and its directions, humidity and rainfall. CO4: Understanding of absorption, emission and scattering of radiations in atmosphere; Radiation laws. CO5: Knowledge of global wind systems, jet streams, local thunderstorms, tropical cyclones, tornadoes and hurricanes. CO6: Knowledge of climate and its classification. Understanding various causes of climate change like global warming, air pollution, aerosols, ozone depletion, acid rain.
SEC 10: Introduction to Physical Computing (xxx1)	CO1: Understand the evolution of the CPU from microprocessor to microcontroller and embedded computers from a historical perspective. CO2: Operate basic electronic components and analog and digital electronics building blocks including power supply and batteries. CO3: Use basic laboratory equipment for measurement and instrumentation. CO4: Understand the Arduino ecosystem and write simple Arduino programs (sketches) CO5: Understand sensor characteristics and select a suitable sensor for various applications. CO6: Read digital and analog data and produce digital and analog outputs from an embedded computer. CO7: Understand how to interface an embedded computer to the physical environment. CO8: Visualize the needs of a standalone embedded computer and implement a simple system using Arduino.
SEC 11: Numerical Analysis (xxx2)	CO1: approximate single and multi-variable function by Taylor's Theorem. CO2: Solve first order differential equations and apply it to physics problems. CO3: solve linear second order homogeneous and non-homogeneous differential equations with constant coefficients. CO4: Calculate partial derivatives of function of several variables CO5: Understand the concept of gradient of scalar field and divergence and curl of vector fields. perform line,

	<p>surface and volume integration</p> <p>CO6: Use Green's, Stokes' and Gauss's Theorems to compute integrals</p>
GENERIC ELECTIVE (GE)	
GE 1: Electricity and Magnetism	<p>CO1: Apply Gauss's law of electrostatics to solve a variety of problems.</p> <p>CO2: Articulate knowledge of electric current, resistance and capacitance in terms of electric field and electric potential.</p> <p>CO3: Calculate the magnetic forces that act on moving charges and the magnetic fields due to currents (Biot-Savart and Ampere laws)</p> <p>CO4: Gain brief idea of dia, para and ferro-magnetic materials</p> <p>CO5: Understand the concepts of induction and self-induction, to solve problems using Faraday's and Lenz's laws</p>
GE 2: Mathematical Physics	<p>CO1: Find extrema of functions of several variables.</p> <p>CO2: Represent a periodic function by a sum of harmonics using Fourier series and their applications in physical problems such as vibrating strings etc..</p> <p>CO3: Obtain power series solution of differential equation of second order with variable coefficient using Frobenius method.</p> <p>CO4: Understand properties and applications of special functions like Legendre polynomials, Bessel functions and their differential equations and apply these to various physical problems such as in quantum mechanics.</p> <p>CO5: Learn about gamma and beta functions and their applications.</p> <p>CO6: Solve linear partial differential equations of second order with separation of variable method.</p> <p>CO7: Understand the basic concepts of complex analysis and integration.</p>
GE 3: Digital, Analog and Instrumentation	<p>CO1: Differentiating the Analog and Digital circuits, the concepts of number systems like Binary, BCD, Octal and hexadecimal are developed to elaborate and focus on the digital systems.</p> <p>CO2: Characteristics and working of pn junction.</p> <p>CO3: Two terminal devices: Rectifier diodes, Zener diode, photodiode etc</p> <p>CO4: NPN and PNP transistors: Characteristics of different configurations, biasing, stabilization and their applications.</p> <p>CO5: CE and two stage RC coupled transistor amplifier</p>

	<p>using h-parameter model of the transistor.</p> <p>CO6: Designing of different types of oscillators and their stabilities.</p>
GE 4: Applied Dynamics	<p>CO1: Demonstrate understanding of the concepts that underlay the study of dynamical systems.</p> <p>CO2: Understand fractals as self-similar structures.</p> <p>CO3: Learn various forms of dynamics and different routes to chaos.</p> <p>CO4: Understand basic Physics of fluids and its dynamics theoretically and experimentally and by computational simulations</p> <p>CO5: In the Lab course, students will be able to perform Simulations/Lab experiments on: coupled Oscillators, Simulation of Simple Population, Predator-Prey Dynamics, Simple genetic circuits, rate equations for some simple chemical reactions, Fractal Formation in Deterministic Fractals, Fluid Flow Models.</p>
GE 5: Medical Physics	<p>CO1: Focus on the application of Physics to clinical medicine.</p> <p>CO2: Gain a broad and fundamental understanding of Physics while developing particular expertise in medical applications.</p> <p>CO3: Learn about the human body, its anatomy, physiology and BioPhysics, exploring its performance as a physical machine.</p> <p>CO4: Learn diagnostic and therapeutic applications like the ECG, Radiation Physics, X-ray technology, ultrasound and magnetic resonance imaging.</p> <p>CO5: Gain knowledge with reference to working of various diagnostic tools, medical imaging techniques</p>
GE 6: Mechanics	<p>CO1: Understand the role of vectors and coordinate systems in Physics.</p> <p>CO2: Learn to solve Ordinary Differential Equations: First order, Second order Differential Equations with constant coefficients.</p> <p>CO3: Understand laws of motion and their application to various dynamical situations.</p> <p>CO4: Learn the concept of inertial reference frames and Galilean transformations. Also, the concept of conservation of energy, momentum, angular momentum and apply them to basic problems.</p> <p>CO5: Understand translational and rotational dynamics of a system of particles.</p> <p>CO6: Apply Kepler's laws to describe the motion of planets and satellite in circular orbit.</p>

	CO7: Understand concept of Geosynchronous orbits
GE 7: Elements of Modern Physics	CO1: Main aspects of the inadequacies of classical mechanics as well as understanding of the historical development of quantum mechanics. CO2: Formulation of Schrodinger equation and the idea of probability interpretation associated with wave-functions. CO3: The spontaneous and stimulated emission of radiation, optical pumping and population inversion. Three level and four level lasers. Ruby laser and He-Ne laser in details. Basic lasing CO4: The properties of nuclei like density, size, binding energy, nuclear forces and CO5: structure of atomic nucleus, liquid drop model and nuclear shell model and mass formula.
GE 8: Solid State Physics	CO1: Elucidate the concept of lattice, crystals and symmetry operations. CO2: Understand the elementary lattice dynamics and its influence on the properties of materials. CO3: Describe the main features of the physics of electrons in solids: origin of energy bands, and their influence electronic behavior. CO4: Explain the origin of dia-, para-, and ferro-magnetic properties of solids. CO5: Explain the origin of the dielectric properties exhibited by solids and the concept of polarizability
GE 9: Embedded System: Introduction to Microcontroller	CO1: Understand what is a microcontroller, microcomputer embedded system. CO2: Describe the architecture of a 8051 microcontroller. CO3: Write simple programs for 8051 microcontroller in C language. CO4: Understand key concepts of 8051 microcontroller systems like I/O operations, interrupts, programming of timers and counters. CO5: Interface 8051 microcontroller with peripherals.
GE 10: Biological Physics	CO1: Know basic facts about biological systems, including single cells, multicellular organisms and ecosystems from a quantitative perspective. CO2: Gain familiarity with various biological processes at different length and time scales, including molecular processes, organism level processes and evolution. CO3: Be able to apply the principles of physics from areas such as mechanics, electricity and magnetism, thermodynamics, statistical mechanics, and dynamical systems to understand certain living processes.

	<p>CO4: Gain a systems level perspective on organisms and appreciate how networks of interactions of many components give rise to complex behavior.</p> <p>CO5: Perform mathematical and computational modelling of certain aspects of living systems.</p> <p>CO6: Acquire mastery of the fundamental principles and applications of various branches of Physics in understanding biological systems.</p> <p>CO7: Learn relevance of chemistry principles and thermodynamics in understanding energy transfer mechanism and protein folding in biological systems.</p> <p>CO8: Get exposure to complexity of life at i) the level of Cell, ii) level of multi cellular organism and iii) at macroscopic system – ecosystem and biosphere</p>
GE 11: Waves and Optics	<p>CO1: Understand Simple harmonic oscillation and superposition principle.</p> <p>CO2: Understand different types of waves and their velocities: Plane, Spherical, Transverse, Longitudinal.</p> <p>CO3: Understand Concept of normal modes in transverse and longitudinal waves: their frequencies and configurations.</p> <p>CO4: Understand Interference as superposition of waves from coherent sources derived from same parent source.</p> <p>CO5: Demonstrate basic concepts of Diffraction: Superposition of wavelets diffracted from aperture, understand Fraunhofer and Fresnel Diffraction.</p>
GE 12: Quantum Mechanics	<p>CO1: Methods to solve time-dependent and time-independent Schrodinger equation.</p> <p>CO2: Quantum mechanics of simple harmonic oscillator.</p> <p>CO3: Non-relativistic hydrogen atom: spectrum and eigenfunctions.</p> <p>CO4: Angular momentum: Orbital angular momentum and spin angular momentum.</p> <p>CO5: Bosons and fermions - symmetric and anti-symmetric wave functions.</p> <p>CO6: Application to atomic systems</p>
GE 13: Communication System	<p>CO1: Understand of fundamentals of electronic communication system and electromagnetic communication spectrum with an idea of frequency allocation for radio communication system in India.</p> <p>CO2: Gain an insight on the use of different modulation and demodulation techniques used in analog communication</p> <p>CO3: Learn the generation and detection of a signal</p>

	<p>through pulse and digital modulation techniques and multiplexing.</p> <p>CO4: Gain an in-depth understanding of different concepts used in a satellite communication system.</p> <p>CO5: Study the concept of Mobile radio propagation, cellular system design and understand mobile technologies like GSM and CDMA.</p> <p>CO6: Understand evolution of mobile communication generations 2G, 3G, and 4G with their characteristics and limitations.</p>
GE14: Verilog and FPGA based system design	<p>CO1: Understand the steps and processes for design of logic circuits and systems.</p> <p>CO2: Differentiate between combinational and sequential circuits.</p> <p>CO3: Design various types of state machines..</p> <p>CO4: Understand various types of programmable logic building blocks such as CPLDs and FPGAs and their tradeoffs.</p> <p>CO5: Write synthesizable Verilog code.</p> <p>CO6: Write a Verilog test bench to test various Verilog code modules.</p> <p>CO7: Design, program and test logic systems on a programmable logic device (CPLD or FPGA) using Verilog.</p>
GE 15: Nano Materials and Applications	<p>CO1: Understand the basic concepts of Quantum Mechanics and solve Schrodinger wave equation for simple problems.</p> <p>CO2: Explain the difference between nanomaterials and bulk materials and their properties.</p> <p>CO3: Explain the role of confinement on the density of state function and so on the various properties exhibited by nanomaterials compared to bulk materials.</p> <p>CO4: Explain various methods for the synthesis/growth of nanomaterials including top down and bottom up approaches.</p> <p>CO5: Analyze the data obtained from the various characterization techniques.</p> <p>CO6: Explain various applications of nano particles, quantum dots, nano wires etc.</p> <p>CO7: Explain why nanomaterials exhibit properties which are sometimes very opposite, like magnetic, to their bulk counterparts.</p>
GE 16: Thermal Physics and Statistical Mechanics	<p>CO1: Learn the basic concepts of thermodynamics, the first and the second law of thermodynamics, the concept of entropy and the associated theorems, the</p>

	<p>thermodynamic potentials and their physical interpretations. They are also expected to learn Maxwell's thermodynamic relations.</p> <p>CO2: Know the fundamentals of the kinetic theory of gases, Maxwell-Boltzman distribution law, equipartition of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.</p> <p>CO3: Learn about the black body radiations, Stefan-Boltzmann's law, Rayleigh-Jean's law and Planck's law and their significances.</p> <p>CO4: Learn the quantum statistical distributions, viz., the Bose-Einstein statistics and the Fermi-Dirac statistics.</p>
GE 17: Digital Signal Processing	<p>CO1: Learn basic discrete-time signal and system types, convolution sum, impulse and frequency response concepts for linear time-invariant (LTI) systems.</p> <p>CO2: Understand use of different transforms and analyze the discrete time signals and systems.</p> <p>CO3: Realize the use of LTI filters for filtering different real world signals. The concept of transfer</p> <p>CO4: Learn to solve Difference Equations.</p> <p>CO5: Develop an ability to analyze DSP systems like linear-phase, FIR, IIR, All-pass, averaging and notch Filter etc.</p>
GE 18: Nuclear and Particle Physics	<p>CO1: To be able to understand the basic properties of nuclei as well as knowledge of experimental determination of the same, the concept of binding energy, its various dependent parameters, N-Z curves and their significance</p> <p>CO2: To appreciate the formulations and contrasts between different nuclear models such as Liquid drop model, Fermi gas model and Shell Model and evidences in support.</p> <p>CO3: Knowledge of radioactivity and decay laws. A detailed analysis, comparison and energy kinematics of alpha, beta and gamma decays.</p> <p>CO4: Familiarization with different types of nuclear reactions, Q- values, compound and direct reactions.</p>
GE 19: Astronomy and Astrophysics	<p>CO1: Different types of telescopes, diurnal and yearly motion of astronomical objects, and astronomical coordinate systems and their transformations.</p> <p>CO2: Brightness scale for stars, types of stars, their structure and evolution on HR diagram.</p> <p>CO3: Components of Solar System and its evolution</p> <p>CO4: The large scale structure of the Universe and its</p>

	<p>history</p> <p>CO5: Distribution of chemical compounds in the interstellar medium and astrophysical conditions necessary for the emergence and existence of life.</p>
GE 20: Atmospheric Physics	<p>CO1: Learn and understand structure of temperature profiles and fine scale features in the troposphere using observations.</p> <p>CO2: Understand Atmospheric waves: surface water waves, atmospheric gravity waves, acoustic waves etc</p> <p>CO3: Learn remote sensing techniques such as radar, lidar, and satellite to explore atmospheric processes.</p>
GE 21: Physics of Earth	<p>CO1: Have an overview of structure of the earth as well as various dynamical processes occurring on it.</p> <p>CO2: Develop an understanding of evolution of the earth.</p> <p>CO3: Apply physical principles of elasticity and elastic wave propagation to understand modern global seismology as a probe of the Earth's internal structure.</p> <p>CO4: Understand the origin of magnetic field, Geodynamics of earthquakes and the description of seismic sources; a simple but fundamental theory of thermal convection; the distinctive rheological behaviour of the upper mantle and its top.</p> <p>CO5: Explore various roles played by water cycle, carbon cycle, nitrogen cycles in maintaining steady state of earth leading to better understanding of the contemporary dilemmas (climate change, bio diversity loss, population growth, etc.) disturbing the Earth.</p>

NAME OF SUBJECT- PHYSICS for Physical Sciences	
PROGRAMME OUTCOME	<p>PO1: A systematic and coherent understanding of basic physics including the concepts, theories and relevant experimental techniques in the domains of Mechanics, Thermal Physics, Electricity and Magnetism, Modern Physics, Optics, Mathematical Physics and of the specialized field like Nuclear and Particle Physics, Quantum Physics, Embedded Systems, etc. in their choice of Discipline Specific Elective course.</p> <p>PO2: A wide ranging and comprehensive experience in physics laboratory methods in experiments related to mechanics, optics, thermal physics, electricity, magnetism, digital electronics, solid state physics and modern physics. Students acquire the ability for</p>

	<p>systematic observations, use of scientific research instruments, analysis of observational data, making suitable error estimates and scientific report writing.</p> <p>PO3: Procedural knowledge that creates different types of professionals related to the disciplinary/subject area of Physics and multi/interdisciplinary domains, including professionals engaged in research and development, teaching, technology professions and government/public service.</p> <p>PO4: Skills in areas related to one's specialization area within the disciplinary/subject area physics.</p>
PROGRAMME SPECIFIC OUT COME	<p>UG educational program in Physics aims to:</p> <p>PSO1: A systematic and coherent understanding of basic physics including the concepts, theories and relevant experimental techniques in the domains of Mechanics, Thermal Physics, Electricity and Magnetism, Modern Physics, Optics, Mathematical Physics and of the specialized field like Nuclear and Particle Physics, Quantum Physics, Embedded Systems, etc. in their choice of Discipline Specific Elective course.</p> <p>PSO2: A wide ranging and comprehensive experience in physics laboratory methods in experiments related to mechanics, optics, thermal physics, electricity, magnetism, digital electronics, solid state physics and modern physics. Students acquire the ability for systematic observations, use of scientific research instruments, analysis of observational data, making suitable error estimates and scientific report writing.</p> <p>PSO3: Procedural knowledge that creates different types of professionals related to the disciplinary/subject area of Physics and multi/interdisciplinary domains, including professionals engaged in research and development, teaching, technology professions and government/public service.</p> <p>PSO4: Skills in areas related to one's specialization area within the disciplinary/subject area physics</p>
COURSE OUTCOME FOR I YEAR	
Semester I	
CC-1A: Mechanics	<p>CO1: Understand the role of vectors and coordinate systems in Physics, solve Ordinary Differential Equations, laws of motion and their application to various dynamical situations.</p> <p>CO2: Learn the concept of Inertial reference frames their transformations. Also, the concept of conservation of energy, momentum, angular momentum and apply them to basic problems.</p>

	<p>CO3: Understand the phenomena of elastic and in-elastic collisions, phenomenon of simple harmonic motion, understand angular momentum of a system of particle, understand concept of Geosynchronous orbits</p> <p>CO4: Understand special theory of relativity - special relativistic effects and their effects on the mass and energy of a moving object.</p> <p>CO5: In the laboratory course, after acquiring knowledge of how to handle measuring instruments (like screw gauge, Vernier calipers, travelling microscope) student shall embark on verifying various principles and associated measurable parameters.</p>
Semester II	
CC-2A: Electricity, Magnetism & EMT	<p>CO1: Have basic knowledge of Vector Calculus</p> <p>CO2: Demonstrate Gauss law, Coulomb's law for the electric field, and apply it to systems of point charges as well as line, surface, and volume distributions of charges.</p> <p>CO3: Apply Gauss's law of electrostatics to solve a variety of problems. Articulate knowledge of electric current, resistance and capacitance in terms of electric field and electric potential.</p> <p>CO4: Calculate the magnetic forces that act on moving charges and the magnetic fields due to currents (Biot- Savart and Ampere laws)</p> <p>CO5: Have brief idea of magnetic materials, understand the concepts of induction, solve problems using Faraday's and Lenz's laws</p> <p>CO6: In the Lab course, students will be able to measure resistance (high and low), Voltage, Current, self and mutual inductance, capacitor, strength of magnetic field and its variation, study different circuits RC, LCR etc.</p>
COURSE OUTCOME FOR II YEAR	
Semester III	
CC-3A: Thermal Physics and Statistical Mechanics	<p>CO1: Learn the basic concepts of thermodynamics, the first and the second law of thermodynamics, the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations. They are also expected to learn Maxwell's thermodynamic relations.</p> <p>CO2: Know the fundamentals of the kinetic theory of gases, Maxwell-Boltzman distribution law, equipartition of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.</p> <p>CO3: Learn about the black body radiations, Stefan-</p>

	<p>Boltzmann's law, Rayleigh-Jean's law and Planck's law and their significances.</p> <p>CO4: Learn the quantum statistical distributions, viz., the Bose-Einstein statistics and the Fermi-Dirac statistics.</p> <p>CO5: In the laboratory course, the students are expected to: Measure of Planck's constant using black body radiation, determine Stefan's Constant, coefficient of thermal conductivity of a bad conductor and a good conductor, determine the temperature co-efficient of resistance, study variation of thermo emf across two junctions of a thermocouple with temperature etc.</p>
Semester IV	
CC-4A: Waves and Optics	<p>CO1: Understand Simple harmonic oscillation and superposition principle.</p> <p>CO2: Understand the importance of classical wave equation in transverse and longitudinal waves and solving a range of physical systems on its basis.</p> <p>CO3: Understand Concept of normal modes in transverse and longitudinal waves: their frequencies and configurations.</p> <p>CO4: Understand Interference as superposition of waves from coherent sources derived from same parent source. Demonstrate understanding of Interference experiments: Young's Double Slit, Fresnel's biprism, Llyod's Mirror, Newton's Rings.</p> <p>CO5: Demonstrate basic concepts of Diffraction: Superposition of wavelets diffracted from apertures. Understand Fraunhofer Diffraction from a slit.</p> <p>CO6: Concept of Polarization</p> <p>CO7: In the laboratory course, student will gain hands-on experience of using various optical instruments and making finer measurements of wavelength of light using Newton Rings experiment, Fresnel Biprism etc. Resolving power of optical equipment can be learnt first hand.</p> <p>CO8: The motion of coupled oscillators, study of Lissajous figures and behaviour of transverse, longitudinal waves can be learnt in this laboratory course.</p>
COURSE OUTCOME FOR III YEAR	
DSE Courses Discipline Specific (Physics Elective)	
DSE-1A: Elements of Modern Physics	<p>This course will prepare the students to appreciate and comprehend the following aspects:</p> <p>CO1: Understand historical basis of quantum mechanics.</p> <p>CO2: Explain how quantum mechanical concepts answer some of unanswered questions of Classical mechanics such as photoelectric effect, Compton scattering etc.</p> <p>CO3: Explain inadequacy of Rutherford model, discrete atomic</p>

	<p>spectra from hydrogen like atoms and its explanation on quantum mechanical basis.</p> <p>CO4: Demonstrate ability to apply wave-particle duality and uncertainty principle to solve physics problems.</p> <p>CO5: Explain two slit interference experiment with photons, atoms and particles establishing non-deterministic nature of QM.</p> <p>CO6: Set up Schrodinger equation for behavior of a particle in a field of force for simple potential and find wave solutions establishing wave-like nature of particles.</p> <p>CO7: Demonstrate ability to solve 1-D quantum problems including the quantum particle in a box, a well and the transmission and reflection of waves.</p> <p>CO8: Explain nuclear structure, binding energy, nuclear models and impossibility of an electron being in the nucleus as a consequence of the uncertainty principle.</p> <p>CO9: Understand radioactivity, radioactive decays, apply radioactive laws to solve related physics problems and Pauli's prediction of neutrino, and the subsequent discovery.</p>
DSE-1A: Digital, Analog and Instrumentation	<p>CO1: Differentiating the Analog and Digital circuits, the concepts of number systems like Binary, BCD, Octal and hexadecimal are developed to elaborate and focus on the digital systems.</p> <p>CO2: Characteristics and working of pn junction.</p> <p>CO3: Two terminal devices: Rectifier diodes, Zener diode, photodiode etc.</p> <p>CO4: NPN and PNP transistors: Characteristics of different configurations, biasing, stabilization and their applications.</p> <p>CO5: CE and two stage RC coupled transistor amplifier using h-parameter model of the transistor.</p> <p>CO6: Designing of different types of oscillators and their stabilities.</p> <p>CO7: Ideal and practical op-amps: Characteristics and applications.</p> <p>CO8: Timer circuits using IC 555 providing clock pulses to sequential circuits and develop multivibrators.</p> <p>CO9: Also impart understanding of working of CRO and its usage in measurements of voltage, current, frequency and phase measurement.</p> <p>CO10: In the laboratory students will learn to construct both combinational and sequential circuits by employing NAND as building blocks. They will be able to study characteristics of various diodes and BJT. They will also be able to design amplifiers (using BJT and Op-Amp),</p>

	oscillators and multivibrators. They will also learn working of CRO.
DSE-1A: Mathematical Physics	<p>CO1: Find extrema of functions of several variables.</p> <p>CO2: Represent a periodic function by a sum of harmonics using Fourier series and their applications in physical problems such as vibrating strings etc.</p> <p>CO3: Obtain power series solution of differential equation of second order with variable coefficient using Frobenius method.</p> <p>CO4: Understand properties and applications of special functions like Legendre polynomials, Bessel functions and their differential equations and apply these to various physical problems such as in quantum mechanics.</p> <p>CO5: Learn about gamma and beta functions and their applications.</p> <p>CO6: Solve linear partial differential equations of second order with separation of variable method.</p> <p>CO7: Understand the basic concepts of complex analysis and integration.</p> <p>CO8: In the laboratory course, the students will be able to design, code and test simple programs in C++ in the process of solving various problems.</p>
DSE-1A: Nano Materials and Applications	<p>CO1: Understand the basic concepts of Quantum Mechanics and solve Schrodinger wave equation for simple problems.</p> <p>CO2: Explain the difference between nanomaterials and bulk materials and their properties.</p> <p>CO3: Explain the role of confinement on the density of state function and so on the various properties exhibited by nanomaterials compared to bulk materials.</p> <p>CO4: Explain various methods for the synthesis/growth of nanomaterials including top down and bottom up approaches.</p> <p>CO5: Analyze the data obtained from the various characterization techniques.</p> <p>CO6: Explain various applications of nano particles, quantum dots, nano wires etc.</p> <p>CO7: Explain why nanomaterials exhibit properties which are sometimes very opposite, like magnetic, to their bulk counterparts.</p> <p>CO8: In the Lab course students will synthesize nanoparticles by different chemical routes and characterize them in the laboratory using the different techniques, learnt in the theory.</p> <p>CO9: They will also carry out thin film preparation and prepare capacitors and evaluate its performance. They will</p>

	fabricate a PN diode and study its I-V characteristics.
DSE-1A: Communication System	<p>CO1: Understand of fundamentals of electronic communication system and electromagnetic communication spectrum with an idea of frequency allocation for radio communication system in India.</p> <p>CO2: Gain an insight on the use of different modulation and demodulation techniques used in analog communication</p> <p>CO3: Learn the generation and detection of a signal through pulse and digital modulation techniques and multiplexing.</p> <p>CO4: Gain an in-depth understanding of different concepts used in a satellite communication system.</p> <p>CO5: Study the concept of Mobile radio propagation, cellular system design and understand mobile technologies like GSM and CDMA.</p> <p>CO6: Understand evolution of mobile communication generations 2G, 3G, and 4G with their characteristics and limitations.</p> <p>CO7: In the laboratory course, students will apply the theoretical concepts to gain hands on experience in building modulation and demodulation circuits; Transmitters and Receivers for AM and FM. Also to construct TDM, PAM, PWM, PPM and ASK, PSK and FSK modulator and verify their results.</p>
DSE-1A: Verilog and FPGA Based System Design	<p>CO1: Understand the steps and processes for design of logic circuits and systems.</p> <p>CO2: Differentiate between combinational and sequential circuits.</p> <p>CO3: Design various types of state machines..</p> <p>CO4: Understand various types of programmable logic building blocks such as CPLDs and FPGAs and their tradeoffs.</p> <p>CO5: Write synthesizable Verilog code.</p> <p>CO6: Write a Verilog test bench to test various Verilog code modules.</p> <p>CO7: Design, program and test logic systems on a programmable logic device (CPLD or FPGA) using Verilog..</p>
DSE-1A: Medical Physics	<p>CO1: Focus on the application of Physics to clinical medicine.</p> <p>CO2: Gain a broad and fundamental understanding of Physics while developing particular expertise in medical applications.</p> <p>CO3: Learn about the human body, its anatomy, physiology and BioPhysics, exploring its performance as a physical machine.</p> <p>CO4: Learn diagnostic and therapeutic applications like the</p>

	<p>ECG, Radiation Physics, X-ray technology, ultrasound and magnetic resonance imaging.</p> <p>CO5: Gain knowledge with reference to working of various diagnostic tools, medical imaging techniques</p> <p>CO6: Understand interaction of ionizing radiation with matter - its effects on living organisms and its uses as a therapeutic technique and also radiation safety practices.</p> <p>CO7: Gain functional knowledge regarding need for radiological protection and the sources of an approximate level of radiation exposure for treatment purposes.</p> <p>CO8: In the laboratory course, the student will be exposed to the workings of various medical devices and getting familiarized with various detectors used in medical imaging, medical diagnostics. The hands-on experience will be very useful for the students from job perspective. Perform mathematical and computational modelling of certain aspects of living systems.</p>
DSE-1A: Applied Dynamics	<p>CO1: Demonstrate understanding of the concepts that underlay the study of dynamical systems.</p> <p>CO2: Understand fractals as self-similar structures.</p> <p>CO3: Learn various forms of dynamics and different routes to chaos.</p> <p>CO4: Understand basic Physics of fluids and its dynamics theoretically and experimentally and by computational simulations</p> <p>CO5: In the Lab course, students will be able to perform Simulations/Lab experiments on: coupled Oscillators, Simulation of Simple Population, Predator-Prey Dynamics, Simple genetic circuits, rate equations for some simple chemical reactions, Fractal Formation in Deterministic Fractals, Fluid Flow Models.</p>
DSE: 2A: Solid State Physics	<p>CO1: Elucidate the concept of lattice, crystals and symmetry operations.</p> <p>CO2: Understand the elementary lattice dynamics and its influence on the properties of materials.</p> <p>CO3: Describe the main features of the physics of electrons in solids: origin of energy bands, and their influence electronic behavior.</p> <p>CO4: Explain the origin of dia-, para-, and ferro-magnetic properties of solids.</p> <p>CO5: Explain the origin of the dielectric properties exhibited by solids and the concept of polarizability.</p> <p>CO6: Learn the properties of superconductivity in solid.</p> <p>CO7: In the laboratory students will carry out experiments based on the theory that they have learned to measure the magnetic susceptibility, dielectric constant, trace</p>

	<p>hysteresis loop. They will also employ to four probe methods to measure electrical conductivity and the hall set up to determine the hall coefficient of a semiconductor.</p>
DSE-2A: Embedded System: Introduction to microcontroller	<p>CO1: Know the major components that constitute an embedded system.</p> <p>CO2: Understand what is a microcontroller, microcomputer embedded system.</p> <p>CO3: Describe the architecture of 8051 microcontroller.</p> <p>CO4: Write simple programs for 8051 microcontrollers in C language.</p> <p>CO5: Understand key concepts of 8051 microcontroller systems like I/O operations, interrupts, programming of timers and counters.</p> <p>CO6: Interface 8051 microcontroller with peripherals</p> <p>CO7: Understand and explain concepts and architecture of embedded systems</p> <p>CO8: Implement small programs to solve well-defined problems on an embedded platform.</p> <p>CO9: Develop familiarity with tools used to develop an embedded environment</p> <p>CO10: Learn to use the Arduino Uno (an open source microcontroller board) in simple applications.</p> <p>CO11: In the laboratory, students will program 8051 microcontroller and Arduino to perform various experiments.</p>
DSE-2A: Nuclear and Particle Physics	<p>CO1: To be able to understand the basic properties of nuclei as well as knowledge of experimental determination of the same, the concept of binding energy, its various dependent parameters, N-Z curves and their significance</p> <p>CO2: To appreciate the formulations and contrasts between different nuclear models such as Liquid drop model, Fermi gas model and Shell Model and evidences in support.</p> <p>CO3: Knowledge of radioactivity and decay laws. A detailed analysis, comparison and energy kinematics of alpha, beta and gamma decays.</p> <p>CO4: Familiarization with different types of nuclear reactions, Q- values, compound and direct reactions.</p> <p>CO5: To know about energy losses due to ionizing radiations, energy losses of electrons, gamma ray interactions through matter and neutron interaction with matter. Through the section on accelerators students will acquire knowledge about Accelerator facilities in</p> <p>CO6: India along with a comparative study of a range of detectors and accelerators which are building blocks of</p>

	<p>modern day science.</p> <p>CO7: It will acquaint students with the nature and magnitude of different forces, particle interactions, families of sub-atomic particles with the different conservation laws, concept of quark model.</p> <p>CO8: The acquired knowledge can be applied in the areas of nuclear medicine, medical physics, archaeology, geology and other interdisciplinary fields of Physics and Chemistry. It will enhance the special skills required for these fields.</p>
DSE-2A: Quantum Mechanics	<p>CO1: Methods to solve time-dependent and time-independent Schrodinger equation.</p> <p>CO2: Quantum mechanics of simple harmonic oscillator.</p> <p>CO3: Non-relativistic hydrogen atom: spectrum and Eigen functions.</p> <p>CO4: Angular momentum: Orbital angular momentum and spin angular momentum.</p> <p>CO5: Bosons and fermions - symmetric and anti-symmetric wave functions.</p> <p>CO6: Application to atomic systems</p> <p>CO7: In the laboratory course, with the exposure in computational programming in the computer lab, the student will be in a position to solve Schrodinger equation for ground state energy and wave functions of various simple quantum mechanical one- dimensional and three dimensional potentials.</p>
DSE-2A: Digital Signal processing	<p>CO1: Learn basic discrete-time signal and system types, convolution sum, impulse and frequency response concepts for linear time-invariant (LTI) systems.</p> <p>CO2: Understand use of different transforms and analyze the discrete time signals and systems.</p> <p>CO3: Realize the use of LTI filters for filtering different real world signals. The concept of transfer</p> <p>CO4: Learn to solve Difference Equations.</p> <p>CO5: Develop an ability to analyze DSP systems like linear-phase, FIR, IIR, All-pass, averaging and notch Filter etc.</p> <p>CO6: Understand the discrete Fourier transform (DFT) and realize its implementation using FFT techniques.</p> <p>CO7: Design and understand different types of digital filters such as finite & infinite impulse response filters for various applications.</p> <p>CO8: In the Lab course, the students will realize various concepts using Scilab simulations like Digital Filters and their classifications based on the response, design and algorithm, Fluency in using Fast Fourier Transform, Signal generation, realization of systems and finding</p>

	their transfer function, characterization using pole-zero plots and designing digital filters.
DSE-2A: Astronomy and Astrophysics	CO1: Different types of telescopes, diurnal and yearly motion of astronomical objects, and astronomical coordinate systems and their transformations. CO2: Brightness scale for stars, types of stars, their structure and evolution on HR diagram. CO3: Components of Solar System and its evolution CO4: The large scale structure of the Universe and its history CO5: Distribution of chemical compounds in the interstellar medium and astrophysical conditions necessary for the emergence and existence of life. Develop an ability to analyze DSP systems like linear-phase, FIR, IIR, All-pass, averaging and notch Filter etc.
DSE-2A: Atmospheric Physics	CO1: Learn and understand structure of temperature profiles and fine scale features in the troposphere using observations. CO2: Understand Atmospheric waves: surface water waves, atmospheric gravity waves, acoustic waves etc. CO3: Learn remote sensing techniques such as radar, LIDAR, and satellite to explore atmospheric processes. CO4: Understand properties of aerosols, their radiative and health effects.
DSE-2A: Physics of the Earth	CO1: Have an overview of structure of the earth as well as various dynamical processes occurring on it. CO2: Develop an understanding of evolution of the earth. CO3: Apply physical principles of elasticity and elastic wave propagation to understand modern global seismology as a probe of the Earth's internal structure. CO4: Understand the origin of magnetic field, Geodynamics of earthquakes and the description of seismic sources; a simple but fundamental theory of thermal convection; the distinctive rheological behavior of the upper mantle and its top. CO5: Explore various roles played by water cycle, carbon cycle, nitrogen cycles in maintaining steady state of earth leading to better understanding of the contemporary dilemmas (climate change, bio diversity loss, population growth, etc.) disturbing the Earth CO6: In the tutorial section, through literature survey on the various aspects of health of Earth, project work / seminar presentation, the students will be able to appreciate need to 'save' Earth.
DSE-2A: Biological Physics	CO1: Know basic facts about biological systems, including single cells, multicellular organisms and ecosystems from a quantitative perspective.

	<p>CO2: Gain familiarity with various biological processes at different length and time scales, including molecular processes, organism level processes and evolution.</p> <p>CO3: Be able to apply the principles of physics from areas such as mechanics, electricity and magnetism, thermodynamics, statistical mechanics, and dynamical systems to understand certain living processes.</p> <p>CO4: Gain a systems level perspective on organisms and appreciate how networks of interactions of many components give rise to complex behavior.</p> <p>CO5: Perform mathematical and computational modelling of certain aspects of living systems.</p>
SKILL-ENHANCEMENT COURSES (SEC)	
SEC1: Physics Workshop Skills	<p>CO1: Using measuring devices like Vernier callipers, Screw gauge, travelling microscope and Sextant for measuring various length scales.</p> <p>CO2: Acquire skills in the usage of multimeters, soldering iron, oscilloscopes, power supplies and relays.</p> <p>CO3: Develop mechanical skill such as casting, foundry, machining, forming and welding and will become familiar with common machine tools like lathe, shaper, drilling, milling, surface machines and Cutting tools.</p> <p>CO4: Get acquaintance with prime movers: Mechanism, gear system, wheel, Fixing of gears with motor axle. Lever mechanism. Lifting of heavy weight using lever. braking systems, pulleys.</p>
SEC 2: Computational Physics Skills	<p>CO1: Use computers for solving problems in Physics.</p> <p>CO2: Prepare algorithms and flowcharts for solving a problem.</p> <p>CO3: Use Linux commands on terminal</p> <p>CO4: Use an unformatted editor to write sources codes.</p> <p>CO5: Learn “Scientific Word Processing”, in particular, using LaTeX for preparing articles, papers etc. which include mathematical equations, picture and tables.</p> <p>CO6: Learn the basic commands of Gnuplot.</p>
SEC 3: Electrical circuits and Network Skills	<p>CO1: Demonstrate good comprehension of basic principles of electricity including ideas about voltage, current and resistance.</p> <p>CO2: Develop the capacity to analyze and evaluate schematics of power efficient electrical circuits while demonstrating insight into tracking of interconnections within elements while identifying current flow and voltage drop.</p> <p>CO3: Gain knowledge about generators, transformers and electric motors. The knowledge would include interfacing aspects and consumer defined control of speed and power.</p> <p>CO4: Acquire capacity to work theoretically and practically</p>

	<p>with solid-state devices.</p> <p>CO5: Delve into practical aspects related to electrical wiring like various types of conductors and cables, wiring-Star and delta connections, voltage drop and losses.</p> <p>CO6: Measure current, voltage, power in DC and AC circuits, acquire proficiency in fabrication of regulated power supply.</p> <p>CO7: Develop capacity to identify and suggest types and sizes of solid and stranded cables, conduit lengths, cable trays, splices, crimps, terminal blocks and solder.</p>
SEC 4: Basic Instrumentation Skills	<p>CO1: The student is expected to have the necessary working knowledge on accuracy, precision, resolution, range and errors/uncertainty in measurements.</p> <p>CO2: Course learning begins with the basic understanding of the measurement and errors in measurement. It then familiarizes about each and every specification of a multimeter, multimeters, multivibrators, rectifiers, amplifiers, oscillators and high voltage probes and their significance with hands on mode.</p> <p>CO3: Explanation of the specifications of CRO and their significance. Complete explanation of CRT.</p> <p>CO4: Students learn the use of CRO for the measurement of voltage (DC and AC), frequency and time period. Covers the Digital Storage Oscilloscope and its principle of working.</p> <p>CO5: Students learn principles of voltage measurement. Students should be able to understand the advantages of electronic voltmeter over conventional multimeter in terms of sensitivity etc. Types of AC millivoltmeter should be covered.</p> <p>CO6: Covers the explanation and specifications of Signal and pulse Generators: low frequency signal generator and pulse generator. Students should be familiarized with testing and specifications.</p> <p>CO7: Students learn about the working</p>
SEC 5: Renewable Energy and Energy harvesting	<p>CO1: Knowledge of various sources of energy for harvesting</p> <p>CO2: Understand the need of energy conversion and the various methods of energy storage</p> <p>CO3: A good understanding of various renewable energy systems, and its components.</p> <p>CO4: Knowledge about renewable energy technologies, different storage technologies, distribution grid, smart grid including sensors, regulation and their control.</p> <p>CO5: Design the model for sending the wind energy or solar energy plant.</p> <p>CO6: The students will gain hand on experience of:</p>

	<p>(i) different kinds of alternative energy sources,</p> <p>(ii) conversion of vibration into voltage using piezoelectric materials,</p> <p>(iii) conversion of thermal energy into voltage using thermoelectric modules.</p>
SEC 6: Engineering Design and Prototyping/Technical Drawing	<p>CO1: Understanding the concept of a sectional view – visualizing a space after being cut by a plane. How The student will be able to draw and learn proper techniques for drawing an aligned section.</p> <p>CO2: Understanding the use of spatial visualization by constructing an orthographic multi view drawing.</p> <p>CO3: Drawing simple curves like ellipse, cycloid and spiral, Orthographic projections of points, lines and of solids like cylinders, cones, prisms and pyramids etc.</p> <p>CO4: Using Computer Aided Design (CAD) software and AutoCAD techniques.</p>
SEC 7: Radiation Safety	<p>CO1: Awareness and understanding the hazards of radiation and the safety measures to guard against these hazards.</p> <p>CO2: Learning the basic aspects of the atomic and nuclear Physics, specially the radiations that originate from the atom and the nucleus.</p> <p>CO3: Having a comprehensive knowledge about the nature of interaction of matter with radiations like gamma, beta, alpha rays, neutrons etc. and radiation shielding by appropriate materials.</p> <p>CO4: Knowing about the units of radiations and their safety limits, the devices to detect and measure radiation.</p> <p>CO5: Learning radiation</p>
SEC 8: Applied Optics	<p>CO1: Understand basic lasing mechanism qualitatively, types of lasers, characteristics of laser light and its application in developing LED, Holography.</p> <p>CO2: Gain concepts of Fourier optics and Fourier transform spectroscopy.</p> <p>CO3: Understand basic principle and theory of Holography.</p> <p>CO4: Grasp the idea of total internal reflection and learn the characteristics of optical fibers.</p>
SEC 9: Weather Forecasting	<p>CO1: Acquire basic knowledge of the elements of the atmosphere, its composition at various heights, variation of pressure and temperature with height.</p> <p>CO2: Learn basic techniques to measure temperature and its relation with cyclones and anti-cyclones.</p> <p>CO3: Knowledge of simple techniques to measure wind speed and its directions, humidity and rainfall.</p> <p>CO4: Understanding of absorption, emission and scattering of radiations in atmosphere; Radiation laws.</p> <p>CO5: Knowledge of global wind systems, jet streams, local</p>

	<p>thunderstorms, tropical cyclones, tornadoes and hurricanes.</p> <p>CO6: Knowledge of climate and its classification. Understanding various causes of climate change like global warming, air pollution, aerosols, ozone depletion, acid rain.</p>
<p>SEC 10: Introduction to Physical Computing (xxx1)</p>	<p>CO1: Understand the evolution of the CPU from microprocessor to microcontroller and embedded computers from a historical perspective.</p> <p>CO2: Operate basic electronic components and analog and digital electronics building blocks including power supply and batteries.</p> <p>CO3: Use basic laboratory equipment for measurement and instrumentation.</p> <p>CO4: Understand the Arduino ecosystem and write simple Arduino programs (sketches)</p> <p>CO5: Understand sensor characteristics and select a suitable sensor for various applications.</p> <p>CO6: Read digital and analog data and produce digital and analog outputs from an embedded computer.</p> <p>CO7: Understand how to interface an embedded computer to the physical environment.</p> <p>CO8: Visualize the needs of a standalone embedded computer and implement a simple system using Arduino.</p>
<p>SEC 11: Numerical Analysis (xxx2)</p>	<p>CO1: approximate single and multi-variable function by Taylor's Theorem.</p> <p>CO2: Solve first order differential equations and apply it to physics problems.</p> <p>CO3: solve linear second order homogeneous and non-homogeneous differential equations with constant coefficients.</p> <p>CO4: Calculate partial derivatives of function of several variables</p> <p>CO5: Understand the concept of gradient of scalar field and divergence and curl of vector fields. perform line, surface and volume integration</p> <p>CO6: Use Green's, Stokes' and Gauss's Theorems to compute integrals</p>

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

SUBJECT: NAME OF SUBJECT- Sanskrit

PROGRAMME OUTCOME	<p>PO1: This course aims to get students acquainted with Classical Sanskrit Poetry.</p> <p>PO2: It intends to give an understanding of literature, through which students will be able to appreciate the development of Sanskrit Literature.</p> <p>PO3: The course also seeks to help students to negotiate texts independently.</p>
<p>PROGRAMME SPECIFIC OUT COME: Buddhist Studies</p> <p>B.A(P) Buddhist Studies</p>	
<p>PROGRAMME SPECIFIC OUT COME:</p> <p>Buddhist Studies</p>	<p>The overall objectives of the learning outcomes-based curriculum framework are to:</p> <p>PSO1: Help formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes that are expected to be demonstrated by the holder of a B.A. Program Degree;</p> <p>PSO2: Enable prospective students, parents, employers and others to understand the nature and level of learning outcomes (knowledge, skills, attitudes and values) or attributes a graduate of a programme should be capable of demonstrating on successful completion of the programme of study;</p> <p>PSO3: Maintain national standards and international comparability of learning outcomes and academic standards to ensure global competitiveness, and to facilitate student/graduate mobility; and provide higher education institutions an important point of reference for designing</p> <p>PSO4: Teaching-learning strategies, assessing student learning levels, and periodic review of programmes and academic standards.</p>
<p>PROGRAMME SPECIFIC OUT COME</p> <p>B.A (H) Sanskrit</p>	<p>PSO1: The overall objectives of the learning outcomes-based curriculum framework are to:</p> <p>PSO2: Help formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes that are expected to be demonstrated by the holder of a qualification;</p> <p>PSO3: Enable prospective students, parents, employers and others to understand the nature and level of learning outcomes (knowledge, skills, attitudes and values) or attributes a graduate of a programme should be capable of demonstrating on successful completion of the programme of study;</p> <p>PSO4: Maintain national standards and international comparability of learning outcomes and academic</p>

	standards to ensure global competitiveness, and to facilitate student/graduate mobility; and PSO5: Provide higher education institutions an important point of reference for designing teaching-learning strategies, assessing student learning levels, and periodic review of programmes and academic standards.
For BA (P) Sanskrit and Generic	PSO1: The BA Programme in Sanskrit is less ambitious in range and level of difficulty. PSO2: It offers limited courses in literature and language. PSO3: Students pursuing the BA Programme course will also get the opportunity to read some Generic Courses in Sanskrit where the emphasis will be more on introducing domain knowledge than language studies.
PROGRAMME SPECIFIC OUT COME FOR SEC	PSO1: Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media PSO2: confidently share one's views and express herself/himself PSO3: demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.
COURSE OUTCOME FOR I YEAR	
Semester I	
Classical Sanskrit Literature (Poetry)	CO1: This course will help the students develop a fair idea of the works of great Sanskrit poets. CO2: They will be able to appreciate the styles and thoughts of individual poets focusing on the poetical, artistic, cultural and historical aspects of their works. CO3: This course will enhance competence in chaste classical Sanskrit and give them skills in translation and interpretation of poetic works.
Critical Survey of Sanskrit Literature	CO1: This course will help the students develop a fair idea of the works of great Sanskrit seers. CO2: They will be able to improve their knowledge about philosophy, socio-religious life, polity as depicted in the prescribed areas of study. CO3: This course will also introduce them to three important śāstras.
Classical Sanskrit Literature (Prose)	CO1: The course will enable students to familiarize themselves with some leading classical prose works and the individual literary styles of their authors. CO2: After the completion of this course the learner will be exposed to the socio-cultural conditions of the Indian society as reflected in the prescribed texts. CO3: They will acquire skills in advanced Sanskrit

	communication.
Self-Management in the Gītā	<p>CO1: This course will help students to learn to read the Gītā as a multipolar text which is open to several alternative interpretations.</p> <p>CO2: This course will equip them with the practical skills to negotiate conflicts and emotional disturbances and define and pursue their goals with clarity and dedication.</p> <p>CO3: The course will instill leadership qualities in learners and also help them to grow as balanced and successful human beings who can face the challenges of life successfully.</p>
COURSE OUTCOME FOR II YEAR	
Semester III	
Classical Sanskrit Literature (Drama)	<p>CO1: After completion of this course the students will be aware about the beauty and richness of classical Sanskrit dramatic tradition.</p> <p>CO2: This course will enhance the ability for critical thinking on issues of culture, polity, morality, religion etc as reflected in the prescribed texts.</p> <p>CO3: The course will make the students aware of the formal structures of Sanskrit drama in the tradition of Bharata's natya Shastra.</p>
Poetics and Literary Criticism	<p>CO1: This course will make students aware of with the skills to assess the merits or demerits of works on poetry, prose and drama.</p> <p>CO2: They will be able recognize the various genres of poetry, appreciate the objectives of poetry and also analyze the structure of a work in terms of the essential ingredients of poetry as propounded.</p> <p>CO3: Students will be inspired and encouraged to compose.</p>
Indian Social Institutions and Polity	<p>CO1: After the completion of this course students will be able to connect the theoretical model propounded by the prescribed texts in the forms of saptanga theory, shadguna theories and mandala theories with contemporary governance issues .</p> <p>CO2: The learners will be able to see Dharma as dynamic institution.</p> <p>CO3: This will free them from the traces of fundamentalism and they should become more open minded and liberal.</p> <p>CO4: Learning and developing a critical approach about the institution of caste and women's issues will make the participants sensitive to discriminating practices.</p>
Semester IV	

Indian Paleography and Epigraphy, and Chronology	<p>CO1: This course will equip students with the necessary tools for the study of Indian inscriptions.</p> <p>CO2: They will learn ancient scripts and use their knowledge in studying more inscriptions later. Students will be able to read, collate and interpret inscriptions to reconstruct history. Thus, it will be useful for students who are interested in pursuing advance study in archaeology.</p>
Modern Sanskrit Literature	<p>CO1: This course will enable the students to appreciate the Mahākāvya and Charitakāvya, Gadyakāvya , Rūpaka, GītīKāvya and Other genres and General Survey of Modern Sanskrit Literature.</p> <p>CO2: It will create an awareness of the modern historicity of the modern Sanskrit literature.</p>
Sanskrit World Literature	<p>CO1: Scholars who pursue this course will learn about the cultural contacts between India on</p> <p>CO2: the one hand and Europe, West Asia and South East Asia on the other during different phases of history.</p> <p>CO3: They will also see how colonialism distorted India's achievements in knowledge production.</p> <p>CO4: They will become aware of Indo European linguistic and cultural affinities, spread of Indian fables, the Upanishads, the Gita and Kalidasa's works in the west.</p> <p>CO5: They will be able to appreciate the close relation between Upanishadic thought and Sufism.</p> <p>CO6: They will study how Sanskrit literature has impacted India's cultural ties with South East Asian countries.</p>
COURSE OUTCOME FOR III YEAR	
Semester V	
Vedic Literature	<p>CO1: By reading these texts, students will have an impression of the depth of Vedic knowledge and will be able to realize that ideas of Vedic seers are based on philosophical, moral, and scientific principles.</p> <p>CO2: By understanding them, students will be able to know and achieve some higher attributes from Vedic heritage about our culture, morals, and thoughts. Thus they may develop curiosity to know more about other Vedic texts and concepts as well.</p> <p>CO3: After completing this course students will surely be able to communicate about some important Vedic verses with their meaning and teaching, and thus fundamentals of religious life of India will be revealed to them in its true form.</p> <p>CO4: Students will understand the strength of Unity, power of</p>

	mind, and will realize the importance of earth in their life. From the study of Upaniṣad they will know about philosophical and Psychological insights of our ancestors and can develop this learning further for the benefit of themselves in particular and society in general.
Sanskrit Grammar: Laghusiddhāntkaumudī	<p>CO1: After completion of this course students will understand the basic structural nuances of Panini's grammar. They will become familiar with fundamental sandhi and compounding patterns.</p> <p>CO2: They will also understand some most important primary and secondary suffixes of Sanskrit.</p> <p>CO3: The practice of the application of the rules learnt from the reading of the texts will further enhance their knowledge of the structural patterns of Sanskrit language.</p>
Semester VI	
Indian Ontology and Epistemology	<p>CO1: Students will become familiar with primary and one of the most important and influential school of Indian Philosophy i.e. Nyaya-Vaisesika through its basic text the Tarkasangraha.</p> <p>CO2: They will also be introduced to essential problems in philosophy - Causation, Ontology and Epistemology. This will enable them to engage with other texts in Indian philosophy with some ease.</p>
Sanskrit Composition and Communication	<p>CO1: This course will help the learners develop a critical, linguistic and scientific approach towards Sanskrit language.</p> <p>CO2: The practice of essay writing will make the students form ideas and express them in Sanskrit.</p> <p>CO3: This practice will also familiarise them with various shastric theories.</p>
DSE	
DSE-1 Indian System of Logic and Debate	<p>CO1: This course will provide knowledge of the principles of debate according to the Nyaya School. It will develop logical faculty of their minds and help them to perceive the world in a more rational way.</p> <p>CO2: They will develop the skill to present their arguments in a more structured manner and to see through fallacious arguments given by others.</p>
DSE-2 Art of Balanced Living	<p>CO1: Graduates who read this course will acquire the necessary tools for a balanced life. They will know the true essence of listening (acquisition of information) manana (reflection) and nididhyasana (unflinching commitment). In this segment students can learn how to improve concentration. They will be able to identify the causes for</p>

	<p>indecisiveness and confusion and will learn how emotional stability can lead to clearer thinking.</p> <p>CO2: This section will help students to understand the importance of Ashtang yoga and Kriyayoga for the purification of mind.</p> <p>CO3: Team work and social cohesion require inter personal skills. Here students will know how to improve their behaviour through jnana, dhyan, karma and bhakti yoga. Students will also understand how active engagement with action is most conducive to healthy and successful living.</p>
DSE-2 Theatre and Dramaturgy in Sanskrit	<p>CO1: After going through this course students will be able to know about several theoretical aspects of theatrical performance and production.</p> <p>CO2: They will become aware of the many types of theatres, their design and construction and stage setting for various kinds of dramas in ancient India.</p> <p>CO3: Students will also become familiar with the main principle of theatre performance and appreciation</p>
DSE-4 Sanskrit and Other Modern Indian Languages	<p>CO1: With this course, students will be able to analyze languages in their different aspects- phonetic, semantic, syntactic and morphological.</p> <p>CO2: On these structural levels they will be able to examine the interconnection of Sanskrit with other Indic languages and appreciate the linguistic unity of India and shed their linguistics chauvinism and see how all Indian languages are connected and related.</p> <p>CO3: They will become aware of the evolution of Indian languages from Sanskritic languages.</p> <p>CO4: They will also see Sanskrit literature as a source and instrument of enrichment of medieval and modern Indian literary traditions. It would also show the cultural and literary continuity of India.</p>
DSE-5 Sanskrit Linguistics	<p>CO1: Students will develop a scientific approach to the study of languages; they will become aware of the linguistic structure of Sanskrit and see its close relation with the Avestan and Prakrits.</p>
DSE-6 Computational Linguistics for Sanskrit	<p>The course-level learning outcomes that a student of this course is required to demonstrate are indicated below:</p> <p>CO1: Learn the basic concept of Theoretical Concepts of Computational Linguistics.</p> <p>CO2: Learn the basic concept various Applied Areas of Computational Linguistics e.g. Morphological Analyzer/Speech/Speller Recognition, Speech Synthesis, Text to Speech, Language Analysis, Understanding,</p>

	<p>Generation, Natural Language Interface, Text Processing and Machine Translation etc.</p> <p>CO3: Learn the basic concept of databases for data Storage.</p> <p>CO4: Student also learn the Survey of Computational Linguistics.</p>
<p>DSE-7</p> <p>Fundamentals of Āyurveda</p>	<p>CO1: Graduates who read this course should be able to know the ancient tradition of Indian Medicine system, which has focused not only to the physical health but a healthy lifestyle.</p> <p>CO2: After reading this paper students will know the history of Āyurveda through original sources of ancient medicine system enshrined in Sanskrit texts like Charaka Samhitā, Śuśruta Samhitā, Aṣṭāṅga Hṛdaya etc. and they will also get the basic knowledge of eight departments of Āyurveda.</p> <p>CO3: Second section of this paper is related to ancient physiology. In this section students will get acquainted with the basic concept of Trigūṇa, Pañcamahābhūtas, Tridoṣas, Saptadhātus, Trayadosāgni, Trimalas, SvasthaVṛtta etc. which will help students to develop Āyurvedic understanding of lifestyle and concepts of preventive medicine. Āyurveda prescribes different food habits in different seasons. After reading this section students will be able to understand seasonal regimen & social conduct and its effect on health. It will develop their understanding of Health and Disease as explained in Āyurveda, and the way of diagnosing the illness.</p> <p>CO4: Taittirīyopaniṣad - Bhṛguvalli will be taught in the third section of this paper. Our Ṛṣis were not only concerned about the physical health of individuals but also about the holistic health i.e. including mental, social and spiritual well being. By reading this portion of Upaniṣad student would develop a more balanced approach towards life.</p>
<p>DSE-8</p> <p>Environmental Awareness in Sanskrit literature</p>	<p>CO1: After completing this course, students will realize that they are a part of nature and nature belongs to all creatures; therefore, they should be more careful about the utilization and preservation of natural resources. This will make them better citizens of the world.</p>
Generic Elective	
<p>GE-1</p> <p>Basic Sanskrit</p>	<p>CO1: Students will acquire basic knowledge of the Sanskrit language</p> <p>CO2: They will be able to communicate in simple Sanskrit</p>

	CO3: They will develop an interest in Sanskrit and the Bhagwadgita and they will be motivated to study further.
GE-2 Indian Culture and Social Issues	<p>CO1: The first unit of this section aims at the basic understanding of culture and civilization at large dimensions, on the basis of which they will be able to evaluate Indian culture in modern terminologies.</p> <p>CO2: The second unit deals with evolution of Indian culture through different ages from ancient times to the modern age with the symbiosis of alien elements e.g. Islamic and other foreign traditions.</p> <p>CO3: The third unit aims at highlighting the undercurrent of Sanskrit-led culture in vernacular as well as urban shades of cultural life. By studying this course a student will be able to perceive India's various cultural identities as enriched by Sanskrit language and literature. In this section the student would be acquainted with the fundamental principles of indigenous law and statutes from original Sanskrit sources e.g. Mahabharata, Manusmriti, Yajñvalkyā Smṛiti etc.</p> <p>CO4: The student will also be able to understand the status and rights of women in ancient Indian society. They will be aware the elasticity and adaptability of Hindu code of conduct as its essential quality, with the change and demand of time. This section would inculcate among the students the capability of debating and ways of arousing valid questions within and to the tradition and find out the efficient answer to cope up with the modern problems.</p>
GE-3 Tools and Techniques for Computing Sanskrit Language	<p>The course-level learning outcomes that a student of this course is required to demonstrate are indicated below:</p> <p>CO1: Learn the basic concept of Sanskrit Phonology, Sanskrit Morphology, Syntax, Semantics, Lexicon and Corpora.</p> <p>CO2: Learn the origin and Development of Language Computing.</p> <p>CO3: Basic Introduction of Computing Sanskrit Language.</p> <p>CO4: Various methodologies used on Language Technology.</p> <p>CO5: Various tools developed for Sanskrit Language.</p> <p>CO6: Survey of Language Computing</p> <p>CO7: Evaluation and Challenges in Machine Translation</p>
GE-4 Basic Principles of Indian	CO1: Graduates who read this course should be able to know the ancient tradition of Indian Medicine system, which has focused not only to the physical health but a healthy

Medicine System (Ayurveda)	<p>lifestyle.</p> <p>CO2: After reading this paper students will know the history of Āyurveda through original sources of ancient medicine system enshrined in Sanskrit texts like Charaka Saṁhitā, Śuśruta Saṁhitā, Aṣṭāṅga Hṛdaya etc. and they will also get the basic knowledge of eight departments of Āyurveda.</p>
GE-5 Indian Aesthetics	<p>CO1: This course will enable students to identify the real essence of Beauty propounded by Indian rhetoricians. After the completion of the course the learner will come across the Indian deliberation on aesthetic experience in the form of Rasa and its process.</p> <p>CO2: The participant will be able to appreciate the various artistic mods of expressions of Beauty in general and poetry in particular.</p> <p>CO3: The course will help the student peep into the historical evolution of the Indian science of aesthetics.</p>
AEEC	
AEEC 1: Acting and Script Writing	<p>CO1: After studying this course the students will be able to know about the performance aspect of the arts in Indian context.</p> <p>CO2: They will learn the skills of developing a story or an incident into writing of the script of the play.</p> <p>CO3: The Students will also be inspired and encouraged to prepare the scripts as well as perform it on the stage.</p>
AEEC 2: Reading skills in Brāhmī Scripts	<p>CO1: This course is helpful for students to investigate how actually Brahmi script developed and transformed into a wide variety at a time when mode and means of transport and communication were extremely slow.</p> <p>CO2: After acquiring knowledge of its variation, it will certainly be helpful in ascertaining to understand period of an inscription whose date is uncertain.</p> <p>CO3: This course is highly helpful for the students willing to adopt archaeology as their occupation with a background of Sanskrit.</p>
AEEC 3: Machine Translation: Tools and Techniques	<p>The course-level learning outcomes that a student of this course will be able to demonstrate are indicated below:</p> <p>CO1: Learn the origin and Development of Machine Translation</p> <p>CO2: Basic Introduction of Machine Translation</p> <p>CO3: Human vs Machine Translation</p> <p>CO4: Concepts to ideal various methodologies used on Machine</p>

	<p>Translation System.</p> <p>CO5: Using guidelines of the Machine Translation system : Google and Bing</p> <p>CO6: Evaluation and Challenges in Machine Translation</p>
AEEC 4: Evolution of Indian scripts	<p>CO1: Students willing to engage in archaeology can be enlightened about the importance and background of written material and utilize it in future.</p> <p>CO2: Study of scripts are useful to evaluate and understand believes of prevailing contemporary multiple contents. After undergoing this course</p> <p>CO3: Students will be able utilize relevant information to develop capability to fix a date of an unknown writing, incidents, etc., with co-relating it to the available similar writing, and somewhat continuing incidents. Thus, it becomes helpful and useful for the students who are interested in pursuing advance study in archaeology.</p>
AEEC5: Sanskrit Meter and Music	<p>CO1: After studying this course the students will be able to understand the origin and development of Indian Prosody and various conceptual elements of Sanskrit classical meters.</p> <p>CO2: They will be able to apply their knowledge in other Sanskrit courses like classical Sanskrit drama and poetry as well as identify the meters used by various poets in their poetry works.</p> <p>CO3: They will be able to appreciate their lyrics while reciting them and will be inspired to translate their emotions and feelings in to metrical Sanskrit writings.</p>
AECC	
AECC 1: Sanskrit Literature	<p>CO1: The students will learn the advance form of Sanskrit language as one of the modern Indian Language through the practice of simple Sanskrit writings.</p> <p>CO2: The stories and verses prescribed in the course will help the learners develop an understanding of the moral and ethical values that will be useful in their day to day life situations.</p> <p>CO3: They will be familiar with the rich history of Sanskrit Literature. This course will enhance their skills of chaste Sanskrit pronunciation as well as competence and performance of the language. This will help them translate and explain the prescribed Sanskrit texts in their native language.</p>
AECC 2: Upaniṣad and Bhagawad Gītā	<p>CO1: The Students will be able to peep into understand the spiritual depth of the intellectual wisdom of Indian seers. The Ishopanishad teaches the art of harmonising materialism and spiritualism. The subject matter of the</p>

	<p>Bhagawad Gita II comprising of the concepts of Niṣkāṁ karmyoga, Self and Sthita Prajñā (the ideal human being) will enable learners to attain a proper balance between intellectual and emotional faculties.</p> <p>CO2: After the completion of this paper the students will be aware of the solutions of many modern day conflicts available in the upanishadic literature and Bhagavad Geeta. They will get to know the spiritual aspects of Indian traditions separated from the religious tradition.</p>
AECC 3: Niti Literature	<p>CO1: The students will learn the essence of the ways of life depicted and enjoined in the Niti Literature of Sanskrit language.</p> <p>CO2: They will also learn various aspects and forms of Sanskrit as one of the modern Indian Languages through the practice of easy and simple Sanskrit texts of Niti Literature.</p> <p>CO3: The storylines and the study and verses from the prescribed texts will instill in the students the moral and ethical values that will be an asset in the lived lives.</p> <p>CO4: They will be familiar with the general history of Sanskrit Literature and with the style and contents of the works of eminent literary figures like Bhasa, Kalidas, Bhavabhuti and Banabhatta etc. This course will enhance the skill of chaste Sanskrit pronunciation as well as competence and performance of language. This will help them translate, explain the prescribed Sanskrit texts in their native language.</p>

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution (to provide the weblink)

SUBJECT: ZOOLOGY	
PROGRAMME OUTCOME	<p>PO1: Zoology helps to learn and understand the concepts regarding animal diversity to appreciate the variability in relation to their morphology, anatomy and behavior among different animals.</p> <p>PO2: After studying this course, our students will be more equipped to learn and know about different human systems, their coordination and control.</p> <p>PO3: This course will also provide an opportunity to understand their own evolution along with other animals.</p> <p>PO4: They will be able to qualitatively and quantitatively</p>

	<p>analyse evolutionary parameters using various bioinformatics and computational tools used in modern sciences. This will provide them ample opportunities to explore different career avenues.</p> <p>PO5: The Zoology degree program will also provide a platform to comprehend classical genetics in order to understand distribution of different traits among populations, their inheritance, ethnicity and correlate with contemporary and modern techniques like genomics, metagenomics, genome editing and molecular diagnostic tools.</p> <p>PO6: Practical and theoretical skills gained in this course will be helpful in designing different public health strategies for social welfare.</p> <p>PO7: The course has been designed to provide in-depth knowledge of applied subjects ensuring the inculcation of employment skills so that students can make a career and become an entrepreneur in diverse fields of aquatic biology, sericulture, apiculture etc.</p> <p>PO8: After completion of this course, students can contribute as policy makers in wild life conservation, animal preservation and environment protection.</p>
<p>PROGRAMME SPECIFIC OUT COME</p> <p>For Zoology Honors</p>	<p>PSO1: Students enrolled in B.Sc. (Hons.) degree program in Zoology will study and acquire complete knowledge of disciplinary as well as allied biological sciences.</p> <p>PSO2: At the end of graduation, they should possess expertise which will provide them competitive advantage in pursuing higher studies from India or abroad; and seek jobs in academia, research or industries. Students should be able to identify, classify and differentiate diverse chordates and non-chordates based on their morphological, anatomical and systemic organization.</p> <p>PSO3: They will also be able to describe economic, ecological and medical significance of various animals in human life. This will create a curiosity and awareness among them to explore the animal diversity and take up wild life photography or wild life exploration as a career option.</p> <p>PSO4: The procedural knowledge about identifying and classifying animals will provide students professional advantages in teaching, research and taxonomist jobs in various government organizations; including Zoological Survey of India and National Parks/Sanctuaries. Acquired practical skills in biotechnology, biostatistics, bioinformatics and</p>

	<p>molecular biology can be used to pursue career as a scientist in drug development industry in India or abroad.</p> <p>PSO5: Our students will be acquiring basic experimental skills in various techniques in the fields of genetics; molecular biology; biotechnology; qualitative and quantitative microscopy; enzymology and analytical biochemistry. These methodologies will provide an extra edge to our students, who wish to undertake higher studies.</p> <p>PSO6: In-depth knowledge and understanding about comparative anatomy and developmental biology of various biological systems; and learning about the organisation, functions, strength and weaknesses of various systems will let students critically analyse the way evolution has shaped these traits in the human body</p>
COURSE OUTCOME FOR I YEAR	
Semester I	
Non-chordates I: Protista to Pseudo-coelomates	<p>CO1: Learn about the importance of systematics, taxonomy and structural organization of animals.</p> <p>CO2: Appreciate the diversity of non-chordates living in varied habit and habitats.</p> <p>CO3: Understand evolutionary history and relationships of different non-chordates through functional and structural affinities.</p> <p>CO4: Critically analyse the organization, complexity and characteristic features of non-chordates making them familiarize with the morphology and anatomy of representatives of various animal phyla.</p> <p>CO5: Comprehend the economic importance of non-chordates, their interaction with the environment and role in the ecosystem.</p> <p>CO6: Enhance collaborative learning and communication skills through practical sessions, team work, group discussions, assignments and projects.</p>
Principles of Ecology	<p>CO1: Demonstrate an understanding of key concepts in ecology with emphasis on historical perspective, role of physical factors and concept of limiting factors.</p> <p>CO2: Comprehend the population characteristics, dynamics, growth models and interactions.</p> <p>CO3: Understand the community characteristics, ecosystem development and climax theories.</p> <p>CO4: Know about the types of ecosystems, food chains, food webs, energy models, and ecological efficiencies.</p> <p>CO5: Apply the basic principles of ecology in wildlife</p>

	conservation and management. CO6: Inculcate scientific quantitative skills, evaluate experimental design, read graphs, and analyse and use information available in scientific literature.
Semester II	
Non-chordates II: Coelomates	CO1: Learn about the importance of systematics, taxonomy and structural organization of animals. CO2: Appreciate the diversity of non-chordates living in diverse habit and habitats. CO3: Understand evolutionary history and relationships of different non-chordates through functional and structural affinities. CO4: Critically think about the organization, complexity and characteristic features of nonchordates. CO5: Getting familiarized with the morphology and anatomy of representatives of various animal phyla. CO6: Comprehend the economic importance of non-chordates, their interaction with the environment and role in the ecosystem. CO7: Enhance collaborative learning and communication skills through practical sessions, team work, group discussions, assignments and projects
Cell Biology	CO1: Understand fundamental principles of cell biology. CO2: Explain structure and functions of cell organelles involved in diverse cellular processes. CO3: Appreciate how cells grow, divide, survive, die and regulate these important processes. CO4: Comprehend the process of cell signalling and its role in cellular functions. CO5: Have an insight of how defects in functioning of cell organelles and regulation of cellular processes can develop into diseases. CO6: Learn the advances made in the field of cell biology and their applications.
COURSE OUTCOME FOR II YEAR	
Semester III	
Diversity of Chordates	CO1: Understand different classes of chordates, level of organization and evolutionary relationship between different subphyla and classes, within and outside the phylum. CO2: Study about diversity in animals making students understand about their distinguishing features. CO3: Appreciate similarities and differences in life functions among various groups of animals in Phylum Chordata.

	<p>CO4: Comprehend the circulatory, nervous and skeletal system of chordates.</p> <p>CO5: Know about the habit and habitat of chordates in marine, freshwater and terrestrial ecosystems.</p>
Physiology: Controlling and Coordinating Systems	<p>CO1: Know the basic fundamentals and understand advanced concepts so as to develop a strong foundation that will help them to acquire skills and knowledge to pursue advanced degree courses.</p> <p>CO2: Comprehend and analyze problem-based questions</p> <p>CO3: Recognize and explain how all physiological systems work in unison to maintain homeostasis in the body and use of feedback loops to control the same</p> <p>CO4: Learn an integrative approach to understand the interactions of various organ systems resulting in the complex overall functioning of the body. Synthesize ideas to make connection between knowledge of physiology and real world situations, including healthy life style decisions and homeostatic imbalances</p> <p>CO5: Know the role of regulatory systems viz. endocrine and nervous systems and their amalgamation in maintaining various physiological processes.</p>
Fundamentals of Biochemistry	<p>CO1: Upon completion of the course, students should be able to: Gain knowledge and skill in the fundamentals of biochemical sciences, interactions and interdependence of physiological and biochemical processes.</p> <p>CO2: Get exposed to various processes used in industries and gain skills in techniques of chromatography and spectroscopy.</p> <p>CO3: Demonstrate foundation knowledge in biochemistry; synthesis of proteins, lipids, nucleic acids, and carbohydrates; and their role in metabolic pathways along with their regulation.</p> <p>CO4: Know about classical laboratory techniques, use modern instrumentation, design and conduct scientific experiments, and analyze the resulting data.</p> <p>CO5: Be knowledgeable in proper procedures and regulations in handling and disposal of chemicals.</p>
Semester IV	
Comparative Anatomy of Vertebrates	<p>CO1: Explain comparative account of the different vertebrate systems</p> <p>CO2: Understand the pattern of vertebrate evolution, organisation and functions of various systems.</p> <p>CO3: Learn the comparative account of integument, skeletal components, their functions and modifications in</p>

	<p>different vertebrates.</p> <p>CO4: Understand the evolution of heart, modification in aortic arches, structure of respiratory organs used in aquatic, terrestrial and aerial vertebrates; and digestive system and its anatomical specializations with respect to different diets and feeding habits.</p> <p>CO5: Learn the evolution of brain, sense organs and excretory organsto a complex, highly evolved form in mammals;</p> <p>CO6: Learn to analyze and critically evaluate the structure and functions of vertebrate systems, which helps them to discern the developmental, functional and evolutionary history of vertebrate species.</p> <p>CO7: Understand the importance of comparative vertebrate anatomy to discriminate human biology.</p>
Physiology: Life Sustaining Systems	<p>CO1: Have a clear knowledge of basic fundamentals and understanding of advanced concepts so as to develop a strong foundation that will help them to acquire skills and knowledge to pursue advanced degree courses.</p> <p>CO2: Comprehend and analyse problem-based questions on physiological aspects.</p> <p>CO3: Recognize and explain how all physiological systems work in unison to maintain homeostasis in the body; and use of feedback loops to control the same.</p> <p>CO4: Learn an integrative approach to understand the interactions of various organ systems resulting in the complex overall functioning of the body.</p>
Biochemistry of Metabolic Processes	<p>CO1: Gain knowledge and skill in the interactions and interdependence of physiological and biomolecules</p> <p>CO2: Understand essentials of the metabolic pathways along with their regulation.</p> <p>CO3: Know the principles, instrumentation and applications of bioanalytical techniques.</p> <p>CO4: Get exposure to various processes used in industries.</p> <p>CO5: Become aware about classical laboratory techniques, use modern instrumentation, design and conduct scientific experiments and analyze the resulting data.</p> <p>CO6: Be knowledgeable in proper procedures and regulations in handling and disposal of chemicals</p>
COURSE OUTCOME FOR III YEAR	
Semester V	
Molecular Biology	<p>CO1: Describe the basic structure and chemistry of nucleic acids, DNA and RNA;</p> <p>CO2: Compare and contrast DNA replication machinery and mechanisms in prokaryotes and eukaryotes.</p> <p>CO3: Elucidate the molecular machinery and mechanism of</p>

	<p>information transfer processes– transcription and translation-in prokaryotes and eukaryotes;</p> <p>CO4: Explain post-transcriptional modification mechanisms for the processing of eukaryotic RNAs;</p> <p>CO5: Discuss general principles of transcription regulation in prokaryotes by exploring the structure and function of lactose and tryptophan metabolism operons;</p> <p>CO6: Give an overview of gene expression regulation in eukaryotes;</p> <p>CO7: Explain the significance of DNA repair mechanisms in controlling DNA damage;</p> <p>CO8: Recognise role of RNAs (riboswitches, siRNA and miRNA) in gene expression regulation.</p> <p>CO9: Demonstrate practical knowledge of raising, handling, maintenance and special features such as antibiotic resistance of a simple prokaryotic model organism, Escherichia coli.</p> <p>CO10: Quantitatively estimate concentration of DNA and RNA by colorimetric methods.</p>
Principles of Genetics	<p>CO1: Have a deeper understanding of the varied branches of the biological sciences like microbiology, evolutionary biology, genomics and metagenomics.</p> <p>CO2: Gain knowledge of the basic principles of inheritance.</p> <p>CO3: Analyse pedigree leading to development of analytical skills and critical thinking enabling the students to present the conclusion of their findings in a scientific manner.</p> <p>CO4: Know the mechanisms of mutations, the causative agents and the harmful impact of various chemicals and drugs being used in day to day life.</p> <p>CO5: Find out the effects of indiscriminate use of various chemicals, drugs or insecticides in nature by studying their effect on various bacterial species in soil and water samples from different industrial or polluted areas.</p>
Semester VI	
Developmental Biology	<p>CO1: Understand the events that lead to formation of a multicellular organism from a single fertilized egg, the zygote.</p> <p>CO2: Acquire basic knowledge of the cellular processes of development and the molecular mechanisms underlying these.</p> <p>CO3: Describe the general patterns and sequential developmental stages during embryogenesis; and understand how the developmental processes lead to establishment of body plan of multicellular organisms.</p>

	<p>CO4: Discuss the general mechanisms involved in morphogenesis and to explain how different cells and tissues interact in a coordinated way to form various tissues and organs.</p> <p>CO5: Understand about the evolutionary development of various animals.</p> <p>CO6: Know the process of ageing leading to interventions that can improve the overall health and quality of life in aged people.</p> <p>CO7: Learn the importance of latest techniques like stem cell therapy, in vitro fertilization and amniocentesis etc. to be applied for human welfare.</p> <p>CO8: Develop the skill to raise and maintain culture of model system; <i>Drosophila</i> in the laboratory.</p>
Evolutionary Biology	<p>CO1: Acquire problem solving and high order analytical skills by attempting numerical problems as well as performing simulation studies of various evolutionary forces in action.</p> <p>CO2: Apply knowledge gained, on populations in real time, while studying speciation, behaviour and susceptibility to diseases.</p> <p>CO3: Gain knowledge about the relationship of the evolution of various species and the environment they live in.</p> <p>CO4: Get motivated to work towards mitigating climate change so that well adapted species do not face extinction as a result of sudden drastic changes in environment.</p> <p>CO5: Use knowledge gained from study of variations, genetic drift to ensure that conservation efforts for small threatened populations are focused in right direction.</p> <p>CO6: Predict the practical implication of various evolutionary forces acting on the human population in the field of human health, agriculture and wildlife conservation.</p> <p>CO7: Use various software to generate interest towards the field of bioinformatics and coding used in programming language</p>
Discipline Specific Elective Paper	
DSE 1: Animal Behaviour and chronobiology	<p>CO1: Understand types of animal behaviour and their importance to the organisms.</p> <p>CO2: Enhance their observation, analysis, interpretation and documentation skills by taking short projects pertaining to Animal behaviour and chronobiology.</p> <p>CO3: Relate animal behaviour with other subjects such as</p>

	<p>Animal biodiversity, Evolutionary biology, Ecology, Conservation biology and Genetic basis of the behaviour.</p> <p>CO4: Understand various process of chronobiology in their daily life such as jet lag.</p> <p>CO5: Learn about the biological rhythm and their application in pharmacology and modern medicine.</p> <p>CO6: Realize, appreciate and develop passion to biodiversity; and will respect the nature and environment.</p>
DSE 2: Biology of Insecta	<p>CO1: Appreciate the diversity of insects.</p> <p>CO2: Understand the physiology of Insects which has made them the most successful animals in terms of numbers and variety of species.</p> <p>CO3: Get a glimpse of the highly organized social life of insects.</p>
DSE 3: Computational Biology	<p>CO1: Explain the basic concepts of Bioinformatics and Biostatistics and its various applications in different fields of biological sciences</p> <p>CO2: Describe theoretically sources of biological data, and list various biological databases –</p> <p>CO3: cleic acids, protein sequence, metabolic pathways and small molecule</p> <p>CO4: Identify various file formats of sequence data and tools for submission of data in databases as well as retrieval of gene and protein data from databases</p> <p>CO5: Annotate gene sequence and protein structure prediction</p> <p>CO6: Perform and explain the underlying mechanisms of pair-wise and multiple sequence alignments and determine phylogenetic relationships</p> <p>CO7: Describe various computational tools and methodologies and their application in structural bioinformatics, functional genomics and in silico drug discovery</p> <p>CO8: Measure variability (standard deviation, standard error, co-efficient of variance) and hypothesis testing (Z-test, t-Test, chi-square test)</p>
DSE 4: Endocrinology	<p>CO1: Understand endocrine system and the basic properties of hormones.</p> <p>CO2: Appreciate the importance of endocrine system and the crucial role it plays along with the nervous system in maintenance of homeostasis.</p> <p>CO3: Gain insight into the molecular mechanism of hormone action and its regulation.</p> <p>CO4: Know the regulation of physiological process by the</p>

	<p>endocrine system and its implication in diseases.</p> <p>CO5: Gain knowledge about the prevalent endocrine disorders and critically analyze their own and their family's health issues</p>
DSE 5: Immunology	<p>CO1: Describe the basic mechanisms, distinctions and functional interplay of innate and adaptive immunity</p> <p>CO2: Define the cellular/molecular pathways of humoral/cell-mediated adaptive responses including the role of Major Histocompatibility Complex</p> <p>CO3: Explain the cellular and molecular aspects of lymphocyte activation, homeostasis, differentiation, and memory</p> <p>CO4: Understand the molecular basis of complex, humoral (Cytokines and Complement) and cellular processes involved in inflammation and immunity, in states of health and disease</p> <p>CO5: Describe basic and state-of-the-art experimental methods and technologies</p> <p>CO6: Integrate knowledge of each subsystem to see their contribution to the functioning of higher-level systems in health and disease including basis of vaccination, autoimmunity, immunodeficiency, hypersensitivity and tolerance</p>
DSE 6: Animal Biotechnology	<p>CO1: Use or demonstrate the basic techniques of biotechnology like DNA isolation, PCR, transformation, restriction digestion etc.</p> <p>CO2: Make a strategy to manipulate genetic structure of an organism for the improvement in any trait or its well-being based on the techniques learned during this course.</p> <p>CO3: Understand better the ethical and social issues regarding GMOs.</p> <p>CO4: Use the knowledge for designing a project for research and execute it.</p>
DSE 7: Basics of Neuroscience	<p>CO1: Understand major advances in neuroscience, neural basis of emotions, behaviour, learning and memory, and how brain and behaviour can be trained/modified by experience.</p> <p>CO2: Discuss how the hypothalamus controls various behavioural patterns by releasing neurohormones/neuropeptides in brain and periphery in response to various signals.</p> <p>CO3: Construct neural mechanisms of learning and memory (spatial and episodic memory etc.) and how specific circuits contribute to learning and memory.</p> <p>CO4: Develop an understanding about cognition,</p>

	<p>mechanism of our reaction to various situations and impact of neurological diseases on cognition.</p> <p>CO5: Understand cellular and molecular mechanisms that underlie cognition such as synaptic plasticity and organisation of memory, memory persistence and forgetfulness, the role of sleep in cognition etc.</p> <p>CO6: Gain knowledge about prion-like mechanisms responsible for the pathogenesis of common neurodegenerative diseases such as Alzheimer's, Parkinson's diseases etc.</p>
DSE 8: Fish and Fisheries	<p>CO1: Acquire knowledge of physiology, reproduction of fishes.</p> <p>CO2: Analyse different kinds of water and identify/differentiate different kinds of fishes.</p> <p>CO3: Procure pure fish seed by artificial procedures such as artificial and induced breeding which can learn by visiting any fish farm or demonstrated in research labs in college/Departments</p> <p>CO4: Become aware and gain knowledge of In-land and marine Fisheries in India and how it contributes to Indian economy.</p> <p>CO5: Know about different kinds of fishing methods and fish preservation which can be employed for export and storage of commercial fishes.</p> <p>CO6: Find the reasons behind the depletion of fisheries resources.</p> <p>CO7: Develop skills for entrepreneurship or self-employment in their own fisheries-related business.</p>
DSE 9: Parasitology	<p>CO1: Understand the variation amongst parasites, parasitic invasion in both plants and animals; applicable to medical and agriculture aspects.</p> <p>CO2: Help to know the stages of the life cycles of the parasites and the respective infective stages.</p> <p>CO3: Develop ecological model, know population dynamics of parasite, establishment of parasite population in host body, adaptive radiations and methods adopted by parasite to combat with the host immune system</p> <p>CO4: Develop skills and realize significance of diagnosis of parasitic attack and treatment of patient or host.</p> <p>CO5: Learn important case studies to highlight interesting researches, serendipities towards the advancement and enrichment of knowledge in the field of Parasitology.</p>
DSE 10: Reproductive Biology	<p>CO1: Get in-depth understanding of morphology, anatomy and histology of male and female reproductive organs.</p> <p>CO2: Know different processes in reproduction starting from germ cell formation to fertilization and</p>

	<p>consequent pregnancy, parturition and lactation.</p> <p>CO3: Compare estrous and menstrual cycles and their hormonal regulation.</p> <p>CO4: Comprehend the interplay of various hormones in the functioning and regulation of the male and female reproductive systems.</p> <p>CO5: Know about the diagnosis and management of infertility, including latest methods, technologies and infrastructure in assisted reproduction</p> <p>CO6: Practically understand the modern methods in contraception and their use in family planning strategies.</p> <p>CO7: Translate their understanding into development of products like non-hormonal contraceptives; contribute to drug discovery programmes as well as neonatal and maternal health programmes and work with family planning teams to understand the needs and preferences of individuals belonging to lower socioeconomic groups.</p>
DSE 11: Wild Life conservation and management	<p>CO1: Become aware about the importance of wildlife in general, and its conservation and management in particular.</p> <p>CO2: Comprehend the application of the principles of ecology and animal behaviour to formulate strategies for the management of wildlife populations and their habitats.</p> <p>CO3: Understand the management practices required to achieve a healthy ecosystem for wildlife population along with emphasis on conservation and restoration.</p> <p>CO4: Know the key factors for loss of wildlife and important strategies for their in situ and ex situ conservation.</p> <p>CO5: Recognize the techniques for estimation, remote sensing and Global Position Tracking for wildlife.</p> <p>CO6: Gain knowledge about the wildlife diseases and the quarantine policies.</p> <p>CO7: Know about the Protected Area Networks in India, Ecotourism, Ecology of perturbation and Climax persistence.</p> <p>CO8: Perform critical thinking, literature review; scientific writing as well as presentations; and participation in citizen science initiatives with reference to wildlife.</p>
Generic Elective Courses	
GE 1: Animal Diversity	<p>CO1: Distinguish between major phyla of animals through a demonstrated understanding of their taxonomic classification and diversity.</p>

	<p>CO2: Describe the distinguishing characteristics of all major phyla.</p> <p>CO3: Understand the fundamental differences among animal body plans and relate them to function, taxonomic classification, and evolutionary relationships among phyla.</p> <p>CO4: Illustrate lifecycles, structure, function and reasons for importance of few representative organisms from different groups of animals.</p> <p>CO5: Identify anatomical structures from prepared tissues.</p> <p>CO6: Observe living animals in the environment and relate observations to theory from the course.</p> <p>CO7: Recognize major animal phyla and animals on the basis of their external characteristics.</p>
GE 2: Insect Vectors and diseases	<p>CO1: Identify different insects and classify them based on their morphology and behaviour</p> <p>CO2: Describe the host-pathogen relationships and the role of the host reservoir on transmission of parasite</p> <p>CO3: Explain various modes of transmission of parasite by insect vectors</p> <p>CO4: Recognize various possible modern tools and methodologies for laboratory diagnosis, surveillance and treatment of diseases</p> <p>CO5: Define various terms related to insect transmitted diseases such as vectorial capacity, mechanical and biological transmission, host specificity etc.</p> <p>CO6: Identify the risk groups and characterize them on the basis of exposure risk</p> <p>CO7: Explain control methods of insect vector diseases including spreading awareness on public health programs and mitigating insect borne diseases</p> <p>CO8: Employ the use of advanced management strategies in disease control with respect to parasite evolution</p>
GE 3: Human Physiology	<p>CO1: Know the principles of normal biological function in human body.</p> <p>CO2: Outline basic human physiology and correlate with histological structures.</p> <p>CO3: Understand how animals maintain an internal homeostatic state in response to changes in their external environment.</p>
GE 4: Exploring the Brain: Structure and Function	<p>CO1: Define the cellular- and anatomical-level organisation of the brain.</p> <p>CO2: Understand the properties of neuronal and non-neuronal cells that make up the brain including the propagation of electrical signals used for cellular communication.</p>

	<p>CO3: Comprehend how the interaction of cells and neural circuits leads to various higher level activities like cognition and behaviour.</p> <p>CO4: Identify principles /mechanism underlying various neurological disorders.</p> <p>CO5: Learn about neuroimaging methods used for disease diagnosis; and neurophysiological methods for sleep and epilepsy analysis.</p>
GE 5: Food, Nutrition and Health	<p>CO1: Have a better understanding of the association of food and nutrition in promoting healthy living.</p> <p>CO2: Think more holistically about the relationship between nutrition science, social and health issues.</p> <p>CO3: Move on to do post-graduation studies and can apply for jobs as food safety officers, food analysts, food inspectors, food safety commissioners or controllers for jobs in organizations like FSSAI.</p> <p>CO4: Specialize in various fields of nutrition.</p>
GE6: Environment and Public Health	<p>CO1: Get familiarized with various aspects of environmental risks and hazards.</p> <p>CO2: Recognize the climate change due to human activities.</p> <p>CO3: Be aware about the various impacts of environmental degradation on human health through case studies and how it can be prevented.</p> <p>CO4: Learn about the nuclear and chemical disasters and their after effects through cases studies.</p> <p>CO5: Know various waste management technologies and their utility.</p> <p>CO6: Understand the diagnostic methods of various diseases and ways to prevent them.</p> <p>CO7: Realize the importance of nature conservation for betterment of human race and all living beings.</p>
GE7: Animal Cell Biotechnology	<p>CO1: Get a clear concept of the basic principles and applications of biotechnology.</p> <p>CO2: Know the basic techniques used in genetic manipulation helping them continue with higher studies in this field.</p> <p>CO3: Acquire knowledge of the basic principles, preparations and handling required for animal cell culture.</p> <p>CO4: Understand principles underlying the design of fermenter and fermentation process and its immense use in the industry.</p> <p>CO5: Design small experiments for successful implementation of the ideas and develop solutions to solve problems related to biotechnology keeping in mind safety factor for environment and society.</p>

	<p>CO6: Apply knowledge and skills gained in the course to develop new diagnostic kits and to innovate new technologies further in their career.</p> <p>CO7: Enhance their understanding of the various aspects and applications of biotechnology as well as the importance of bio-safety and ethical issues related to it</p>
GE8: Aquatic Biology	<p>CO1: Know the physico-chemical environment, and its role in aquatic ecosystem.</p> <p>CO2: Learn about adaptations exhibited by organisms to survive in these typical conditions.</p> <p>CO3: Realize how human activities influence the physicochemical environment of water bodies, and devastating impact it has on aquatic organisms.</p> <p>CO4: Learn about the laws governing the use of freshwater systems, as well as the local, state, federal, and international agencies that enforce these laws to protect endangered and vulnerable species.</p> <p>CO5: Understand and apply relevant scientific principles in the area of aquatic biology and educate others or work to conserve our natural resources.</p>
Skill Enhancement Courses (Elective)	
SEC-1 Apiculture	<p>CO1: Learn about the various species of honey bees in India, their social organization and importance.</p> <p>CO2: Be aware about the opportunities and employment in apiculture- in public, private and government sector.</p> <p>CO3: Gain thorough knowledge about the techniques involved in bee keeping and honey production.</p> <p>CO4: Know about various products obtained from beekeeping sector and their importance.</p> <p>CO5: Develop entrepreneurial skills necessary for self-employment in beekeeping sector.</p> <p>CO6: Enhance collaborative learning and communication skills through practical sessions, team work, group discussions, assignments and projects.</p>
SEC 2: Aquarium Fish Keeping	<p>CO1: Upon completion of the course, students should be able to: Acquire knowledge about different kinds of fish their compatibility in aquarium.</p> <p>CO2: Become aware of Aquarium as commercial, decorative and of scientific studies.</p> <p>CO3: Develop personal skills on maintenance of aquarium.</p> <p>CO4: Know about the basic needs to set up an aquarium, i.e., dechlorinated water, reflector, filters, scavenger, aquatic plants etc. and the ways to make it cost-effective.</p>
SEC 3: Medical Diagnostics	<p>After completing this course, the students should be able to:</p> <p>CO1: Gain knowledge about various infectious, non-</p>

	<p>infectious and lifestyle diseases, tumors and their diagnosis</p> <p>CO2: Understand the use of histology and biochemistry of clinical diagnostics and learn about the molecular diagnostic tools and their relation to precision medicine.</p> <p>CO3: Develop their skills in various types of tests and staining procedure involved in hematology, clinical biochemistry and will know the basics of instrument handling.</p> <p>CO4: Learn scientific approaches/techniques used in the clinical laboratories to investigate various diseases and will be skilled to work in research laboratories.</p> <p>CO5: Gain knowledge about common imaging technologies and their utility in the clinic to diagnose a specific disease.</p>
SEC 4: Research Methodology	<p>CO1: Describe basic concepts of research and its methodologies</p> <p>CO2: Identify appropriate research topics and set up hypothesis</p> <p>CO3: Perform literature review using library (print) and internet (online) resources</p> <p>CO4: Design experiments/surveys, collect data and represent data in tables/figures</p> <p>CO5: Analyze data with appropriate software tools, interpret results and draw conclusion</p> <p>CO6: Write scientific report/ review/ thesis and prepare seminar/ conference presentations – oral as well as poster</p> <p>CO7: Understand the methods of citation and referencing styles, check plagiarism and get insight of intellectual property right</p>
SEC 5: Sericulture	<p>CO1: Learn about the history of sericulture and silk route.</p> <p>CO2: Recognize various species of silk moths in India, and exotic and indigenous races.</p> <p>CO3: Be aware about the opportunities and employment in sericulture industry- in public, private and government sector.</p> <p>CO4: Gain thorough knowledge about the techniques involved in silkworm rearing and silk reeling.</p> <p>CO5: Develop entrepreneurial skills necessary for self-employment in mulberry and seed production and be apprised about practicing sericulture as a profit-making enterprise.</p> <p>CO6: Enhance collaborative learning and communication skills through practical sessions, team work, group</p>

	discussions, assignments and projects.
SEC 6: Genetic Counselling	<p>CO1: Get acquainted with the diseases caused by genetic abnormalities.</p> <p>CO2: Develop the basic understanding of counselling the individuals based on the deductive methods.</p> <p>CO3: Deal with the various social and ethical aspects in relation to genetic diseases inheritance and its predictability in a responsible manner.</p> <p>CO4: Collect data about the history of a disease in a family and arrange it into a pedigree.</p> <p>CO5: Be aware and competent of the legalities and national and international policies in the area.</p> <p>CO6: Understand their risk for developing a genetic disease and to make informed decisions.</p>
SEC 7: Environmental Audit	<p>CO1: To provide understanding by the students of general chronology of audit, audit strategy, audit program and audit procedures;</p> <p>CO2: To provide comprehensive idea to the students on the ethical principles of audit profession;</p> <p>CO3: To develop an appropriate documentation for an environmental impact statement and to introduce the types of audit reports.</p> <p>CO4: To understand how the environmental commitments by industry can be monitored and audited</p> <p>CO5: How potential environmental impacts are described in Environmental Impact Assessments (EIA)</p> <p>CO6: How industry controls their environmental impacts through Environmental Management Systems (EMS)</p> <p>CO7: How environmental management systems are audited</p> <p>CO8: How waste is generated and controlled and other environmental management initiatives such as product life cycle analysis and sustainability programmes</p> <p>CO9: Develop ability to plan, execute and document the environmental audit.</p> <p>CO10: Develop entrepreneurial skills</p>