



**SEETHALAKSHMI RAMASWAMI COLLEGE**

**Autonomous**

**Affiliated to Bharathidasan University**

**Tiruchirappalli**

*Accredited with A+ by NAAC (4<sup>th</sup> Cycle)*



**PROGRAMME OUTCOME**  
**PROGRAMME SPECIFIC OUTCOME**  
**COURSE OUTCOME**

**2021**

## UNDERGRADUATE PROGRAMMES

### PROGRAMME OUTCOMES (POs)

On completion of programmes offered, the graduates can:

**PO1** :Apply the assimilated domain knowledge to resolve real life challenges

**PO2** : Get employed globally or pursue higher education or be successful entrepreneurs

**PO3** :Communicate and use the modern ICT tools effectively to be productive in individual and team work

**PO4** :Contribute towards environment, sustainable development and societal enrichment

**PO5** :Appreciate diversity in day to day and work environments facilitated by the ethics and values imbibed

**PO6** :Remain motivated for lifelong learning

## B.Sc. BOTANY

### PROGRAMME SPECIFIC OUTCOMES

**PSO1**: Understand and recall the basic concepts of plant science enhancing the academic skills for successful carrier

**PSO 2**: Develop and acquire entrepreneurial skills related to plant science

**PSO 3**: Analyze the socio-environmental issues and suggest solutions for the conservation of natural resources

**PSO 4**: Gain insight into morphological, anatomical, cytogenetical, embryological, physiological and biochemical aspects of plants

**PSO5**: Develop skills in the application of microbes in plant and environmental biotechnology

**PSO 6**: Understand the applied aspects of plant science and apply them in problem solving, vertical and horizontal mobilization and for job seeking.

### COURSE OUTCOMES

#### Core Course 1: Algae, Fungi and Bryophytes

**CO1**: Recognize the algal forms; describe the thallus organization, life cycle patterns and economically important forms of algae.

**CO2**: Describe the structure and character of algal genera.

**CO3**: Explain the classification, characters of fungi and compare the different types of lichens and discuss its economic and ecological importance.

**CO4**:Compare and identify the fungal forms.

**CO5**: Summarize the characters of bryophytes, and assess the economic importance.

#### Core Course 2: Pteridophytes, Gymnosperms and Paleobotany

**CO 1**: Summarize the characters, classify Pteridophytes and describe the different types of steles and Heterospory.

**CO 2**: Explain the vegetative and reproductive structures of Pteridophytes.

**CO 3**: Compare the vegetative and reproductive structures of Pteridophytes

**CO 4**: Categorize the vegetative and reproductive structure in Gymnosperms.

**CO 5**: Acquire knowledge on the geological time scale, fossilization methods, dating of fossil and understand the structure of fossil forms.

#### Core Course 3:Anatomy and Embryology

- CO1:** Understand and recognize the structure of meristematic and permanent tissues.
- CO2:** Describe and illustrate the complex permanent tissues, structure of leaf, nodal anatomy and various stomatal types of plants.
- CO3:** Apply the knowledge and practice to observe the annual rings, heart and sap wood of angiosperms.
- CO4 :** Outline the structure and development of male and female gametophytes and types of endosperms.
- CO5:** Explain the structure and development of dicot and monocot embryos and compare the practical utility of apomixis, polyembryony and parthenocarpy.

#### **Core Course 4: Cell Biology, Genetics and Biostatistics**

- CO 1:** Describe the ultra structure and functions of cell and its organelles
- CO2:** Explain the chromosome structure, functions of gene, Gene regulation, proof for DNA as genetic material and types of cell division.
- CO3:** Analyze the laws of Mendel in classical genetics, deviations from Mendelian ratios, multiple alleles, structure and variations of chromosomes.
- CO 4:** Discuss crossing over, linkage, mapping of genes, sex linked, sex determination and cytoplasmic inheritance and Human Genome project.
- CO 5:** Develop skills in collection, presentation of data, measures of central tendency, measures of dispersion and test of significance.

#### **Core Course 5: Morphology, Taxonomy and Economic Botany**

- CO 1:** Understand the morphological variations of angiosperms
- CO 2:** Acquire the knowledge in collection of plant specimens and preparation of herbarium and museum specimens.
- CO 3:** Outline and interpret the classification of angiosperms.
- CO 4:** Explain the theoretical knowledge for identification of the plants and their families.
- CO 5:** Assess the economically useful plants in day to day life.

#### **Core Course 6: Biological Techniques**

- CO 1:** Understand and apply the principles of microscopy, micrometry and camera lucida.
- CO2:** Acquire and apply the knowledge of fixing, microtome sectioning and staining of plant materials.
- CO3:** Apply and analyze the principles, construction and uses of pH meter, haemocytometer, centrifuge and colorimeter and understand the various separation techniques.
- CO 4:** Explain the culture techniques of algae, fungi and bacteria.
- CO 5:** Analyze and apply bioinformatic tools such as BLAST, SCANPS and PHYLIP.

#### **Core Course 7: General Microbiology**

- CO 1:** Discuss the history, scope, importance of Microbiology and industrial applications of microbes.
- CO2:** Explain the structure, nutrition and reproduction of bacteria, and understand the structure, infectious cycle and preventive measures of CORONA virus.
- CO3:** Categorize the microbes in soil and explain the microbiological characteristics of water.
- CO 4:** Evaluate the quality of water and milk and discuss the diseases transmitted through them.
- CO 5:** Explain the industrial production of penicillin, vitamin B<sub>12</sub>, citric acid and vinegar.

#### **Major Based Elective Course I: Environmental Biotechnology**

- CO 1:** Analyze the physical, chemical and biological treatment of waste water.
- CO 2:** Interpret the potential application of microorganisms in the conversion of biomass.
- CO 3:** Explain the sources, production and advantages of biogas and biodiesel.
- CO 4:** Understand the role of microbes as single cell protein.

**CO 5:** Employ the microorganism in pollution abatement.

**Major Based Elective Course 1: Plant Pathology (Optional)**

**CO 1:** Classify plant diseases and discuss the scope and importance of plant pathology.

**CO 2:** Analyze the effect of environment on diseases development.

**CO 3:** Identify diseases, symptoms and control measures of fungal infections.

**CO 4:** Explain the bacterial diseases, symptoms and control measures.

**CO 5:** Describe the life cycle of TMV, bunchy top and root knot.

**Core Course 8: Plant Physiology, Biochemistry and Biophysics**

**CO 1:** Recall and understand the water and minerals relation of plants.

**CO 2:** Discuss the mechanism of translocation of solutes, ascent of sap, stomatal transpiration and enzyme activity

**CO 3:** Interpret the vital physiological activities.

**CO 4:** Explain the role of growth hormones, plant movements and the mechanism of photoperiodism and vernalization.

**CO 5:** Compile the primary and secondary metabolites and summarize the physical forces, chemical bonding of biomolecules and bioenergetics.

**Core Course 9: Environment, Biodiversity and Conservation**

**CO 1:** Identify factors of ecology and their relation to terrestrial and/or aquatic plant.

**CO 2:** Acquaint the knowledge and understand the structure and functions of the ecosystems.

**CO 3:** Describe the effects of pollution and solve pollution problems.

**CO 4:** Develop a deeper concern and appreciation for conservation of natural resources and describe the process of data acquisition of satellite images and their applications.

**CO 5:** Compare the botanical regions of Tamil Nadu and different vegetation types.

**Major Based Elective Course 2: Horticulture and Plant Breeding**

**CO 1:** Discuss the scope, importance, sub-disciplines of horticulture in human welfare and acquire knowledge on plant growth regulators.

**CO 2:** Explain and discuss the cultivation practices of fruits and vegetables.

**CO 3:** Analyze and discuss the propagation and cultivation of useful flowers and vegetables.

**CO 4:** Define the components of garden and gardening techniques.

**CO 5:** Apply knowledge in different methods of plant breeding.

**Major Based Elective Course 2: Herbal Technology (Optional)**

**CO 1:** State the scope and importance of pharmacognosy.

**CO 2:** Discuss the drug from carbohydrate, glycosides and lipids.

**CO 3:** Describe the uses of volatile oil and resins

**CO 4:** Compare the alkaloids and steroids.

**CO 5:** Estimate the biological testing of herbal drugs and start home-based business on herbal Preparations.

**Second Allied Course 1: Plant Science-1: Cryptogams, Gymnosperms, Morphology, Taxonomy, Anatomy and Embryology.**

**CO 1:** Explain the structure, reproduction and life cycle of cryptogams.

**CO 2:** Assess the morphology, anatomy, reproduction and life cycle of Pteridophytes and Gymnosperms.

**CO3:** Differentiate the types of phyllotaxy, stipules and to describe flower parts and types of inflorescence.

**CO4:** Classify & identify the plant families emphasizing their morphology, distinctive features and recall their economic importance.

**CO5:** Compare the primary anatomical structure of dicot, monocot plant parts and describe the structure of microsporangium and mega sporangium.

### **Second Allied Course 2: Plant Science-II: Cytogenetics, Ecology, Plant Physiology and Plant Propagation.**

**CO 1:** Explain the ultra-structure and functions of cell organelles.

**CO 2:** Interpret the Mendel's principles; understand the pattern of inheritance and human blood groups.

**CO3:** Illustrate the adaptations in xerophytes, hydrophytes and mangroves.

**CO 4:** Assess the mechanism of various metabolic processes in plants.

**CO5:** Analyze and select appropriate propagating methods for specific plants

### **Skill Based Elective Course 1: Nursery Techniques and Mushroom Cultivation.**

**CO 1:** Assess the importance of nursery, organic and inorganic fertilizers.

**CO 2:** Explain the different propagative methods.

**CO 3:** Categorize the methods of layering and grafting.

**CO 4:** Analyze and identify the poisonous and edible mushrooms, the nutritive and medicinal value of mushrooms.

**CO 5:** Understand the cultivation method of oyster mushroom.

### **Skill Based Elective Course 1: Plant Protection (Optional)**

**CO 1:** Identify the pests of plants and use of pesticides for the controlling of pests.

**CO2:** Differentiate between sprayer and duster and explain the hazards of pesticides.

**CO 3:** Manage the control of pests.

**CO 4:** Understand the seed and soil treatment.

**CO 5:** Justify the integrated pest management.

### **Skill Based Elective Course 2: Biofertilizer and Biopesticides**

**CO 1:** Understand the basics of biofertilizer and describe the methods of vermicomposting.

**CO 2:** Explain the characteristics and mass inoculum production of biofertilizer.

**CO 3:** Assess Azolla as green manure cum biofertilizer.

**CO 4:** Summarize the isolation, inoculum production and the importance of mycorrhiza.

**CO 5:** Classify and analyze the bacterial, fungal and viral biopesticides.

### **Skill Based Elective Course 2: Food and Agricultural Microbiology (Optional)**

**CO 1:** Understand and indicate the important food products.

**CO 2:** Assess the toxic foods.

**CO 3:** List and interpret the role of soil microbes in agriculture

**CO 4:** Discuss the uses of *Azotobacter* and Phosphobacteria.

**CO 5:** Explain the applications of cyanobacteria.

### **Skill Based Elective Course 3: Preservation of Fruits and Vegetables**

**CO 1:** Summarize the principles, methods and importance of preservation of fruits and vegetables.

**CO 2:** Assess the preparation of preserved products.

**CO 3:** Explain the method of drying fruit and vegetable and to prepare squash and syrup.

**CO 4:** Understand the method and problems in the preparation of jam and jellies.

**CO 5:** Design a flow chart for preparation of jam, jelly and marmalade.

### **Skill Based Elective Course 3: Ethnobotany (Optional)**

**CO 1:** Understand scope and importance of indigenous medicinal sciences.

**CO 2:** Report the role of ethnic groups in conservation.

**CO 3:** Compare ethnobotany and modern medicine.

**CO 4:** Explain the significance of medicinal plants.

**CO 5:** Summarize the value of tribal medicines.

### **Non Major Based Elective Course 1: Gardening and Mushroom Cultivation**

**CO 1:** Analyze the scope, importance and sub disciplines of Horticulture.

**CO 2:** Assess and understand the propagative methods.

**CO 3:** Draw and identify the horticultural tools, their uses and categorize the components of garden.

**CO 4:** Design the kitchen garden lay out. Understand bonsai and vase-life period of flowers.

**CO 5:** Explain the cultivation method of edible mushroom and discuss the preparation of mushroom recipes.

### **Non Major Based Elective Course 2: Bioinoculants**

**CO 1:** Classify and discuss the mass culture and field application of biofertilizer.

**CO 2:** Explain the methods and advantages of vermicomposting.

**CO 3:** Summarize and understand the characteristics, mass production, and isolation of microbial fertilizers.

**CO 4:** Assess *Azolla* as green manure.

**CO 5:** Review the isolation, inoculum production and importance of mycorrhiza.

## **B.Sc. CHEMISTRY**

### **PROGRAMME SPECIFIC OUTCOMES**

**PSO1 :** Render in-depth knowledge in various concepts of inorganic, organic, physical, analytical and industrial chemistry and expertise in C language.

**PSO2 :** Understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics, bio and pharmaceutical chemistry to a wide variety of chemical problems. Acquaintance to experimental techniques based on theoretical knowledge and practical skills with basic and advanced instruments.

**PSO3 :** Apply their knowledge in specialised areas like biochemistry, pharmaceutical chemistry, analytical chemistry, forensic, nanoscience and writing C programs for problems in chemistry.

**PSO4 :** Ability to implement the learned principles of chemistry to apply in Quality control labs and industries of metallurgy, fertilizer, petroleum, pharmaceutical, perfumes and food.

**PSO5:** Utilize chemistry knowledge and expertise to solve difficult scientific challenges like environmental issues to meet out the social needs.

### **COURSE OUTCOMES**

#### **Core Course 1: Inorganic, Organic and Physical chemistry I**

**CO 1:** Compare periodic properties of element and its classification

**CO 2:** Apply the concept of volumetric analysis to find unknown strength and the concept of metallurgy in industries

**CO 3:** Identify the nomenclature of organic compounds and the types of organic reaction

- CO 4: Describe the preparation, properties and hybridization of alkanes and alkenes  
CO 5: Create interest in various phenomena of gaseous state and basics of liquid state.

### **Core Course 2 : Inorganic, Organic and Physical chemistry II**

- CO 1: Identify the types of bonding, VBT, MOT and VSEPR theory.  
CO 2: Create interest in the study of p-block and zero group Elements  
CO 3: Describe the preparation, properties & relative stability of Cycloalkanes and study of polar effects  
CO 4: Apply the basics of data analysis in the next level of learning process and introduction of thermodynamic concepts  
CO 5: Compare the derivations for various thermodynamic Properties.

### **Core Course 3 : Inorganic, Organic and Physical chemistry III**

- CO 1: Apply the principles and techniques of semi-micro analysis.  
CO 2: Describe the electrophilic substitution and the directing influence of substituents in benzene.  
CO 3: Predict the mechanism of nucleophilic substitution and elimination reactions.  
CO 4: Analyse various applications of second law of thermodynamics.  
CO 5: Justify the concept of equilibrium constant and free energy change.

### **Core Course 4 : Inorganic, Organic and Physical chemistry IV**

- CO 1: Compare the chemistry of d and f-block elements.  
CO 2: Describe the interconversion of monohydric alcohols  
CO 3: Illustrate the relative acidity of substituted phenols.  
CO 4: Explain the basic concepts of ideal and non-ideal solutions.  
CO 5: Assess the absolute entropies of solids, liquids and gases.

### **Core Course 5 : Inorganic Chemistry I**

- CO 1: Investigate various methods of separation of lanthanides and describe their properties and uses, naming the coordination compounds using IUPAC nomenclature.  
CO 2: Discuss various theories of coordination compounds.  
CO 3: Explain the mechanism and rates of reactions of coordination complexes.  
CO 4: Assess the classification, preparation, properties and structure of metallic carbonyl and nitrosyl compounds.  
CO 5: Apply the principles of gravimetric analysis to perform gravimetric experiments.

### **Core Course 6 : Organic Chemistry I**

- CO 1: Assess the stereochemistry of compounds and conformations of n-butane, cyclohexane and other compounds.  
CO 2: Explain the reaction mechanism of carbon-oxygen multiple bonds.  
CO 3: Compare and contrast properties of aliphatic and aromatic carboxylic acids  
CO 4: Illustrate the synthetic application of active methylene compounds and sulphadiazines.  
CO 5: Describe the structure of proteins and composition of Nucleic acids.

### **Core Course 7 : Physical Chemistry**

- CO 1: Apply the knowledge gained in understanding the kinetics of chemical reactions.  
CO 2: Assess the mechanism of photochemical reactions.  
CO 3: Can examine the effect of solvent on the strength of given acids and bases.  
CO 4: Explain the deliquescent and efflorescent behaviour of hydrated crystals  
CO 5: Relate the structure of simple and complex ions with their magnetic properties.

### **Core Course 8 : Inorganic Chemistry II**

- CO 1: Discuss about nuclear subatomic particles, nuclear stability and the role of metal ions in biological systems,
- CO 2: Outline radioactivity and uses of radioisotopes
- CO 3: Investigate theories of metallic bonding and describe the structure of alloys and semiconductors
- CO 4: Use thermogravimetric analysis and examine the Thermogram
- CO 5: Describe industrial preparation of glass, cement, safety matches, fertilizers and fuel gases

### **Core Course 9 (Organic Chemistry II)**

- CO 1: Explain the classification, structures and use of carbohydrates.
- CO 2: Describe the structural elucidation of alkaloids and terpenoids.
- CO 3: Outline the preparation, properties of aliphatic and aromatic amines
- CO 4: Identify the different molecular rearrangements
- CO 5: Plan the different methods of purification of organic compounds.

### **Core Practical 1 : Volumetric Analysis**

- CO 1: Analyse the given unknown solution and assess its normality
- CO 2: Evaluate the amount of substance from the normality
- CO 3: Apply iodimetry method for the estimation of  $As_2O_3$
- CO 4: Predict the hardness of water samples using EDTA
- CO 5: Construct a method for estimating  $Fe^{2+}$  and  $Fe^{3+}$  ions present in a mixture using potassium dichromate

### **Core Practical 2 : Semimicro Analysis**

- CO 1: Describe the methodologies which aid in analysing the samples.
- CO 2: Apply the solubility product principle to qualitative analysis.
- CO 3: Perform a systematic qualitative analysis.
- CO 4: Identify both interfering and non-interfering anions.
- CO 5: Create special skills of analyzing ions present in micro level quantities.

### **Core Practical 3 : Gravimetric and Organic Analyses**

- CO 1: Find out the percentage of water of hydration in commercial products.
- CO 2: Predict the amount of elements like barium, lead, calcium and nickel by applying gravimetric techniques effectively.
- CO 3: Synthesize organic compounds by adopting methods like oxidation, hydrolysis and nitration.
- CO 4: Evaluate the nature of given organic compounds by identifying different functional groups present.
- CO 5: Use simple laboratory techniques like reflux, recrystallisation and filtration.

### **Core Practical 4 : Experimental Techniques in Physical Chemistry**

- CO 1: Apply conductometric and potentiometric techniques for the estimation of unknown ions present in industrial products.
- CO 2: Find the quality of commercial products.
- CO 3: Investigate the rate of unknown reactions.
- CO 4: Predict the molecular weight of given unknown compound
- CO 5: Evaluate critical solution temperature, transition temperature and rate constant.

### **Allied Course 5 : Chemistry for Biologists I**

- CO 1: Discuss the basic concepts of bonding and their cleavages.
- CO 2: Use of theoretical basis of volumetric analysis in laboratories.

- CO 3: Find the chemical composition and uses of fuel gases, fertilizer and halogen compounds.
- CO 4: Assess an idea about industrial organic chemistry.
- CO 5: Categorize the drugs in pharmaceutical chemistry.

#### **Allied Course 2 : Chemistry for Biologists II**

- CO 1: Discuss the classification and properties of colloids.
- CO 2: Assess the biological importance of pH in the living system.
- CO 3: Investigate the theoretical background about chemical kinetics and catalysis.
- CO 4: Describe the sources, preparation and reactions of carbohydrates.
- CO 5: Illustrate the preparation and properties of amino acids.

#### **Allied Course 1 : General Chemistry I**

- CO 1: Illustrate the cleavage of covalent bonds
- CO 2: Describe the properties and uses of refrigerant
- CO 3: Discuss the basics of volumetric analysis
- CO 4: Prioritize the chemical composition of fuel gases and fertilizer
- CO 5: Assess the preparation and applications of Polymer

#### **Allied Course 2 : General Chemistry II**

- CO 1: Discuss the types of colloidal system, emulsions and gels
- CO 2: Describe the classification of carbohydrates
- CO 3: Illustrate amino acids, proteins and nucleic acids
- CO 4: Assess the concepts acids and bases
- CO 5: Categorize the varieties of steel

#### **Allied Course 2 : Chemistry for Physicists I**

- CO 1: Relate the quality of chemical compounds with the knowledge on chemical Bonding.
- CO 2: Recommend proper method for the separation of mixture of compounds.
- CO 3: Use theoretical basics of volumetric analysis for practical experiments.
- CO 4: Discuss the role of industrial products in domestic applications.
- CO 5: Categorize drugs according to their action.

#### **Allied Course 2 : Chemistry for Physicists II**

- CO 1: Outline the various possible methods for the determination of pH of a solution.
- CO 2: Apply the knowledge on electrochemical series to explain the difference in the rate of discharge of different ions.
- CO 3: Find the composition of various alloys which we come across in our life.
- CO 4: Explain the cleansing action of soap.
- CO 5: Assess the type of given amino acid.

#### **Allied Practical for Botany and Zoology Major : Volumetric analysis and Simple experimental techniques in Chemistry**

- CO 1: Identify the strength of given solution.
- CO 2: Understand the principle of iodometry.
- CO 3: Apply the analytical skills for quality assessment in industries.
- CO 4: Investigate the hardness of water samples using EDTA. Investigate the hardness of water samples using EDTA.
- CO 5: Assess the purity of substances using chromatographic technique.

### **Allied Practical for Home Science Major : Titrimetric and Analytical techniques in Chemistry**

**CO 1:** Identify the strength of given solution.

**CO 2:** Understand the principle of iodometry.

**CO 3:** Apply the analytical skills for quality assessment in industries.

**CO 4:** Investigate the hardness of water samples using EDTA.

**CO 5:** Assess the purity of substances using chromatographic technique.

### **Allied Practical for Physics Major : Volumetric and Analytical Experiments**

**CO 1:** Identify the strength of given solution.

**CO 2:** Understand the principle of iodometry.

**CO 3:** Apply the analytical skills for quality assessment in industries.

**CO 4:** Investigate the hardness of water samples using EDTA.

**CO 5:** Assess the purity of substances using chromatographic technique.

### **Major Based Elective Course 1 : C Language and Chemistry**

**CO 1:** Describe the terminologies used in C and explain the basic concepts of programming.

**CO 2 :** Outline the significance of decision-making statements, arrays, structures and pointers.

**CO 3:** Construct some new C programs.

**CO 4:** Illustrate basic concepts of object-oriented programming.

**CO 5:** Summarize various general features of C++ programs.

### **Major Based Elective Course 2 : Spectroscopy, Electrochemistry and Group Theory**

**CO 1:** Describe the basic principles of various spectroscopic techniques.

**CO 2:** Interpret the structure of simple compounds from their spectral data (UV-visible, PMR and ESR).

**CO 3:** Complete successfully electrical experiments with the help of theoretical knowledge.

**CO 4:** Assess solubility through emf measurements.

**CO 5:** Identify the point groups of small molecules like  $H_2O$  and  $NH_3$ .

### **Major Based Elective Course 3 : Biochemistry**

**CO 1:** Relate the basic concepts of cell structure and their functions.

**CO 2:** Explain the concept of enzymes and their activity.

**CO 3:** Identify the metabolism of carbohydrate.

**CO 4:** Illustrate digestion and various types of reaction by lipids.

**CO 5:** Assess the structural elucidation of riboflavin.

### **Major Based Elective Course 3 : Pharmaceutical Chemistry**

**CO 1:** Describe the terminologies of pharmaceutical chemistry and explain mechanism of drug action.

**CO 2:** Illustrate the basics of first aid, clinical laboratory techniques.

**CO 3:** Outline the components, functions and significance of blood.

**CO 4:** Compile the drugs that aid to heal epilepsy, cancer, cardiovascular diseases and diabetes.

**CO 5:** Summarize the activity and purpose of antibiotics, analgesics, anaesthetics, antiseptics and disinfectants.

### **Non Major Based Elective Course 1 : Material Chemistry**

**CO 1:** Describe the composition of alloys and its uses.

**CO 2:** Outline the importance of petroleum chemistry.

**CO 3:** Categorize the natural and synthetic polymers.

**CO 4:** Illustrate the types and uses of glass and ceramics.

**CO 5:** Summarize the composition of matches, fireworks and

explosives and explain the manufacture and uses of sugar and alcohol

### **Non Major Based Elective Course 2 : Role of Chemistry in Daily Life**

**CO 1:** Outline important medicines for common diseases.

**CO 2:** Predict the methods and process of water softening

**CO 3:** Identify the processes involved in diary chemistry.

**CO 4:** Write the composition, nutritive value of cereals and medicinal values of spices.

**CO 5:** Explain the classification and functions of lipids.

### **Skill Based Elective Course 1: Chemistry of Commercial products**

**CO 1:** Use of explosives getting employment in mines.

**CO 2:** Identify the composition of various alloys.

**CO 3:** Describe the uses of fats, oils and waxes.

**CO 4:** Recommend awareness in paper production techniques.

**CO 5:** Outline various chromatographic techniques.

### **Skill Based Elective Course 2: Phytochemistry**

**CO 1:** Name the chemicals in herbal medicines.

**CO 2:** Evaluate methods for the isolation of chemical constituents in plants.

**CO 3:** Identify the alkaloids present in plants.

**CO 4:** Outline the role of plant in cancer treatment.

**CO 5:** Illustrate the advantages of naturally occurring colouring agents and essential oils

### **Skill Based Elective Course 3 : Polymer Chemistry**

**CO 1:** Classify the polymers based on their nature and structure

**CO 2:** Explain the various types of polymerization techniques.

**CO 3:** Discuss morphology of polymers.

**CO 4:** Assess polymer processing methods.

**CO 5:** Illustrate various polymers we use in our daily life.

### **Cross Disciplinary Course : Radiation and Safety management**

**CO 1:** Recognize radiation quantities and compare different radiation detection techniques.

**CO 2:** Describe different safety management techniques

**CO 3:** Analyze the effects of radiation and develop radiation protection techniques.

**CO 4:** Discuss the facts behind X-rays and connect its uses and safety measures of handling

**CO 5:** To understand and gain knowledge about the health hazards of radiations due to cell phones and communication gadgets.

## **B.COM (COMMERCE)**

### **PROGRAMME SPECIFIC OUTCOME**

**PSO 1:** Demonstrate the skills in various areas of Functional Management.

**PSO 2:** Portray their knowledge in Computerized Accounting.

**PSO 3:** Plan for higher education

### **COURSE OUTCOMES**

**Core Course 1: Business Accounting**

- CO 1:** Acquire conceptual knowledge of basics of Business Accounting and preparation of Final Accounts
- CO2:** Apply Single Entry System to maintain accounts
- CO3:** Compute the various Methods of charging Depreciation
- CO4:** Prepare the Accounts for Non-Trading Concern
- CO5:** Prepare the Consignment and Joint Venture accounts

### **Core Course 2: Partnership Accounting**

- CO1:** Understand the accounting procedures followed in Partnership firm.
- CO2:** Discuss the Accounting Treatment related to Admission of a Partner.
- CO3:** Comply with the accounting procedures followed in case of Retirement of a Partner.
- CO4:** Compute the different modes of Dissolution of Firm and Insolvency of a Partner.
- CO 5:** Prepare accounts of Sale of Partnership to limited Company.

### **Core Course 3 : Business Management**

- CO1:** Understand the various concepts of Business Management Techniques.
- CO2:** Describe the Planning Process and Decision Making process.
- CO 3:** Interpret the various types of Organisation structure, charts, delegation and decentralization.
- CO4:** Describe the various aspects of Staffing, Motivation.
- CO5:** Describe the various aspects of Co-ordination and Control.

### **Core Course 4 : Financial Accounting**

- CO 1:** Apply the procedures for Amalgamation of Firms.
- CO2:** Prepare Insolvency Accounts of individual and a partnership firm.
- CO3:** Discuss the system of Hire–Purchase and Installment method.
- CO4:** Prepare Branch accounting and Departmental accounts
- CO5:** Compute the Insurance Claims and calculation of Royalty.

### **Core Course 5 : Banking Theory Law and Practice**

- CO1:** Gather knowledge on banking system.
- CO2:** Identify the Rights and Obligations of Banker.
- CO3:** Demonstrate process of opening and Operation of an account.
- CO4:** Demonstrate the significance of crossing of cheques.
- CO5:** Analyze the principles of sound lending and different types of credit.

### **Core Course 6 : Corporate Accounting I**

- CO1:** Recall and understand the concept of issue of shares, forfeiture and reissue
- CO 2:** Understand the concept of redemption of preference Shares
- CO3:** Analyse the accounting practices relating to issue and redemption of debentures
- CO4:** Analyse the various accounting procedures relating to profits prior to incorporation and acquisition of business
- CO5:** Evaluate and Apply the various items appearing on the final accounts of companies

### **Core Course 7 : Business Communication**

- CO1:** Understand the process of Communication and Barriers of Communication.
- CO2:** Demonstration of good understanding of effective business writing and business correspondence.
- CO3:** Draft different Business Letters along with appropriate replies.
- CO4:** Drafting Biodata and Application Letters.
- CO5:** Utilising modern forms of communication like fax, email, video-conferencing, Internet,

websites and their uses in business.

### **Core Course 8 : Income Tax**

**CO 1:** Outline the basic concepts, determination of residential status and incidence of tax

**CO2:** Discuss the income chargeable under salary

**CO 3:** Compute the taxable income of House property

**CO4:** Compute the profits and gains of business or profession

**CO5:** Understand Capital Gain and compute Income from Other Sources

### **Core Course 9 : Corporate Accounting II**

**CO1:** Understand and apply the accounting procedure relating to Liquidation of companies

**CO 2:** Analyze the accounting practices regarding Amalgamation and absorption of Joint-Stock companies

**CO3:** Evaluate various accounting practices of Banking companies

**CO4:** Analyze the accounting aspects of Insurance companies

**CO5:** Create the various accounting concepts of Internal and External reconstruction.

### **Core Course 10 : Financial Management**

**CO1:** Understand Time value of Money and its Techniques.

**CO2:** Understand and determine Cost of Capital and Valuation of Securities.

**CO3:** Determine EBIT–EPS Analysis in Capital structure.

**CO4:** Acquaint with the Capital budgeting Techniques for arriving decisions.

**CO5:** Determine and evaluate the working capital Requirements.

### **Core Course 11 : Management Accounting**

**CO1:** Understand the concept of Management Accounting.

**CO2:** Analyze and interpret various ratios to find out the liquidity, solvency and profitability position of the company.

**CO3:** Construct the statement of fund flow and cash flow.

**CO 4:** Prepare the various types of budgets.

**CO5:** Apply marginal costing techniques for managerial decision making.

### **Core Course 12 : Cost Accounting**

**CO1:** Understand cost accounting methods and techniques

**CO2:** Prepare cost sheet and tenders.

**CO 3:** Familiarize the purchase, storing and issue procedures for materials.

**CO4:** Acquaint methods of remuneration for labour.

**CO5:** Distinguish allocation and apportionment of overheads and understand process costing procedures

### **Allied Course 1 : Accounting Principles and Practices –I**

**CO1:** Understand the basic accounting concepts, accounting rules.

**CO2:** Journalise the business transactions and post to Ledger accounts.

**CO3:** Prepare Trial Balance, Subsidiary Books and Final accounts of a sole trading concern

### **First Allied Course 2 : Accounting Principles and Practices –II**

**CO1:** Compute the various Methods of charging Depreciation and apply Single Entry System to maintain accou

nts.

**CO2:** Prepare Final accounts and accounts of Non Trading Concerns, Hire purchase and Installments system.

**CO3:** Prepare Branch accounting and departmental Accounting.

### **Second Allied Course – 1 Business Economics**

**CO 1:** Discuss and describe the origin of economic concepts, theory of production, problems, functions, economies of large scale production.

**CO2:** Understand the supply schedule, marginal and average Cost

**CO3:** Analyse the different forms of markets and price determination

### **Second Allied Course 2 : Marketing**

**CO1:** Understand an idea about Marketing and its functions

**CO2:** Analyse the Product Planning, Product Life Cycle and New Product Development

**CO 3:** Determine different kinds of Pricing for different products, analyse and evaluate the various Promotional tools and Distribution channels

### **Second Allied Course 3: Human Resource Management**

**CO1:** Outline the functions of HRM and understand the various stages of Selection and Recruitment

**CO2:** Analyse the various types of Interviews, Placement and Induction

**CO3:** Evaluate the different methods of training and various methods of Performance Appraisal

### **Major Based Elective 1 : Business Law**

**CO 1:** Understand the concepts of various Business Laws like contract, Sale of Goods.

**CO2:** Apply the various Legislations relating to Agency.

**CO3:** Describe the various aspects of insurance.

**CO4:** Describe the conceptual framework of Bailment and Pledge.

### **Major Based Elective 1 : Company Law (Alternative Paper)**

**CO1:** Describe the characteristics and kinds of companies.

**CO2:** Outline registration procedure and Alteration of Articles and Memorandum of Association.

**CO3:** Outline the appointments, duties, rights and liabilities of company secretary and Directors.

**CO4:** Describe provisions relating to allotment, issue and transfer of shares, debentures and deposit etc.

### **Major Based Elective 2 : Auditing**

**CO 1:** Define the important concepts and rules relating to Auditing.

**CO 2:** Understand the techniques of Internal audit and analyse the Valuation and Verification of assets and liabilities.

**CO3:** Analyse the Auditing of various types of Reserves and Provisions.

**CO4:** Examine the Investigation process and analyse the accounts and auditing of computerized accounts.

### **Major Based Elective 2 : Business Ethics**

**CO1:** Define the important concepts and benefits of business ethics.

**CO2:** Outline the legal provisions relating to customer duties and responsibilities and analyse the various ethical issues in HRM

**CO 3:** Evaluate the ethical issues in financial aspects of an Organisation

**CO4:** Analyse and Evaluate the aspects of CSR

### **Major Based Elective 3 : E-Commerce**

- CO1:** Understand the fundamentals of E-Commerce.
- CO 2:** Demonstrate various applications of E-Commerce.
- CO3:** Outline the concept of online marketing.
- CO 4:** Discuss the various security measures of E-Transactions.

### **Major Based Elective 3 : E-Banking**

- CO 1:** Identify the Basic E-Banking Concepts
- CO 2:** Utilize ATM Banking, Internet Banking and Mobile Banking Facilities.
- CO 3:** Demonstrate the Technical features of Debit cards and Credit Cards.
- CO 4:** Design an outline of Electronic Fund Transfer System.

### **Skill Based Elective 1 : Stock Market Practices**

- CO 1:** Discuss the structure of primary and secondary markets.
- CO2:** Outline the various functions of stock exchanges and explain various functions of OTCEI, NSE, BSE and analyse various indices.

### **Skill Based Elective 1 : Fundamentals of Investment (Alternative Paper)**

- CO1:** Understand and evaluate the various investment avenues based on different Analysis.
- CO2:** Analyse, evaluate and construct different Investment portfolios

### **Skill Based Elective 2: Principles of Insurance**

- CO 1:** Identification of various features of insurance and analysis of the Life Insurance Policy, its types and predict settlement of claims.
- CO2:** Understand the General Insurance policies and Motor insurance policies. Discuss various types of fire and marine insurances and understand the powers and functions of IRDA.

### **Skill Based Elective 2 – Financial Services (Alternative Paper)**

- CO1:** Recall innovative financial services, fund based and non-fund based services.
- CO 2:** Demonstrate the role of Financial Service Intermediaries as Merchant Banker, Issue Manager, Venture Capitalist

### **Skill Based Elective 3 : Non Banking Financial Institutions**

- CO1:** Discuss the role of NBFIs in the financial market and understand and analyze the structure and broad functioning of NBFIs.
- CO 2:** Understand the concepts of Money market, Hire purchase, leasing and mutual funds

### **Skill Based Elective 3: Customer Relationship Management (Alternative Paper)**

- CO 1:** Discuss relationship theory from the point of view of customers and the organization and evaluate the CRM implementation strategy.
- CO2:** Discuss the formulation and assessment of tactical CRM decisions for different stakeholders.

### **Non Major Elective 1 : Fundamentals of Book Keeping**

- CO1:** Understand and apply the basic concepts of Double Entry and Book Keeping like Journal, ledger, Subsidiary book, Cash book for a Business concern.
- CO2:** Apply the Accounting practices relating to preparation of Final Accounts of Sole Trader.

### **Non Major Elective 3 : Practical Banking**

- CO 1:** Understand the basic concepts of

banking, Analyse the features and operation of various types of Accounts.

**CO 2:** Evaluate the various aspects of Banking Instruments and Recent Trends in Net banking and Mobile Banking.

## **B.Sc. COMPUTER SCIENCE**

### **PROGRAMME SPECIFIC OUTCOMES**

**PSO 1:** Demonstrate technical expertise with the wide sphere of knowledge in multidimensional angle.

**PSO 2:** Proficient to design, develop and test software systems for providing innovative solutions to real life problems.

**PSO 3:** Create, select and apply appropriate techniques, tools and resources to cope up with the current scenario.

**PSO 4:** Function effectively as an individual or a team member or a leader in multi-disciplinary professional environments.

**PSO 5:** Capable of adapting to new technologies and constantly upgrading their skills with an attitude to engage in independent and lifelong learning in the broadest context of digital era.

### **COURSE OUTCOMES**

#### **Core Course 1: 'C' Programming**

**CO 1:** Understand the basic concepts of Programming

**CO 2:** Develop skills to program using Branching and Looping

**CO 3:** Understand the concept of arrays and strings functions.

**CO 4:** Understand the principles of user defined functions, concept of structures, unions, pointers and file management

**CO 5:** Write basic and advanced level of programming

#### **Core Practical 1 : 'C' and Java Programming**

**CO 1:** Understand the basic data types and statements in C

**CO 2:** Demonstrate the skill in writing functions and pointers in C programming

**CO 3:** Enumerate string handling and array functions

**CO 4:** Write efficient C programs for file handling

**CO 5:** Apply structure concepts to develop employee and student file system

#### **Cross Disciplinary Course : Radiation and Safety Management**

**CO 1 :** Understand the concepts, benefits and applications of OOP

**CO 2:** Explain data types and operators in Java

**CO 3:** Write programs for simple programs in Java

**CO 4:** Discuss concept of decision making, branching and looping statement and write programs

**CO 5:** Apply the concept of classes, objects, methods and interface

#### **Core Course 1 : Programming in Java**

**CO 1:** Apply the concept of control structures

**CO 2:** Develop the skills in writing programs using string functions, arrays

**CO 3:** Enumerate class, objects, constructors, overloading, overriding concepts

**CO 4:** Write efficient Java programs for one dimensional, two dimensional, nested methods and multithreading

**CO 5:** Apply inheritance, interface concepts to write programs

#### **Core Practical 1 : 'C' and Java Programming**

- CO 1:** Apply the concept of control structures
- CO 2:** Develop the skills in writing programs using string functions, arrays
- CO 3:** Enumerate class, objects, constructors, overloading, overriding concepts
- CO 4:** Write efficient Java programs for one dimensional, two dimensional , nested methods and multithreading
- CO 5:** Apply inheritance, interface concepts to write programs

### **Core Course 3 : Database Management System**

- CO 1:** Understand the basic concepts of DBMS
- CO 2:** Apply the skills of using RDBMS and SQL
- CO 3:** Develop skills to design database
- CO4:** Understand the concept of Normalization
- CO 5:** Understand the concepts of transaction controls and mechanisms in Database

### **Core Practical 2 :MySQL and PYTHON Programming**

- CO 1:** Understand the MySQL to create and alter the table
- CO 2:** Apply the skill to insert and delete records
- CO 3:** Use select clause, union, intersect, sum and count operations
- CO 4:** Write MySQL programs for group, min, max, grouping, inner and outer join operations
- CO 5:** Apply membership, views, sub queries and string operations

### **Non Major Elective 1 : Basic of Internet Concepts**

- CO 1:** Explain basic internet terminologies
- CO 2:** Identify Internet Protocols.
- CO 3:** Acquire knowledge about Browsers and search engine
- CO4:** Understand the concept of Normalization & understand the mail concepts and addressing through Email
- CO 5:** Learn E-mail protocols and structure

### **Skill Based Elective 1 : DHTML Programming**

- CO 1:** Understand the basic concepts of HTML
- CO 2:** Use XHTML to create and to add images to Web Pages
- CO 3:** Use the Dynamic HTML Object Model and Scripting to create dynamic Web Pages.
- CO 4:** Understand the notion of events, event handlers and event bubbling.
- CO 5:** Able to modify filters dynamically using DHTML

### **Core Course 4 : PYTHON Programming**

- CO 1:** Understand the basics, history, operators of programs and problem solving techniques in Python
- CO 2:** Apply the concepts of control structures, functions and modules
- CO 3:** Develop skills to write string functions and file handling techniques
- CO 4:** Apply various data structures to write programs
- CO 5:** Develop skills to write programs using classes and object in Python

### **Core Practical 2 :MySQL and PYTHON Programming**

- CO 1:** Develop programs using some basics of Python

**CO 2:** Apply Looping statements and recursive functions in Python

**CO 3:** Develop programs using command line, strings and files

**CO 4:** Write programs to display directory, various operations on file such as counting of characters, words and lines, finding GCD, LCM and Palindrome

**CO 5:** Develop programs for Matrix operations, checking prime numbers, sum of natural numbers and dictionary operations.

### **Non Major Elective 2 : E-Learning**

**CO 1:** Possess a basic idea on the understanding of e-learning methodologies and ways to deal with delivery of e-contents

**CO 2:** Designing learning objectives, analyzing the target audience and defining the delivery and evaluation strategy

**CO 3:** Gain insights into preparation and presentation tools , authoring tools with the right courseware content

**CO 4:** Develop the documentation skills and skills of facilitating the audience, communication skills and e-learning and open source platform skills required.

**CO 5:** Prepare themselves for Collaborative learning and to learn the Moodle and other open source solutions. Evaluation of the impact of e-learning is carried out.

### **Skill Based Elective 2 : Image Editing Tools**

**CO 1:** Describe the fundamentals of images and basic tools.

**CO 2:** Ability to use the Painting tools effectively.

**CO 3:** Ability to use the Editing tools effectively

**CO 3:** Ability to use the Editing tools effectively

**CO 4:** Ability to use the Selection tools effectively

**CO 5:** Ability to use the Layers effectively

### **Core Course 5 : Principles of Operating Systems**

**CO 1:** Understand the basic concepts and terminologies

**CO 2:** Understand the different approaches in memory management

**CO 3:** Understand about the process and how processes are synchronized and scheduled

**CO 4:** Conceptualize the classic problems of synchronization

**CO 5:** Know about the measures involved in security and protection

### **Core Course 6 :Data Structures and Algorithms**

**CO 1:**Understand the fundamental concepts of data structures

**CO 2:** Learn skills to understand the concepts of Linked Lists.

**CO 3:** Understand and learn about the non-linear data structure concepts

**CO 4:** Work with graph traversals and to find out the shortest path.

**CO 5:** Executing searching and sorting algorithms.

### **Core Course7 : Microprocessor and Applications**

**CO 1:** Understand the Microprocessor Intel 8085 and its Configuration

**CO 2:** Learn the concept of Instruction set of Intel 8085

**CO 3:** Write basic Assembly Language Program

**CO 4:** Understand the Microprocessors, their programming and interfacing, interfacing circuits and devices, peripherals.

**CO 5:** Understand the knowledge of ADC and DAC concepts.

### **Core Practical 3 : Operating Systems**

**CO 1:** Handle Vi editor to identify the structure and Syntax of the basic commands of Linux OS

**CO 2:** Demonstrate the Linux OS Commands for Creating and testing the files and directories

**CO 3:** Implementation of Operating System concepts of various CPU Scheduling techniques

**CO 4:** Implementation of Operating System concepts of various Memory Allocation techniques for memory Management in multiprocessing environment.

**CO 5:** Implementation and testing of Operating System concepts of Sequential and Random access file processing.

### **Major Based Elective 1 : Computer Graphics**

**CO 1:** Ability to describe about the basic graphics applications, animations, input, display devices

**CO 2:** Describe the properties of output primitives and algorithms for drawing line and circle

**CO 3:** Ability to demonstrate 2D geometric transformations and clipping algorithms

**CO 4:** Define the 3D transformations and Logical classification of Input devices

**CO 5:** Describe three-dimensional display methods and design of animation sequences

### **Skill Based Elective 3 : .NET Programming**

**CO 1:** Understand the benefits, history and managing states of ASP.NET

**CO 2:** Learn and apply the concept of standard, navigations controls

**CO 3:** Learn apply validation controls

**CO 4:** Apply the skills to develop using login controls and web part controls

**CO 5:** Understand the concepts working databases using ADO.NET, creation of Master pages and themes

### **Core Course 8 : Basic Computer Networks**

**CO 1:** Understand the basic concepts of networks and their topologies

**CO 2:** Learn the various protocols, switches and routers needed

**CO 3:** Explain the various network protocol standards and TCP/IP framework

**CO 4:** Understand IP addresses, routers and subnet and their works

**CO 5:** Executing searching and sorting algorithms.

### **Core Course 9 : Programming in PHP**

**CO 1:** Understand the PHP scripts, history and features

**CO 2:** Learn and apply the concept of control structures

**CO 3:** Write Program using arrays

**CO 4:** Apply the skills to write programs using files and directories

**CO 5:** Understand the concepts working databases using SQL

### **Core Practical 4 : Programming in PHP**

**CO 1:** Find factorial, if-else, switch statements

**CO 2:** Write programs using while and do-while, multi dimensional array and user defined functions

**CO 3:** Create Multiplication table, string, numeric functions and design web page for age calculation

**CO 4:** Write program to download file from server, Working with cookies, page views count in session

**CO 5:** To design calculator, web page creation for authentication using PHP and MySQL

### **Major Based Elective 2 : Cloud Computing**

**CO 1:** Understand the basic concepts cloud and their applications

**CO 2:** Explain the network connectivity and architecture of cloud

- CO 3: Explain the network connectivity and applications using cloud
- CO 4: Learn different cloud environment for setting up cloud models
- CO 5: Understand the various types of services for cloud applications

### **Major Based Elective 3 : Basics of Software Development**

- CO 1: Ability to describe about the basics of Software Engineering and its ethics
- CO 2: Describe software process models for designing the software
- CO 3: Describe Agile Software Development methods
- CO 4: Define the concepts of user and system requirements
- CO 5: Demonstrate skills for software development by design and testing of a software product

## **B.A. ECONOMICS**

### **PROGRAMME SPECIFIC OUTCOME**

- PSO 1 Identify the recent trends in Economics which enhance them to appear for the competitive Examinations.
- PSO 2 Prepare the students for higher studies and research programmes.
- PSO 3 Create awareness about the managerial and entrepreneurial skills for self employment.
- PSO 4 Utilize the students for selfless services on nation building activities.

### **COURSE OUTCOMES**

#### **Core Course :1 Elementary Theories of Demand and Supply**

- CO 1 :Acquire knowledge in the basic concepts of Micro economics.
- CO 2 : Analyze the theories of demand and supply.
- CO 3: Discuss the importance of factors of production.
- CO 4: Demonstrate economic tools that are the foundation for analyzing other courses.
- CO 5: List out the types of cost.
- CO6: Write economies of scale, diseconomies of scale and constant returns to scale.

#### **Core Course :2 Value and Distribution**

- CO 1: Analyze the value determination in different market structure.
- CO 2: Identify the various types of markets.
- CO 3: Interpret charts, graphs and tables on pricing decisions under various market conditions.
- CO 4: Demonstrate price determination under monopolistic competition and Oligopoly.
- CO 5: Understand the difference between the classical and modern theories of distribution.
- CO 6::Organize the various theories of factors of production in the Production function.

#### **Core Course :3 Indian Economic Development-I**

- CO 1: Acquire Knowledge in the nature and structure of Indian economy.
- CO 2: Identify the inputs and strategies related to green revolution.
- CO 3: Evaluate the various population policies in India.
- CO 4: Infer the importance of agriculture and create economic consciousness in primary sector.
- CO 5: Interpret the role of agricultural marketing.
- CO 6: Examine the significance of regulated markets in agricultural marketing.

#### **Core Course :4 Evolution of Economic Doctrines**

- CO 1: Understand the importance of Economic thought.
- CO 2: Connect the evolution of economic ideas in response to economic problems.

- CO 3: Recognize the significance of economists ideas in building the economy.
- CO 4: Compare the ideas and theories in relations to other economic ideas.
- CO 5: Identify and relate the major ideas associated with contemporary economic thinking.
- CO 6: Acquire knowledge in Indian Economic thought.

#### **Core Course :5 Indian Economic Development – II**

- CO 1: Illustrate the various components of Indian Economy.
- CO 2: Differentiate the small scale and large scale industries.
- CO 3: Describe the new industrial policy.
- CO 4: Discuss the major development of Transport sector.
- CO 5: Compare the role of Industrial and Service sector in Indian economy.
- CO 6: Recognize significance of LPG in the Indian economic development.

#### **Core Course : 6 Health Economics**

- CO 1: Understand the health concepts and health indicators.
- CO 2: Discuss the institutional framework for health care.
- CO 3: Explain the availability and accessibility of public and private health care services.
- CO 4: Analyze the various stages of Planning process and Cost- Benefit analysis of Health.
- CO 5: Utilize the health expenditure system and policies of State and Central government.
- CO6: List the Nutritional Requirements for Women throughout life.

#### **Core Course : 7 Principles of Money**

- CO 1: Trace the evolution and functions of money in the economy.
- CO 2: To determine the Rate of exchange.
- CO 3: Assess the value of money.
- CO 4: Compare quantity theories of money.
- CO 5: Classify the various types of rate of exchange.
- CO 6: Assess the role of money market in Indian economy.

#### **Core Course : 8 Macro Economics**

- CO 1: Apply Macro Economic concepts and variables in practical life.
- CO 2: Relate the macro economic theories in real life.
- CO 3: Understand the application of consumptions and saving theories.
- CO 4: Recognize the role of business cycle in economy.
- CO 5: Classify the types of Inflation.
- CO 6: Evaluate Macro Economic policies

#### **Core Course 9 : Environmental Economics**

- CO 1: Comprehend the basic concepts of environmental economics.
- CO 2: Relate the environment and economic system.
- CO 3: Identify the social welfare function.
- CO 4: Create awareness about types, effects of pollution and pollution control.
- CO 5: Defend the environment for sustainability.
- CO 6: Analyze the role of forest in the environmental quality.

#### **Core Course 10 : Principles of Public Finance**

- CO 1: Understand the sources of finance both public and private.
- CO 2: Acquire the knowledge in roles and functions of the government.

- CO 3: Analyze and apply the different theories of taxation.
- CO 4: Compare the various kinds of taxes in mobilizing the public revenue.
- CO 5: Compare shifting and incidence.
- CO 6: Assess the system of tax administration in India.

### **Core Course 11 : Principles of Banking**

- CO 1: Recognize the basic concepts and principles of banking.
- CO 2: Understand the balance sheet and credit creation.
- CO 3: Intercept the policies of the central and commercial bank.
- CO 4: Examine the policies of the government and the Reserve Bank of India.
- CO 5: Explain the monetary policies.
- CO 6: Summarize the functioning of money and capital markets.

### **Core Course 12 : Tamil Nadu Economic Development**

- CO 1: Enhance the students to get knowledge about Tamil Nadu's Geographical feature.
- CO 2: Analyze strengths and weaknesses of Tamil Nadu's Agricultural pattern and marketing.
- CO 3: Acquire knowledge on the role of Industrial sector in Tamil Nadu.
- CO 4: Understand the process of growth of various sectors in Tamil Nadu.
- CO 5: Solve the specific economic issues pertaining to the region.
- CO 6: Explain the various Health and Environmental issues in Tamil Nadu.

### **Core Course 13 : Public Finance in Practice**

- CO 1: Comprehend basic concepts of Public Expenditure.
- CO 2: Classify the Public Debt.
- CO 3: Evaluate the various kinds of Budget.
- CO4: Discuss the Centre and State Financial Relationship.
- CO5: Examine the Fiscal Policy in India.
- CO6: Organize various Fiscal Policy theories.

### **First Allied Course 1 :Marketing**

- CO 1: Get knowledge of the basic concepts of marketing.
- CO 2: Analyze the role of retailers in the channels of distribution.
- CO 3: Discuss the types of wholesaler in marketing.
- CO 4: Acquire knowledge in product lifecycle and branding.
- CO 5: Differentiate packaging and Labelling.
- CO6: Summarize the role of marketing in the development of economy.

### **First Allied Course 2 :OrganisationalBehaviour – I**

- CO 1: Assess the nature and scope of organizational behavior.
- CO 2: Develop the skills required for organizational development.
- CO 3: Discuss the various theories of motivation.
- CO 4: Understand and improve the interpersonal behaviour through transactional analysis.
- CO 5: Describe the difference between a leader and manager.
- CO6: Compare the various leadership styles in the organization.

### **First Allied Course 3: Salesmanship and Advertising**

- CO 1: Acquire knowledge in the basic concepts of salesmanship and advertising.
- CO 2: Apply the skills of salesmanship and advertisement in marketing.

- CO 3: Analyze the various methods of training.
- CO 4: Evaluate the sales techniques through personal selling, advertising and media marketing.
- CO 5: Enumerate the importance of advertising agency.
- CO 6: Discuss the role of indoor and outdoor advertising in the sales promotion.

### **Second Allied Course 1 :OrganisationalBehaviour – II**

- CO 1: Understand how power emerges in an organization.
- CO 2: Design the different types of communication essential for business.
- CO 3: Illustrate various skills essential for the management of the organization.
- CO 4: Assess the significance of the counselor in settling professional conflicts at various level.
- CO 5: Analyse the various factors in resistance to change.
- CO 6: Discuss the role of OD Interventions in Team Building.

### **Second Allied Course 2: Economic Statistics –I**

- CO 1: Acquire knowledge in various concepts of statistical tools.
- CO 2: Distinguish classification and tabulation.
- CO 3: Interpret the average value by using mean, median and mode.
- CO 4: Differentiate the various type of measures of variation.
- CO 5: Evaluate the strategies and shortcomings of statistical problems.
- CO 6: Apply various statistical tools in economic theories.

### **Second Allied Course 3: Economic Statistics -II**

- CO 1: Acquire knowledge in the various concepts of statistical tools.
- CO 2: Compute various statistical methods in Economics.
- CO 3: Differentiate the correlation and regression.
- CO 4: Discuss the uses and classification of index numbers.
- CO 5: Evaluate the strategies and shortcomings of statistical problems.
- CO 6: Analyse the measurement of trend by using graph, semi-average, moving average and method of least square.

### **Major Based Elective 1 :Mathematical Methods in Economics**

- CO 1: Able to perform basic computations in higher mathematics.
- CO 2: Acquire the knowledge in quantitative techniques to solve economic problems.
- CO 3: Apply the mathematical methods in economic theory.
- CO 4: Compile and apply the mathematical tools for profit maximization and cost minimization.
- CO 5: Apply the tool of Matrix Algebra to find solution to the problems of addition, subtraction, multiplication and determinants.
- CO 6: Formulate the set operations on numbers and equations.

### **Major Based Elective 2 : Consumer Economics**

- CO 1: Acquire broad and deep knowledge of Consumer Economics.
- CO 2: Relate the practical Knowledge in Consumerism.
- CO 3: Analyze various theories of Consumption Function.
- CO 4: Create awareness of various business malpractices.
- CO 5: Identify the various consumer organizations to protect the Consumers.
- CO 6: Explain the role of consumer education in consumer protection.

### **Major Based Elective 3 : International Economics**

- CO 1: Compare various theories of International trade.

- CO 2: Discuss the basic principles in governing the global trade.
- CO 3: Analyze the importance of IMF and NIEO for the promotion of International trade.
- CO 4: Show the terms and conditions of Free Trade, Tariffs and Quotas.
- CO 5: Explain Balance of Trade and Balance of Payment.
- CO 6: Examine the importance of International trade in Economic Development.

#### **Non-Major Based Elective 1 :Basics of Insurance**

- CO 1: Identify the different needs for policy coverage of insurance.
- CO 2: Describe the basic concepts of Insurance.
- CO 3: Analyse the Risk Insurance Management Process.
- CO 4: Utilize the various kinds and types of insurance organizations existing in the economy.
- CO 5: Classify various types of insurance and their functions.
- CO 6: Prepare to take up position as a insurance agent and development officers.

#### **Non-Major Based Elective 2 :Economics for Competitive Examinations**

- CO 1: Discuss the basic concepts of Micro Economics.
- CO 2: Describe the price and output determination under perfect competition.
- CO 3: Understand the Keynesian theory of Employment.
- CO 4: Apply the knowledge of Economics to clear competitive examinations.
- CO 5: Classify the various type of market.
- CO 6: Apply Macro Economic concepts and variables in real life.

#### **Skill Based Elective 1 : Economics of Small Business**

- CO 1: Understand basic economic concepts used in Small Business.
- CO2: Identify the various sources of finance.
- CO3: Analyze the role of DIC for the growth of Small Enterprise.
- CO4: Acquire knowledge of the Marketing Feasibility.
- CO5: Demonstrate the strategies of new product in market.
- CO6: Evaluate and outline the emerging trends in Marketing.

#### **Skill Based Elective 2 : Economics of Entrepreneurship**

- CO 1:Recognize the concept, qualities and functions of an Entrepreneur.
- CO 2: Analyze the importance and problems of Entrepreneurs.
- CO 3: Identify the different Business opportunity.
- CO 4: Evaluate the process of Project identification.
- CO 5: Demonstrate the role of various promotional agencies.
- CO 6: Analyze the importance of Industrial Estates in development of Entrepreneurs.

#### **Skill Based Elective 3 : Fundamentals of Sociology**

- CO 1: Define and discuss the basic concepts of sociology.
- CO 2: Explain the nature and types of society, identify the types of social groups, meaning of culture.
- CO 3: Apply the social research techniques for the study of social issues. Appreciate the values of family, society, social institutions and socialization.
- CO 4: Outline the meaning and importance of social institutions, Categorize the various social institutions. Define socialization and social groups, demonstrate the need and importance of Socialization.
- CO 5: Explain social disorganization, List various social problems in India and analyze the causes for social problems.

## **B.A. ENGLISH**

### **PROGRAMME SPECIFIC OUTCOMES**

**PSO 1** Understand and appreciate the nuances of English language and literature

**PSO 2** Demonstrate the knowledge of LSRW skills

**PSO 3** Communicate in English language effectively

**PSO 4** Plan to pursue various specialization courses successfully

**PSO 5** Write accurately in English for career examinations

### **Core Course 1 : Indian Writing in English I**

**CO1:** Recognize and discuss the growth and development of Indian Writing in English

**CO2:** Identify the contribution made by representative Indian writers

**CO 3:** Demonstrate their knowledge about the issues and concerns of the area of Indian writing in English

**CO4:** Analyze the works of the Indian novelists and their works

**CO5:** Evaluate Indian ethos, and the uniqueness of Indian values that underlies such contributions

### **Core Course 2 : Indian Writing in English-II**

**CO1:** Recognize the heterogeneous mixture of Indian tradition and culture as revealed in Indian Writing in English

**CO2:** Enumerate and discuss different genres of writing

**CO3:** Interpret the texts and compare major and emerging writers of Indian Writing in English

**CO4:** Analyze text critically

**CO5:** Develop creativity in writing

### **Core Course 3 : British Literature-I (Chaucerian, Elizabethan and Augustan Age)**

**CO 1:** Demonstrate the understanding of the spirit of Chaucerian, Elizabethan and Augustan age

**CO2:** Assess the English society of each age

**CO3:** Analyze the representative literary works of each age

**CO4:** Assess the literary genres of the each age

**CO5:** Evaluate the seminal works of each period

### **Core Course 4 : Phonetics and Spoken English**

**CO1:** Demonstrate advanced pronunciation skills to speak English well

**CO2:** Exhibit complete knowledge of Phonemes in English language

**CO3:** Transcribe into Orthographic and Phonemic scripts

**CO4:** Apply word accent, sentence accent, rhythm and intonation in speech that will enhance their professional skills

**CO5:** Demonstrate the proficiency acquired in workplaces like, Educational institution, Mass Media, BPOs and KPOs.

### **Core Course 5: British Literature-II (Romantic and Victorian Age)**

**CO1:** Identify, and explain the spirit of the Romantic age and the Victorian age

**CO2:** Understand the Victorian attitude

**CO3:** Interpret the seminal works each period

**CO4:** Analyze the representative literary works of each age

**CO5:** Assess the English society of the respective Ages

### **Core Course 6: Linguistics**

- CO 1:** Exhibit the knowledge of the basic concepts of structures in the English Language
- CO2:** Apply the knowledge of Morphology, Semantics, Syntax of English language
- CO3:** Interpret and analyse words and sentences
- CO4:** Use English Language effectively in both the spoken and written medium
- CO5:** Evaluate the social context & diversity of English Language

### **Core Course 7: British Literature-III (Modern Age)**

- CO1:** Demonstrate the understanding of the spirit of the Modern age
- CO2:** Assess the seminal works of the period
- CO3:** Analyze the representative literary works of the age
- CO4:** Analyze the cultural experiences of the age as represented in the prescribed texts
- CO5:** Evaluate the various genres of modern age English literature

### **Core Course 8: Shakespeare**

- CO1:** Analyze the poetry of Shakespeare
- CO2:** Explain the thematic and technical aspect of Shakespeare plays
- CO3:** Demonstrate the knowledge of Elizabethan theatre and audience
- CO4:** Analyze the heroes and their tragic flaws
- CO5:** Thematic analysis of Shakespeare's plays, poems and sonnets

### **Core Course 9: American Literature**

- CO1:** Trace the evolution of American civilization
- CO 2:** Outline the history of America
- CO3:** Demonstrate knowledge of American history and Culture
- CO4:** Analyze and appreciate the seminal works in American Literature
- CO 5:** Describe the main currents of developments in American Literature
- CO6:** Categorize works of writers according to American History
- CO7:** Assess contributions made by the American writers to American Literature

### **Core Course 10: Postcolonial Writing in English**

- CO1:** Evaluate the literatures in English written by non-native speakers of English
- CO2:** Analyze the cultural experiences represented in these texts
- CO 3:** Analyze the social and political experiences represented in these texts
- CO 4:** Estimate the creative fusion of Native and English literary traditions found in Postcolonial Literatures in English
- CO 5:** Apply the literary devices used in Postcolonial Literatures
- CO6:** Identify the salient features of literary works of Postcolonial nations
- CO 7:** Learn the literary tradition of postcolonial nations

### **Core Course 11: World Classics in Translation**

- CO 1:** Recognize the cultural and historical backgrounds of various societies or civilizations of the past
- CO 2:** Exhibit knowledge of classical mythology
- CO 3:** Apply the style and language of the canonical literatures of the Classical languages around the world
- CO4:** Demonstrate the differences between Oriental and Western literary landscapes
- CO5:** Apply the knowledge in further research in branches of literature like Comparative Literature

### **Core Course 12: Women's Writing**

- CO 1:** Analyze the oeuvre of literary writings in English by women
- CO2:** Identify and analyze many and varied voices of women silenced down the ages
- CO3:** Demonstrate new perspectives on various women's issues
- CO 4:** Evaluate attitudes of life realities arising out of gender discrimination
- CO5:** Recognize and discuss aspects of women's writing

### **Core Course 13: Principles of Literary Criticism**

- CO1:** Understand and appreciate evolution of English critical tradition.
- CO2:** Analyze the works of famous critics of Literature
- CO 3:** Appreciate the critical contribution made by prominent critics from the 16<sup>th</sup> century to twentieth century
- CO4:** Apply the knowledge of literary history and literary tradition
- CO5:** Apply the knowledge in further research in various branches of literature

### **First Allied Course 1: Social History of England**

- CO1:** Trace the evolution of literature and discuss the Social history of England
- CO2:** Demonstrate a comprehensive understanding of the political, social, economic and cultural history of England
- CO3:** Apply the background study to comprehend literary texts in English Literature
- CO4:** Analyze and understand the implications of the social History of England
- CO5:** Discuss the impact of various revolutions of England in English literature

### **First Allied Course 2: Rhetoric and Composition**

- CO1:** Explain the basic rules of grammar
- CO2:** Apply the rules of grammar to write grammatically correct English
- CO3:** Analyze various rhetorical styles of writing
- CO4:** Distinguish different kinds of composition
- CO5:** Write different kinds of composition

### **First Allied Course 3: History of English Literature–I**

- CO 1:** Demonstrate a comprehensive knowledge of the representative English writers and literary works from the Age of Chaucer to Pope.
- CO2:** Demonstrate the various trends in English Literature
- CO3:** Apply the knowledge acquired for preparing for UGC Examinations
- CO4:** Train to know the outline history and the background of English Literature
- CO5:** Recognizing the literary techniques of the representative English writers.

### **Second Allied Course 1 : Literary Forms**

- CO1:** Demonstrate the various genres of English Literature
- CO2:** Demonstrate the knowledge of various literary terms
- CO3:** Apply the nuances of literature
- CO4:** Train to differentiate and describe the characteristics of the major literary forms in Prose, Poetry, Drama and Fiction
- CO5:** Recognize the salient features of literary Texts

### **Second Allied Course 2: History of English Literature–II**

- CO1:**Demonstrateacomprehensiveknowledgeofthe representative English writers and literaryworksfromtheAgeofJohnsontothe Presentage
- CO2:**DemonstratethevarioustrendsinEnglishliterature
- CO3:**ApplytheknowledgeacquiredforpreparingforUGCExaminations
- CO4:**TraintoknowtheoutlinehistoryandthebackgroundofEnglishLiterature
- CO5:**Recognizetheemerging,contemporaryEnglishwriters

**Second Allied Course3: WorldLiteraturesthroughShortStories**

- CO1:**DemonstratetheknowledgeofWorldLiteratures
- CO2:**EvaluateshortstoriesinEnglishfromdifferentcountries
- CO3:**Assessthevariedculturalexperiencesrepresentedinthesetexts
- CO4:**Comparethefunctioningofdifferentsocietiesacrossthe world
- CO5:**Assessthesocialconditionofthepeoplethroughthesetexts

**MajorBased Elective 1: EnglishLanguageTeaching**

- CO 1:** Explainthe background ofEnglishLanguageTeaching
- CO2:**Explainthe basicprinciplesunderlyingEnglishLanguageacquisitionand EnglishLanguagelearning
- CO3:**AdopttheteachingtechniquesforEnglish asasecondLanguage attheSecondarylevel
- CO 4:**Prepareanduseteaching aidsforclassroomteaching
- CO5:**Applymethodologiesforofflineand onlineteaching
- CO6:** Applythefundamentaltechniques ofevaluation
- CO7:** ApplytheevaluationtechniquesintheESLClassroom

**MajorBased Elective1: IntroductiontoComparativeLiterature**

- CO 1:** Demonstratebasicconceptsof ComparativeLiterature
- CO2** ApplytheconceptsofComparativeLiterature
- CO 3** Apply the knowledge of the study ofComparativeLiterature
- CO4**Analyse the problems and Techniques in ComparativeStudies.
- CO5**BecomeComparatists.

**MajorBased Elective2: Translation forBeginners**

- CO1:**Explain theconcept oftheprocess oftranslation
- CO2:**Demonstratethebilingualcompetenceandtranslationskills
- CO3:**Analysetheproblemsandconstraintsofthetranslator
- CO4:**Translateverse,couplets,passages,shortstoriesfromEnglishto Tamil and vice-versa
- CO5:**Evaluatetherelevanceoftranslationinthe multilingualcontext

**MajorBased Elective2: Basic Translation forVocationalPurposes**

- CO1:**Acquireknowledgeinfindingequivalentwordsandterms
- CO2:**Explainthethematicandtechnicalaspectsofthetranslation
- CO3:**Analyseandappreciateliteraturesofvarious Languages
- CO4:**Analyserelevanceoftranslationinmulti-lingual Context
- CO 5:** Apply the background study in the process oftranslation

**MajorBased Elective 3: Journalism-Theoryand Practice**

- CO1:**DemonstratethebasicconceptsofJournalism
- CO2:**Demonstratetheartofwritingheadlines,features,articlesand leads
- CO3:**ApplythetechniquesofJournalisticcommunicationandJournalistic writing

**CO4:** Train to report news for print media and electronic media

**CO5:** Recognize the emerging trends of journalism

### **Major Based Elective 3: English for Mass Media**

**CO1:** Demonstrate the basic concepts of mass media

**CO2:** Train to report news for print media and electronic media

**CO3:** Apply the techniques of Journalistic communication and Journalistic writing

**CO4:** Recognize the emerging trends of mass Media

**CO5:** Acquire professional skills and abilities

### **NonMajor Elective 1: English for Competitive Examinations**

**CO 1:** Acquire sub-skills related to LSRW skills for acquiring jobs

**CO 2:** Enhance learner's skills to understand the concepts pertaining to competitive exams

**CO 3:** Focus on the English language skills which incorporate grammar, vocabulary and comprehension

### **NonMajor Elective 2: English for Occupational Needs**

**CO1:** Assess and evaluate the modalities of using English Language for professional communication

**CO2:** Use English effectively for communicating in English both in the spoken and written medium

**CO3:** Apply English knowledge in business Endeavor

**CO4:** Demonstrate knowledge in the Advertisement sector

**CO5:** Apply knowledge at workplace

### **Skill Based Elective 1: Listening and Speaking Skills – Practical**

**CO1:** Improve ability to understand and comprehend verbal information

**CO2:** Communicate ideas and knowledge more effectively

**CO3:** Develop the various skills of listening that are useful in the classroom

**CO4:** Expand the vocabulary to enhance Proficiency

**CO5:** Understand the concept and theories of Communication

### **Skill Based Elective 1 English Pronunciation Practice – Practical**

**CO1:** Identify and produce English key sounds as well as its basic rhythm, stress and intonation patterns in context

**CO2:** Get basic on English pronunciation

**CO3:** Learn how to pronounce English sounds and undertake fluent oral ability

**CO 4:** Learn about topics such as problems

in pronunciation, how speech organs work, sounds in English including consonants and vowels, and Intonation

**CO 5:** Acquaint with domain English pronunciation theoretically and practically

### **Skill Based Elective 2 : Reading and Vocabulary Skills**

**CO1:** Discuss word relationships and use dictionaries

**CO2:** Demonstrate efficacy in comprehending ideas

**CO3:** Analyse different styles of reading

**CO4:** Choose more appropriate words while communicating

**CO5:** Develop effective communication skills in English

### **Skill Based Elective 2 : Grammar and Writing Skills**

**CO1:** Discuss word relationships and use dictionaries

**CO2:** Demonstrate efficacy in comprehending ideas

- CO3:Analysedifferentstylesofreading
- CO4:Choosomoreappropriatewordswhilecommunicating
- CO5:Developeffectivecommunicationskillsin English

### **SkillBasedElective 3: CollegeWritingSkills**

- CO 1: Demonstrate the nature of writing foracademicpurposesandhonetheirskillsinwriting.
- CO2:Demonstratetoadapt properdictionandlearnitspurposetogainacademicwriting.
- CO3:Applythetechniquesof Journalistic communicationand Journalisticwriting
- CO4:Train to acquireknowledgeon the mechanicsofwriting.
- CO5:Recognizetoincorporatecriticalthinking inallstepsofthe writing process

### **SkillBasedElective3: EmployabilitySkills**

- CO1:Demonstrateemployabilityskillsandprofessionalattributes
- CO 2: Demonstrate creative ability, criticalthinkingandeffective communicationskills
- CO3: Applythegatheredinformationbyrelatingemploymentopportunities
- CO4:Traintoacquiretheskills foremploymentProspects
- CO5:Trainotherstoacquireemployabilityskills.

## **B.A. HISTORY**

### **PROGRAMME SPECIFIC OUTCOMES**

- PSO 1: Secure admissions in B.Ed., B.L., M.A.,MSW, Sociology, Public Administration, Political Science, Journalism, International Relations etc. Ensuring Horizontal and Vertical progress
- PSO 2: Acquire knowledge about neighbouring countries and the other countries in the world
- PSO 3: Understand human progression in all fields
- PSO 4: Acquire knowledge on contemporary history and current affairs
- PSO 5: Acquire the ability to critically think and examine the discipline of History
- PSO 6: Serve as faculty in schools

### **COURSE OUTCOMES**

#### **Core Course 1: History of India upto 1206 C.E.**

- CO1: Identify and indicate the developments in early Civilizations.
- CO 2: Discuss the features of Mauryan, Gupta administration.
- CO 3: Demonstrate the importance of Ahimsa and tolerance in to-day's society.
- CO 4: Analyze the impact of Muslim invasion on India.
- CO 5: Analyze and appraise the rich cultural heritage of India in terms of values, beliefs, & traditions.

#### **Core Course 2 : History of India 1206 - 1761 C. E.**

- CO 1: Outline the key features of the different dynasties of the Delhi Sultanate, Vijayanagar and Mughals.
- CO 2: Explain and assess the reasons for the emergence of the Vijayanagar, Bahamani kingdoms and Marathas.
- CO 3: Compare and contrast the Administrative system of the given dynasties.
- CO 4: Estimate and assess the contribution of Sulatanate, Vijayanagar and Mughals to literature, art and architecture.
- CO 5: Use the moral values taught by the Saints of the Bhakti movement to become better Individuals, assess the impact of Islam on Indian Society.

#### **Core Course 3 : History of India 1762 – 1858 C.E.**

**CO 1:** Trace the advent of the Europeans, discuss the system of trade and commerce, dramatize the emergence of British in India

**CO 2:** Sketch the consolidation of Indian territories under British. Estimate the Company rule in India.

**CO 3:** Define the policies of the British on Society and Economy. Critically analyze and reflect on the economic policies of the Company.

**CO 4:** Identify the reaction to the British rule. Assess the impact of 1857 Mutiny on India.

**CO 5:** Indicate the social evils in the Indian society. Appraise the importance of Socio-Religious reform Movements.

#### **Core Course 4 : History of Tamil Nadu up to 900 C.E.**

**CO 1:** List the sources of Ancient Tamil Nadu. Arrange the various dynasties and rulers of Ancient Tamil Nadu.

**CO 2:** Outline the Polity, society and economy of Ancient Tamil Nadu. Appraise the trade contact with other countries.

**CO 3:** Determine the contribution of ancient Tamils to Literature and temple architecture. Outline the origin and growth of Bhakti Movement

**CO 4:** Arrange chronologically the various rulers in the Pallavas and Pandya dynasties. Discuss the polity and society under the above said dynasties.

**CO 5:** Demonstrate knowledge on the rich and hoary past of Tamil Nadu. Assess the contribution of Tamils to Indian Culture.

#### **Core Course 5 : History of India 1858 - 1947 C.E.**

**CO 1:** Outline the British rule under Crown, and sketch their administrative policies, Trace the evolution of constitution,

**CO 2:** Define nationalism and discuss the factors giving rise to nationalism. Appraise the role of early nationalists.

**CO 3:** Dramatize the oppressive, divide and rule diplomacy of the British, Infer the Indian reaction.

**CO 4:** Sketch the growth of Nationalism under Gandhiji. Estimate the role of important leaders and their ideologies for India's Independence.

**CO 5:** Examine the development of Communalism in India. Comprehend the various phases of freedom struggle.

#### **Core Course 6 : History of Tamil Nadu 900 - 1565 C. E.**

**CO 1:** List out and review the source for the study of Medieval Tamil Nadu.

**CO 2:** Outline the genealogy of rulers in the given dynasties. Distinguish the features of Chola, Pandya and Vijayanagar administration.

**CO 3:** Compare and classify the architecture of Cholas, Pandyas and Vijayanagar.

**CO 4:** Summarize the establishment and influence of Vijayanagar rule in Tamil Nadu.

**CO 5:** Explain the foundation of Nayak rule in Tamil Nadu.

#### **Core Course 7 : History of India 1947 – 1989 C.E.**

**CO 1:** Trace the problems of Independent India, Illustrate the process of Integration and estimate the role of Patel.

**CO 2:** Discuss the linguistic reorganization of states, and appraise the ideology of India's foreign policy.

**CO 3:** Illustrate the economic ideology of Nehru and critically analyze the economic development in contemporary India

**CO 4:** Sketch the internal problems of India, evaluate the Indian democratic politics, Assess the role of India in International politics.

**CO 5:** Assess the advancement of science and technology. Outline the role of Leaders in shaping India since Independence.

**Core Course 8 : History of Tamil Nadu 1565 - 1800 C.E.**

**CO 1:** List the genealogy of rulers in the Madurai Nayaks and Marathas, discuss their administrative system, Explain the features of Polegar system

**CO 2:** Appraise the contribution of Nayaks of Madurai and Marathas of Thanjavur to art and literature.

**CO 3:** Draw the advent of Europeans and sketch the establishment of British in Tamil Nadu.

**CO 4:** Trace the emergence of Christian Missionaries, assess the role of Priests, analyze the activities of Christian Missionaries.

**CO 5:** Validate the solidarity shown by Tamils against British.

**Core Course 9 : Intellectual History of Modern India**

**CO 1:** Outline the contribution of Modern Indian intellectuals on various fields. Relate the role of modern ideologies in the development of India

**CO 2:** Identify the social evils and summarize the part played by the reformers to eradicate it.

**CO 3:** Interpret the Economic ideologies of the Indian economists. Critique the major trends in Modern Indian intellectual thoughts.

**CO 4:** Assess the Role of thinkers and reformers in uplifting women and backward people.

**CO 5:** Appreciate the contribution of Literarians. Review the select writings of intellectuals of Modern India.

**Core Course 10: History of USA 1900 - 1993 C.E.**

**CO 1:** Trace the social evils in American society, explain the progressivism movement, analyse the various diplomacy of USA for imperialism.

**CO 2:** Identify the role of USA in the World Wars. Determine the emergence of USA as a World power.

**CO 3:** Determine the causes for Great depression and estimate the role of F.D. Roosevelt.

**CO 4:** Outline the internal and external policies of various Presidents. Analyze the part played by USA in International politics.

**CO 5:** Discuss the different phase of bi-polar politics and assess its impact on World.

**Core Course 11 : History of Tamil Nadu 1800 – 1984 C.E.**

**CO 1:** Sketch the consolidation of British rule, Outline the features of British administration, assess the growth of education and Judiciary

**CO 2:** Trace the emergence of early associations and Identify the growth of Nationalism and role of congress.

**CO 3:** Identify the factors led to the Non- Brahmin movement. Assess the impact of Non-Brahmin Movement

**CO 4:** Illustrate the contributions of various Chief ministers in development of Tamil Nadu. Assess the factors led to the fall of Congress and rise of Dravidian parties.

**CO 5:** Outline the policies of DMK for Socio-economic development. Evaluate the growth of Education after Independence.

**Core Course 12 : History of Europe 1453 – 1815 C.E.**

**CO 1:** Tabulate the explorers and their discoveries, Identify the causes for the disintegration of the feudal system and Outline the emergence of new social and economic order in Europe.

**CO 2:** List the scholars, architects, artists and their works, Sketch the characteristics of Renaissance, analyze the significance of Renaissance and Reformation in European society.

**CO 3:** Infer the significance of Thirty Years' War and its impact on Europe. Identify the emergence of Spain as sovereign state in Europe

**CO 4:** Determine the factors that led to the rise of Nation states. Assess the Enlightened despotism.

**CO 5:** Debate the causes and results of French Revolution. Appraise the rise and fall of Napoleon.

### **Core Course 13 : Introduction to Historiography**

**CO 1:** Define History. Explain the nature, scope and purpose of History.

**CO 2:** Determine the inter-disciplinary nature of History. Interpret role of individuals and institutions in the course of history.

**CO 3:** Trace the evolution of historical writings and analyze the emergence of various traditions.

**CO 4:** Identify the Indian historical writings. Assess the contributions of various Indian historians.

**CO 5:** Understand meaning and types of Research. Identify problem for Historical research, integrate the knowledge in writing thesis and articles.

### **First Allied Course 1 : Modern Governments – I**

**CO 1:** Define the constitution, Classify the different types of constitution and understand the purpose of the Constitution.

**CO 2:** Infer and illustrate salient features of the British Constitution and discuss the role of usage and conventions.

**CO 3:** Explain the position of the British Parliament and determine the position of the Crown.

**CO 4:** Assess the role of Prime Minister, Cabinet and speaker in the Parliamentary form of government.

**CO 5:** Relate the skills on the functional knowledge of government.

### **First Allied Course 2 : Sociology of Tourism**

**CO 1:** Exhibit basic understanding of tourism and its social dimensions.

**CO 2:** Explain and Interpret tourism on sociological perspective.

**CO 3:** Discuss and analyze the government policies and steps towards Tourism development.

**CO 4:** Identify and appreciate the various tourist spots with special reference to Tamil Nadu.

**CO 5:** Evaluate the impact of tourism on society and culture.

### **First Allied Course 3 : Modern Governments – II**

**CO 1:** Define and discuss the basic features of Indian Constitution, discuss and appraise the ideals of Preamble, Fundamental Rights and Directive Principles of State Policy.

**CO 2:** Explain the powers and functions of the Indian Parliament and analyze the nature and working of our democratic polity.

**CO 3:** Explain the salient features of the Constitution of the USA and Sketch the powers and functions of the Congress

**CO 4:** Discuss and compare the powers and functions of Supreme Court of India and USA.

**CO 5:** Evaluate the theory of separation of powers and Validate the idea of Judicial Review.

### **Second Allied Course 1 : Indian Geography – An Outline**

**CO 1:** Outline the physical features of India and Locate the major mountains, passes, plateaus and rivers of India. List out geographical terms.

**CO 2:** Identify the monsoon system in India and discuss the factors affecting the Climate of India.

**CO 3:** Illustrate the different types of soils, identify the causes for soil erosion, state the factors that determine the growth of natural vegetation.

**CO 4:** Explain the types of vegetation, determine the importance of agriculture and necessity of irrigation system. Discuss the contribution of Industries to Indian economy.

**CO 5:** Inculcate the spirit of conservation of natural resources, devise mechanism to manage disaster, demonstrate the knowledge for the contribution to our Economy.

### **Second Allied Course 2 : Elements of Sociology – I**

**CO 1:** Define and discuss the basic concepts of sociology.

**CO 2:** Explain the nature and types of society, identify the importance of language, differentiate community and society

**CO 3:** Outline the meaning and importance of social institutions, Categorize the various social institutions.

**CO 4:** Define socialization and social groups, demonstrate the need and importance of Socialization.

**CO 5:** Apply the social research techniques for the study of social issues. Appreciate the values of family, society, social institutions and socialization.

### **Second Allied Course 3 :Elements of Sociology - II**

**CO 1:** State the nature and types of Social Control, analyse the role of formal and informal agencies.

**CO 2:** Explain the basic principles of social stratification, discuss the caste system in India and point out the factors of social mobility

**CO 3:** Recognize the nature of social change, Illustrate the factors that led to social change, Infer resistance to social change.

**CO 4:** Explain social disorganization, List various social problems in India, analyze the causes for social problems.

**CO 5:** Estimate the contributions of sociologists and the recent trends in sociology.

### **Major Based Elective 1: History of Tiruchirappalli**

**CO 1:** List out the sources for the study of Tiruchirappalli. Sketch a brief history of Tiruchirappalli.

**CO 2:** Determine the consolidation of British power and Trace the evolution of company's administration.

**CO 3:** Estimate the role of leaders of Tiruchirappalli in freedom movement. Summarize the historical significance of Vedaranyam March.

**CO 4:** Express the role of Christian missionaries in Thiruchirappalli and discuss the growth of education.

**CO 5:** List out important monuments in Tiruchirappalli. Appreciate the architectural features of historical monuments.

### **Major Based Elective 1 : Journalism**

**CO1:** Explain the meaning of Journalism

**CO2:** Discuss the history of the Press

**CO3:** Assess the meaning of Editing, Reporting

**CO4:** Evaluate the works of the news agency

**CO5:** Analyze Indian press Laws

### **Major Based Elective 2 :Tamil Epigraphy**

**CO 1:** Explain the importance of Tamil Epigraphy. Identify the format of an Epigraph.

**CO 2:** Classify different types of inscriptions, Analyze the historical importance of Epigraphy.

**CO 3:** Trace the evolution of scripts. Identify Tamil Brahmi, Vattaluttu and Tamil scripts

**CO 4:** Perform the procedure of Estampagetaking and deciphering inscriptions.

**CO 5:** Summarize some of the important epigraphs of Tamil Nadu.

### **Major Based Elective 2 : Panchayat Raj with Special Reference to Tamil Nadu**

**CO1:** Assess the concepts of Panchayat Raj

- CO2: Discuss the new Panchayat Raj system
- CO3: Explain the implementation of welfare schemes.
- CO4: Analyze the Gandhian views of Panchayat Raj

### **Major Based Elective 3 : Human Rights - An Outline**

- CO 1: Define human rights and its implications on society.
- CO 2: Explain the nature and content of various international and national Human rights Documents.
- CO 3: Illustrate and interpret the ideals of Human Rights enshrined in our Constitution.
- CO 4: Outline the contemporary Human Rights issues and analyze the pros and cons of Human rights violations.
- CO 5: List out the National and International Protective Mechanisms and estimate their role as Human Rights Protectors.

### **Non -Major Elective 1 : Tourism in India – An Outline**

- CO 1: Define tourism, classify types of tourism and analyze the growing importance of Tourism.
- CO 2: Explain the role of different transport system in the growth of Tourism. Demonstrate knowledge on Travel formalities
- CO 3: Examine the role of Government in promoting tourism and describe the services of Travel agencies.
- CO 4: Illustrate the Tourist centres of Tamil Nadu.
- CO 5: Identify and appreciate the monuments in your locality. Demonstrate the knowledge for self employment.

### **Non -Major Elective 1 : Geography in India – An Outline**

- CO1: Discuss the fundamental features of our constitution
- CO2: Explain the rights and duties as citizen of India
- CO3: Outline the structure of our government
- CO4: Face competitive examinations confidently

### **Non- Major Elective 2 : History for Competitive Examinations**

- CO 1: Recognize and memorize the major events in Indian History. Analyse the rich cultural heritage of India in terms of values, beliefs and traditions
- CO 2: Contrast the key features of the different dynasties of ancient and medieval India and assess their contribution to Indian culture
- CO 3: Identify the key elements and appraise the legacy of Muslim rule in polity, society and economy.
- CO 4: State the emergence of the British, sketch their policies and assess its impact on Indian society and economy
- CO 5: Trace the emergence of National movement and appraisethe role of Nationalists for Independence.

### **Non- Major Elective 2 : Temple Architecture of Tamil Nadu**

- CO1: Explain the evolution of temple architecture
- CO2: Discuss the genesis of Vimana
- CO3: Compare the contribution of major dynasties of Tamil Nadu to Temple Architecture
- CO4: Assess the cultural heritage of Tamils

### **Skill Based Elective 1 : Archaeology**

- CO 1: Identify Archaeology as a source for history and appreciate the role of Indologists.
- CO 2: Identify the types of burial system and classify the different types of pottery
- CO 3: Discuss and appraise the development of Megalithic culture in Tamilnadu.

**CO 4:** Identify the coins of various dynasties, summarize the importance of Numismatics as a source of History.

**CO 5:** Classifying and exhibiting the artifacts. Demonstrate the methods of Exploration, Excavation and Preservation.

### **Skill Based Elective 1 : Social Psychology**

**CO1:** Assess social psychology and its relationship with sociology

**CO2:** Explain the social perception, social prejudice and social personality and apply it to the contemporary society

**CO3:** Discuss the analytical aspect of leadership

**CO4:** Compare the perceptions of the people on various social issues

### **Skill Based Elective 2 : Modern Pedagogy in History**

**CO 1:** Define the aims of Teaching History and discuss the objectives and values of teaching history.

**CO 2:** Identify the role of history teacher, Judge the role in inculcating knowledge and values in the minds of students.

**CO 3:** Analyze the need of modern methods in teaching history. Experiment different types of teaching.

**CO 4:** Analyze the importance and need of audio-visual aids in teaching history. Demonstrate modern techniques in teaching.

**CO 5:** Explain the need for preparing lesson plan in every week. Formulate the Lesson Plan.

### **Skill Based Elective 2 : Indian Constitution**

**CO1:** Trace the historical evolution of our Constitution, discuss the salient features, justify the ideals enshrined in our constitution, evaluate the functioning of our constitution.

**CO2:** Discuss the composition of the Indian Parliament, compare and contrast functions of the two houses, Sketch the role of executives, distinguish the relation between executive and legislature

**CO3:** List out the Unicameral and bicameral Legislative Assemblies. Discuss the composition of the State Legislature, Explain the powers and functions of Chief Minister, Council of Ministers in State

**CO4 :** Distinguish Local government and Local-self government. Sketch the Rural Local-self government and Urban Local-self Government. Apply the knowledge and chart out the Local-self government in your locality

**CO5:** Outline the single integrated judicial system of India. explain the concept of Judicial review, Justify the role of judiciary as the guardian of Fundamental rights.

### **Skill Based Elective 3 – Archives Keeping**

**CO 1:** Trace the origin of archives and determine the need and importance of archives

**CO 2:** List out the Private archives in India and Identify the role of Private archives.

**CO 3:** Identify the internal and external agents of deterioration, demonstrate preservation techniques.

**CO 4:** Identify the origin and development of National archives, Summarize the role of archives in historical research.

**CO 5:** Record the important curators of Madras archives and assess the contributions of curators in preserving archival records.

### **Skill Based Elective 3 - Sociology of Mass Communication**

**CO1:** Explain the concept of the various forms of communication

**CO2:** Assess the origin and growth of Mass Communication in India

**CO3:** Explain the elements of Mass Media and its recent technological developments

**CO4:** Discuss the impact of mass media on society

## **B.Sc. HOME SCIENCE**

### **PROGRAMME SPECIFIC OUTCOMES**

**PSO1 FOOD AND NUTRITION – Basics of Food Science, Human Physiology, Normal and Therapeutic Nutrition & Nutritional Biochemistry** - Food Technologist & Food Processing sectors, Lab Technicians, Dietician, Diet Counselor, Entrepreneur

**PSO2 TEXTILE AND CLOTHING - Textile Science& Clothing Construction** - Textile Designer, Dress Designer, Fashion Maker, Merchandiser, Quality Controller in Textile Industry, Entrepreneur

**PSO3 HOUSING AND RESOURCE MANAGEMENT- Furnishing of Life Space and Designing & Family Resource Management** - Interior Designer, Front Office Managers and House Keeping

**PSO4 HUMAN DEVELOPMENT – Introduction to Home Science and Child Development&Health Care in Human Development** - Pre-School Teacher, Run a Crèche, Family Counselor, Primary Health Care Specialist

**PSO5 EXTENSION EDUCATION – Home Science Extension & Extension and Communication** - Primary Health Care, Non Government Organizations, Entrepreneur

### **COURSEOUTCOMES**

#### **CoreCourse1 : Introduction to Home Science and Child Development**

**CO 1:** Discover the disciplines of Home Science and its scope

**CO 2:** Associate the factors influencing growth and development

**CO 3:** Apply the types and objective of preschool education

**CO 4:** Discuss the characteristics and learning methods of late childhood

**CO 5:** Analyze the developmental changes in adolescence

#### **CoreCourse2 : Health Care in Human Development**

**CO 1:** Describe the stages of pregnancy and lactation.

**CO 2:** Understand the characteristics of adulthood and old age

**CO 3:** Teach the concept of immunity and health

**CO 4:** Explain the role of microorganism with health

**CO 5:** Interpret the microbes role in human health

#### **CoreCourse3: Textile Science**

**CO1:** Understand and define the fundamentals of textile terms.

**CO2:** Compare the properties and uses of various textile Yarns.

**CO3:** Relate critical understanding of the techniques of textile manufacturing.

**CO4:** Summarize the methods of printing, dyeing and finishing.

**CO5:** Demonstrate the methods of printing, dyeing and finishing of textiles for specific use.

#### **CoreCourse4 :Clothing Construction**

**CO1:** Develop an understanding about the basics of clothing construction

**CO2:** Apply the working principles of sewing equipments that are essential in a sewing room.

**CO3:** Understand various preparatory process of garment construction.

**CO4:** Relate the elements and principles of design in garment construction.

**CO 5:** Categorize the process in wardrobe planning for different age groups

#### **CoreCourse5 :Basics of Food Science**

**CO 1:** Understand the fundamentals and applied aspects of food science

- CO 2: Acquire the knowledge on composition of cereals and their processing
- CO 3: Perceive the classification and functions of pulses, fruits & vegetables
- CO 4: Compare the changes and nutritive value of fleshy foods
- CO 5: Experiment the properties of fats and oils

#### **CoreCourse6 : Furnishing of Life Space and Designing**

- CO 1: Interpret knowledge gained on selection of site and house planning principles in real life situations.
- CO 2: Illustrate house plans based on standard guidelines and principles.
- CO 3: Analyze elements and principles of design in interior.
- CO 4: Assess and apply colour concepts in all art forms.
- CO 5: Develop skills in flower arrangement display, and furniture arrangement.

#### **CoreCourse7 : Home Science Extension**

- CO 1: Perceive the objectives and principles of extension education
- CO 2: Analyze the socio – economic condition of the people especially in rural area
- CO 3: Identify the existing organizations at village and block levels
- CO 4: Apply the necessary skills in extension teaching and field work
- CO 5: Summarize the rural development program for women and children

#### **CoreCourse8 : Normal and Therapeutic Nutrition**

- CO 1: Associate nutritional requirements with stages of human life
- CO 2: Summarize the concepts and principles of diet therapy
- CO 3: Perceive the difference between acute, chronic and intermittent fever and gastrointestinal tract disorders.
- CO 4: Understand the disease of the heart, liver and kidney for therapeutic planning of menu
- CO 5: Assess the stages of allergy, cancer and AIDS and provide dietary recommendation

#### **CoreCourse9 : Family Resource Management**

- CO 1: Understanding the concepts and principles of family resource management
- CO 2: Associate time and energy management for work simplification
- CO 3: Analyze different sources of income and budgeting to lead a good financial status by the family
- CO 4: Evaluate ergonomic concepts and principles for work environment
- CO 5: Interpret the rights and responsibilities of the consumer

#### **MajorBasedElective1 : Human Physiology**

- CO 1: Understand the Human body, structure of different organs and its functionalities
- CO 2: Explain the blood, blood vessels and heart functions
- CO 3: Illustrate of the digestive system and excretory system of body
- CO 4: Compare the reproductive systems and the hormones
- CO 5: Show the structure and functions of nervous system

#### **MajorBasedElective2 : Nutritional Biochemistry**

- CO 1: Understand the basis of energy and metabolism
- CO 2: Relate the properties of starch and describe the various metabolic pathways of carbohydrates.
- CO 3: Explain the metabolism and value of protein
- CO 4: Summarize the properties and functions of fats
- CO 5: Distinguish the role of vitamins and minerals in health

#### **MajorBasedElective3 : Extension and Communication**

- CO 1: Understand importance and functions of communication
- CO 2: Apply the concepts relating to communication
- CO 3: Explain the communication models
- CO 4: Choose the role of Audio Visual aids in extension teaching
- CO 5: Select the approaches in communicating the rural people

#### **NonMajorBasedElective1 : Interior Decoration**

- CO 1: Identify the importance of art in interior decoration
- CO 2: Analyze place of elements of design in interior
- CO 3: Associate principles of design and the contributing factors for decoration
- CO 4: Analyze and adapt the skill of applying color in interior
- CO 5: Estimate the role of accessories based on its purpose in decoration

#### **NonMajorBasedElective2 : Surface Ornamentation Techniques**

- CO 1: Identify the techniques of fabric painting.
- CO 2: Associate the printing methods in surface ornamentation.
- CO 3: Apply the basic hand embroideries in various garments.
- CO 4: Analyse the method of traditional Embroidery
- CO 5: Prepare Trimmings and Decorations

#### **SkillBasedElective1 :Care for Special Children**

- CO 1: Describe the methods of child study
- CO 2: Interpret the needs of children
- CO 3: Classify the disability in children
- CO 4: Distinguish the Mentally Challenged and Gifted children
- CO 5: Summarize the rights of children

#### **SkillBasedElective2 Traditional Textiles and Costumes of India**

- CO 1: Understand the Indian traditional history and its unique textile traditions
- CO 2: Develop an understanding of the classification of traditional textiles based on the process of making it.
- CO 3: Differentiate traditional textiles from different parts of the count
- CO 4: Apply the characteristic features of the traditional costumes of India.
- CO 5: Apply the techniques of traditional embroidery.

#### **SkillBasedElective3 Food Preservation**

- CO 1: Narrate the importance and principles of food preservation
- CO 2: Explain the bacteriostatic methods of preservation
- CO 3: Manipulate the bactericidal methods in preserving food
- CO 4: Connect the skills in product preparation
- CO 5: Judge the role of preservatives

### **B.Sc.MATHEMATICS**

#### **PROGRAMME SPECIFIC OUTCOMES**

- PSO 1 Able to apply domain knowledge and expertise for enhancing innovative ideas into reality.
- PSO 2 Able to interpret any data using statistical tools to handle social relevant problems through mathematical techniques.

**PSO 3** Positive approach towards Higher Education in Mathematics and apply Mathematical skills to crack competitive examinations.

**PSO 4** Able to develop job oriented skills in solving problems using Mathematical techniques for both in industry and in academic sector.

**PSO 5** Able to apply appropriate mathematical methods for finding solutions and acquire knowledge and understanding in advanced areas in mathematics.

## **COURSE OUTCOMES**

### **Core Course 1: Calculus**

**CO 1:** Calculate radius of curvature in Cartesian and polar Forms and explain evolute and involute concepts.

**CO 2:** Apply the properties of definite integrals to obtain reduction formulae.

**CO 3:** Evaluate of double integrals both in Cartesian and polar forms.

**CO 4:** Examine the notions of Jacobian and change of variables to evaluate double integrals.

**CO5:** Determine Beta and Gamma functions and discuss their properties

### **Core Course 2: Theory of equations and Vector Analysis**

**CO 1:** Explain the relation between roots and coefficients of algebraic equations and describe the method of solving reciprocal equations.

**CO2:** Explain the method of finding quotient and remainder when a polynomial is divided by a binomial.

**CO 3:** Analyze vector identities using the differential operator  $\nabla$

**CO4:** Explain line, surface, volume integrals using vector functions

**CO 5:** Apply integral theorems like Gauss's divergence theorem, Stoke's theorem and Green's theorem to solve problems

### **Core Course 3: Analytical Geometry of Three Dimensions**

**CO 1:** Explain the method of finding projections and direction cosines of a line in three dimensional analytical geometry

**CO 2:** Analyze various forms of plane equations and straight line equations

**CO 3:** Illustrate the concepts of straight lines skew lines and shortest distance

**CO 4:** Determine the equation of a sphere and - Condition for orthogonality of Two Spheres.

**CO 5:** Construct the equation of a Cylinder with a given generator and a given Guiding Curve.

### **Core Course 4: Numerical Methods**

**CO 1:** Analyze the methods to find the solution of Algebraic and Transcendental equations.

**CO 2:** Explain interpolation and use Newton's formulae, to solve problems.

**CO 3 :** Apply Lagrange's formula for unevenly spaced points

**CO 4:** Apply Trapezoidal, Simpson's 1/3 rule and Simpson's 3/8 rule to evaluate integrals.

**CO 5:** Evaluate the numerical solution of ordinary differential equations.

### **Core Course 5: Modern Algebra – I**

**CO 1:** Analyze and apply the knowledge of basic abstract systems.

**CO 2:** Classify the concepts and properties of groups.

**CO 3:** Apply and discuss group concepts in Lagrange's theorem.

**CO 4:** Summarize the importance of homomorphism and isomorphism in groups

**CO 5:** Explain and use the concepts of rings.

### **Core Course 6: Programming in C**

- CO 1: Analyse and Discuss the concepts of Constants, Variables and Data types.
- CO 2: Analyse and Explain Operators and Expressions.
- CO 3 :Illustrate and Explain managing input and output operations with examples.
- CO 4: Analyse and classify Decision making and branching.
- CO 5: Describe Decision making and Looping.

### **Core Course 7: Modern Algebra- II**

- CO 1: Identify subspaces, linear transformation and span of a set.
- CO 2: Analyze Linear independence and dimension of vector spaces
- CO 3: Classify the types of matrices and algebra of matrices.
- CO 4: Apply Cayley-Hamilton theorem to solve simultaneous linear equations
- CO 5: Examine the concepts of Lattices and Boolean Algebra.

### **Core Course 8: Real Analysis – I**

- CO 1: Analyse field axioms, countable sets and uncountable sets
- CO 2: List the neighbourhoods, open sets, closed sets and limit points.
- CO 3: Analyze convergence of sequences, divergence of sequences and Cauchy sequences.
- CO 4: Apply Cauchy's nth root test and D'Alembert's ratio test to check the convergence of the series.
- CO 5: Summarize the concepts of continuity and Uniform continuity

### **Core Course 9: Statics**

- CO 1: Analyse and illustrate the concept of parallel forces and moments
- CO 2: Define couples, Analyse Equilibrium of three forces acting on a rigid body
- CO 3: Analyse and Explain about the coplanar forces with examples.
- CO 4: Demonstrate laws of friction, angle of friction with examples
- CO 5: Explain centre of gravity of different geometrical structures like triangle, quadrilateral etc., Analyse equilibrium of strings.

### **Core Course 10: Differential Equations and Fourier Transforms**

- CO 1: Apply practical rule for solving exact differential equation and rules for finding integrating factor.
- CO 2: Explain the method of solving linear Differential equations with constant coefficients and simultaneous Differential equations with examples.
- CO 3: Analyse the method of forming Partial differential equations for various situations and solving partial differential equations.
- CO 4: Determine the condition for existence of Laplace Transforms and to obtain Laplace transforms of various functions.
- CO 5: Classify the Fourier series and Fourier Transforms for different functions.

### **Core Course 11: Real Analysis – II**

- CO 1: Describe partial sum, convergent series and explain Cauchy's general principle of convergence of a series
- CO 2: Explain and illustrate the concepts of Derivatives
- CO 3: Explain Rolle's theorem, Lagrange's mean value theorem and demonstrate Cauchy's mean value theorem.
- CO 4: Summarize the necessary and sufficient condition to estimate extreme values.
- CO 5: Analyze and experiment the concept of Riemann integration.

### **Core Course 12: Complex Analysis**

**CO 1:** Categorize the Analytical functions and discuss about the Harmonic functions

**CO 2:** Classify the elementary transformations and fixed points of bilinear transformations.

**CO 3:** Apply Cauchy integral formula and Cauchy's theorem on integrals.

**CO 4:** Analyze Taylor's series, Laurent's series, Zeros of analytical functions and singularities.

**CO 5:** Evaluate residues using Cauchy's residues theorem.

### **Core Course 12: Dynamics**

**CO 1:** Analyse relative, angular velocity, Define and calculate moment of inertia in particular cases using parallel axes and perpendicular axes theorem.

**CO 2:** Analyse and Discuss about projectiles, path, range of a projectile and range on an inclined plane.

**CO 3:** Analyse and explain about collision of elastic bodies, impact of two bodies and loss of kinetic energy.

**CO 4:** Explain the motion under the action of central forces, find the pedal equation for some curves.

**CO 5:** Analyse and Discuss about simple harmonic motion, demonstrate the motion of a rigid body about a fixed axis.

### **Second Allied Course 1: Mathematical Statistics-I**

**CO1:** Explain and Describe moments, skewness and kurtosis

**CO2:** Explain and Apply Baye's theorem in Decision making

**CO3:** Analyse, Classify and explain the characteristics of probability distribution

**CO4:** Analyse and explain binomial and poisson distribution

**CO5:** Explain, Analyse, Describe normal distribution

### **Second Allied Course II: Mathematical Statistics-II**

**CO1:** Explain and analyse the mathematical expectations and variance for linear combination of random variables

**CO2:** Describe and determine coefficients of correlation, regression and rank correlation

**CO3:** Explain and analyse the small, large samples and non-parametric test problems

**CO4:** Describe and analyse Chi-square distribution

**CO5:** Outline and explain and F distribution

### **Second Allied Practical: Excel Lab for Mathematical Statistics**

**CO1:** Draw charts and diagrams

**CO2:** Evaluate of measures of dispersion and rank correlation

**CO3:** Classify simple linear and non linear regression models

**CO4:** Demonstrate fitting of probability distributions

**CO5:** Assess t-test, F-test and Chi-square test

### **ALLIED COURSE FOR B.Com**

#### **First Allied Course 1: Business Mathematics**

**CO1:** Examine the concept of derivatives for maxima and minima

**CO2:** Analyse the rate of change in business and economics

**CO3:** Illustrate the methods to test the consistency of a system of simultaneous linear equations

**CO4:** Identify finance and economics problems mathematically

**CO5:** Construct a linear programming problem and solve using simplex method

#### **First Allied Course 2: Business Statistics**

- CO1:** Determine all measures of central tendencies for raw and grouped data
- CO2:** Analyse Measures of Dispersion
- CO3:** Calculate regression and correlation for forecasting
- CO4:** Analyse Statistics in business problems and finding their inference
- CO5:** Inspect appropriate Statistical techniques for business data

**First Allied Practical: Practical Mathematics for Commerce**

- CO1:** Discuss the applications of Geometric Mean and Harmonic Mean
- CO2:** Examine the consistency of a given data
- CO3:** Apply correlation analysis for forecasting
- CO4:** Explain input and output analysis using matrix
- CO5:** Use statistical analysis in cost of living index

**ALLIED COURSE FOR B.Sc., CHEMISTRY/PHYSICS**

**Second Allied Course 1: Allied Mathematics – I**

- CO1:** Discuss the nature of roots and solve equations
- CO2:** Apply Leibnitz formula to determine  $n^{\text{th}}$  derivative of a Product
- CO3:** Discover radius of curvature, Evolute and Involute
- CO4:** Determine Fourier Series for different functions
- CO5:** Determine Fourier Series for different functions applying the change of interval

**Second Allied Course 2: Allied Mathematics – II**

- CO1:** Calculate the complementary function and particular integral of Differential Equations
- CO2:** Determine the solutions of partial differential equations
- CO3:** Solve differential equations using Laplace Transformation.
- CO4:** Analyze the Physical applications of Differentiation of Vector Functions.
- CO5:** Analyze the coordinate system and plane.

**Second Allied Practical: Practical Mathematics**

- CO1:** Define radius of curvature, Evolute and Involute
- CO2:** Formulate Fourier Series for different functions
- CO3:** Evaluate the solution of Partial Differential Equations
- CO4:** Compute solution of differential equations using Laplace Transformation
- CO5:** Classify the Physical applications of Differentiation of Vector Functions

**ALLIED COURSE FOR B.Sc., COMPUTER SCIENCE**

**Second Allied Course 1: Numerical And Statistical Methods**

- CO1:** Evaluate numerical solution for Algebraic and Transcendental Equations
- CO2:** Describe numerical differentiation and integration
- CO3:** Discuss the numerical solution of ordinary differential equations
- CO4:** Analyze the correlation and regression
- CO5:** Explain the fitting of Binomial, Poisson and Normal distributions

**Second Allied Course 2: Operations Research**

- CO1:** Explain LPP, the formulation and its graphical solution
- CO2:** Evaluate LPP using simplex algorithm
- CO3:** Construct transportation problem as LPP and solve by MODI method
- CO4:** Describe the Hungarian Assignment method

**CO5:** Compare PERT and CPM

**Second Allied Practical: Practical Mathematics for Computer Science**

**CO1:** Explain numerical integration using Trapezoidal Rule and Euler's Method

**CO2:** Calculate Correlation coefficient for a bivariate frequency distribution

**CO3:** Apply simplex method to the solutions of simultaneous linear equations and inverse of a matrix

**CO4:** Describe stepping stone solution method

**CO5:** Modify special cases of assignment problems

**Major Based Elective Course 1: Graph Theory**

**CO1:** Analyze the concepts of connected graphs, disconnected graphs, Euler's graphs, Hamiltonian paths and circuits.

**CO2:** Describe trees, fundamental circuits, cuts and cut vertices.

**CO3:** Explain knowledge in planar graphs.

**CO4:** Describe incidence matrix, cut set matrix, path matrix and adjacency matrix.

**CO5:** Explain digraph, paths and connections.

**Major Based Elective Course 1 (Optional): Discrete Mathematics**

**CO1:** Define the basic concepts of logics.

**CO2:** Describe the concepts of predicate calculus.

**CO3:** Explain lattices and the properties of Lattices.

**CO4:** Explain Boolean Algebras, Boolean polynomials and Karnaugh maps.

**CO5:** Solve the recurrence relations

**Major Based Elective Course 2: Operations Research**

**CO 1:** Explain the formulation of LPP.

**CO 2:** Construct the dual of LPP and solve LPP through duality and dual simplex method.

**CO 3:** Formulate transportation and assignment problem as LPP and solve by appropriate methods

**CO 4:** Analyze the methods of Queuing systems

**CO 5:** Demonstrate the rules of network and compare PERT/CPM.

**Major Based Elective Course 2 (Optional): Astronomy**

**CO1:** Explain Celestial sphere and Diurnal Motion

**CO2:** Describe The zones of earth and Dip of Horizon

**CO3:** Discuss Influence of temperature and pressure of atmosphere on refraction

**CO4:** Apply Kepler's Laws of planetary motion to find Seasons – Julian Date .

**CO5:** Discuss Determination of latitude of a place

**Major Based Elective Course 3: Number Theory**

**CO1:** Identify and use the concepts of fundamental theorem of arithmetic

**CO2:** Apply and Analyze permutations and combinations, Fermat's little theorem and Wilson's theorem

**CO3:** Analyze and Apply the concept of congruence to solve the system of congruences

**CO4:** Classify and apply the notion of arithmetic functions  $\varphi(n), d(n), \sigma(n), \mu(n)$

**CO5:** Analyze and use the concepts of Tchebychev's theorem

### **Major Based Elective Course 3 (Optional): Mathematical Modelling**

**CO 1:** Discuss mathematical models for growth and decay processes using ordinary differential equations.

**CO 2:** Explain the concepts of difference equations and method of solving difference equations.

**CO 3:** Prepare mathematical models through difference equations.

**CO 4 :** Create mathematical models through PDE

**CO 5 :** Express mathematical models through graphs.

### **Skill Based Elective Course 1: Combinatorics**

**CO 1:** Estimate permutations and combinations with examples

**CO 2:** Apply Binomial identities and generating functions

**CO 3:** Analyze the properties binary relations in a set and represent a relation by matrix

**CO 4:** Identify a relation by matrix

**CO 5:** Examine Warshall's algorithm for transitive closure

### **Skill Based Elective Course 2: Financial Mathematics**

**CO 1:** Evaluate square roots and Cube roots

**CO 2:** Calculate profit and loss, Ratio and proportion.

**CO 3:** Explain partnership and estimate different types of Interest.

**CO 4:** Assess various types of Discounts

**CO 5:** Analyze Graphs and Charts

### **Skill Based Elective Course 3: Practical: MATLAB**

**CO 1:** Explain Algebraic and Transcendental equations using MATLAB

**CO 2:** Compute the sum, product, transpose of matrices, the inverse and eigen values of matrices

**CO 3:** Evaluate the problems on Differential Equations and Integral Equations

**CO 4:** Determine graph using MATLAB and analyze the PASCAL's Triangle.

**CO 5:** Evaluate the problems on Numerical differentiation and Integration

### **Non Major Based Elective Course 1: General skills in Mathematics-I**

**CO 1:** Analyze bar graphs and pie-diagrams

**CO 2:** Calculate arithmetic mean, median and mode

**CO 3:** Apply the concepts of measures of dispersion

**CO 4:** Determine Standard deviation and Variance

**CO 5:** Explain the concepts of Correlation, Rank Correlation

### **Non Major Based Elective Course 2: General skills in Mathematics-II**

**CO 1:** Determine H. C. F and L. C. M of numbers

**CO 2:** Analyze the concepts of Profit and Loss, Ratio and Proportion

**CO 3:** Analyze the concepts about the Time and Work, Pipes and Cistern

**CO 4:** Analyze the concepts of Time and Distance, Alligation or Mixture

**CO 5:** Estimate Simple Interest, Compound Interest

## **B.A. MUSIC**

### **PROGRAMME SPECIFIC OUTCOMES**

**PSO 1:** Showcase a good knowledge on the theoretical and practical aspects of vocal and instrumental music and folk lore

**PSO 2:** Assimilate the knowledge of music from lakshanagranthas, literature , epic and oral tradition and apply them to the contemporary music

**PSO 3:** Relate the nuances in practical aspects with the theoretical music knowledge to enrich the innovative ideas and display skill to communicate globally through vocal and instrumental music skills.

**PSO 4:** Possess employment , ED skills and performing skills.

**PSO 5:** Demonstrate skills to take up competitive exams.

### **Core course 1: Fundamentals of music**

**CO1:** Explain the basic technical terms used in classical music

**CO2:** Identify the scheme of 72 melakartas that are basis for Carnatic Music

**CO3:** Classify the Janya ragas

**CO4:** Discuss principal talas and their expansions

**CO5 :** Outline the musical forms

### **Core course 2: History of Music**

**CO 1:** Evaluate the origin of scales

**CO 2:** Analyze the History of Music from ancient period

**CO 3:** Assess the structure of Abhyasagana and Sabha gana Musical forms

**CO 4:** Evaluate Trayodasalakshnas which determine the lakshana of the ragas

**CO 5:** Categorize the role of Vaggeyakaras to the field of Music

### **Core course 3: Theory of Music**

**CO 1 :**Summarize the theoretical aspects of various advanced Talas

**CO 2 :** Discriminate and Classify musical instruments

**CO 3 :** Compile the construction and playing technique of the classical musical instruments

**CO 4 :** Generalize rhetorical beauties dealt with in the advanced Musical forms

**CO 5:** Differentiate the general classification of Raga

### **Core Course 4 : Applied Music**

**CO 1:** Combine the techniques used in manodharmasangeetha theory with Practical

**CO 2:** Point out the importance of Musical prosody

**CO 3:** Explain Physics of Music & Terms related to Music

**CO 4:** Evaluate & Analyze the various types of Mudras

**CO 5:** Integrate the raga lakshana with various compositions practically

### **Core Course 5: Historical study of music and it's growth**

**CO 1:** Compare the significance of Gamakas with Kritis&Categorize the important sources that construct the history of music

**CO 2:** Analyze the significant aspects of lakshnagranthas and evaluate the patronage of Chola Kings to the field of Music and Dance

**CO 3:** Summarize the historical informations gained from seats of music

**CO 4:** Develop writing Notation

**CO 5:** Compare the raga lakshana theory with practical compositions

### **Core Course 6: Musicology**

**CO1:** Compare Taladasa pranas and the theory of 22 srutis with practical concept

**CO2:** Analyze the Mela Melapaddati

**CO3:** Assess the structure of the Art form Bhajana and Bhagavata mela nataka

**CO4:** Explain the structure of the musical forms

**CO5:** Evaluate the contribution of nayanmars and composers

### **Core practical 1: Kalpithasangitam I**

**CO 1:** Apply Vocal and fingering exercises

**CO 2:** Use voice culture

**CO 3:** Compare and Sing Alankaras in different ragas and talas

**CO4:** Evaluate svara with sahithya in gitam&Svarajati

**CO 5:** Identify simple Musical forms

### **Core practical 2 KalpitaSangitam – II**

**CO 1:** Identify 12 svarasthanas

**CO 2:** Illustrate varna in two degrees of speed

**CO 3:** Appraise the musical form kriti and mode of singing

**CO 4:** Analyze the Lakshana of the ragas in which they are composed

**CO 5:** Evaluate & Sing Art Musical forms

### **Core Practical 3: KalpithaSangitam- III**

**CO 1:** Analyze other language gitam with tamilgitam

**CO 2:** Explain the prasa beauty of the varnam and sing 2 speeds

**CO 3:** Compare &Discriminate tamilcomposers composition

**CO 4:** Develop thePasuram

**CO 5:** Assess and sing Bhakti Ilakkiya song

### **Core Practical 4: KalpitaSangitam-IV**

**CO1:** Compare, contrast & Sing Ata Tala Varna with Adi tala varna

**CO 2:** Analyze and sing Pancharatnakriti

**CO 3:** Compare compositions practically with their raga lakshana

**CO 4:** Compile & Sing miscellaneous musical forms

**CO 5:** Construct & Develop raga alapana and kalpanasvara

### **Core Practical 5: KalpitaSangitam V**

**CO 1:** Analyze and perform the musical beauties in Pancharathnam

**CO 2:** Compare and contrast the Group kriti composed by various composers

**CO 3:** Illustrate the musical form padampractically

**CO 4:** Organize the composition Kriti

**CO 5:** Prepare the Raga alapana and Kalpana svara on their own

### **Core Practical 6:KalpitaSangitam-VI**

**CO1:** Pointout the musical aspect of the advanced musical form Svarajati of Syamasastri

**CO2:** Design the concert pattern with Varna &Kritis

**CO3:** Summarize the meaning of Pancharathnam with practical explanation

**CO4:** Evaluate the musical compositions practically

- CO5: Compare the ragas in Ragamalika
- CO6: Plan to start a music school / class on their own
- Core Practical 4: ManodharmaSangitam**
- CO1: Design improvised singing
- CO2: Plan for stage performance
- CO3: Prepare list to Sing Major ragas
- CO4: Create raga alapana& Kalpana svaras phrases
- CO5: Develop Pallavi singing

#### **First Allied Course 1: Folk Music of Tamil Nadu**

- CO 1: Identify the outline knowledge about ragas and talas used in folk music
- CO 2: Analyze and Explain Ceremonial songs, Occupational songs and Agricultural songs
- CO 3: Discuss the folk music tune
- CO 4: Classify and Discuss the role of musical forms in Folk Music
- CO 5: Classify the construction of few musical instruments

#### **First Allied Course 2 :Folk Arts of Tamil Nadu**

- CO 1: Criticize the Social and spiritual values of Folk Music
- CO 2: Summarize various Folk arts
- CO 3: Classify the folk dance forms and associate the occasions on which they are performed
- CO 4: Compare and contrast the structure, Artists & costumes
- CO 5: Discriminate the folk instruments of Tamil Nadu

#### **Second Allied Course 1: Aesthetic Music and Arts**

- CO 1: Compile and compare the sanctity in the sacred forms of music
- CO 2: Describe about performing Arts of Tamil Nadu
- CO 3: Compare about the performing Arts of Kerala & Karnataka
- CO 4: Evaluate Pavai songs of Andal and Manikkavasagar
- CO 5: Categorize the Group kritis of Trinity

#### **Second Allied Course 2: Objective study of an Opera- Azhagar Kuravanji**

- CO 1: Evaluate & Analyze the Origin and the structure of an Opera
- CO 2: Sketch the life history and the contribution of Opera composer
- CO 3: Explain the story of Kuravanji
- CO 4: Compare the characters and their role
- CO 5: Evaluate the Musical forms

#### **First Allied Practical 1: Enchanting melody through Violin /Veena/Vocal**

- CO 1: Identify and apply the basic fingering exercises in instruments
- CO 2: Compare various raga svarastanas in 3 octaves
- CO 3: Illustrate Alankaras in different ragas
- CO 4: Identify simple Musical forms in instruments
- CO 5: Apply various basic fingering techniques

#### **First Allied Practical 1: Enchanting melody through Violin /Veena/Vocal**

- CO 1: Categorize 3 degrees of speed in various Varisaigal
- CO 2: Apply dhatu varisaigal for different ragas
- CO 3: Illustrate fingering techniques for various svarasthanas

**CO 4:** Compare mantra sthayi with Mel sthayivarisai

**CO 5:** Differentiate 12 svarasthanas in instruments

**Second Allied Practical 1: Enchanting melody through Violin /Veena/Vocal**

**CO 1:** Demonstrate the svara exercise in TodiShanmukapriya combination ragas

**CO 2:** Compare the jatis with the svara pattern in Jatisvara

**CO 3:** Compile the svara for sahithya in Svarajathi

**CO 4:** Connect the karvai in the Varna with the sahithya

**CO 5:** Show the playing method of note svara and simple devotional songs

**Second Allied Practical 1 :Enchanting melody through Violin /Veena/Vocal**

**CO 1:** Plan to play alankaram in various ragas

**CO 2:** Illustrate varna in two speeds

**CO 3:** Use the fingering technique to play kriti in sudhaMadhyamaraga &PratiMadhyama raga

**CO 4:** Write notation for the learnt song

**CO 5:** Analyze the musical form Divya Nama Keerthana&Thiruppugazh practically

**Non Major Elective 1: Enchanting Harmony Through Vocal / Veena**

**CO 1:** Identify and sing/play the basic svarasthana in Vocal/ Veena

**CO 2:** Understand the pattern of Janta Varisaigal

**CO 3:** Compare the various sthayi's and svara pattern

**CO 4:** Categorize the different tala in Alankaram

**CO 5:** Understand and sing/ play Light classical songs

**Non Major Elective 2: Introduction to South Indian Music**

**CO 1:** Recognize the basic technical terms, Tala system used in classical music

**CO 2:** Demonstrate the 72 Melakarthis

**CO 3:** Illustrate the Tala system

**CO 4:** Classify the Tevara pans

**CO 5:** Categorize the classification of folk music

**Skill Based Elective 1: Practical Azhagar Kuravanji**

**CO 1:** Identify and practically explain about the invocatory song

**CO 2:** Assess the classical folk songs

**CO 3:** Evaluate the musical form Daru

**CO 4:** Analyze the composition Padam practically

**CO 5:** Plan to Sing various Kirtanai

**Skill Based Elective 1 :Practical Hymnal Music**

**CO 1:** Differentiate & Compare the significance of the divinity in Tevaram and Tiruvagasam

**CO 2:** Compare & Compile the basic theme inTiruppavai and Tiruvempavai

**CO 3:** Pointout and sing the significance of Pasuram

**CO 4:** Understand to sing the PeriyapuranaPadal

**CO 5:** Identify the chandam of Tiruppugazh& Analyze the SiddarPadal

**Skill Based Elective 2: Indian and Western Musical Instruments**

**CO 1:** Analyze the South Indian Instruments

**CO 2:** Explain the North Indian Instruments

**CO 3:** Classify the Western Instruments

- CO 4: Criticize the folk Instruments
- CO 5: Categorize the Ritualistic Instruments

**Skill Based Elective 2 :Music in PanchaBhoothaSthalas**

- CO 1: Summarize the significance of PanchaBhoothaSthalas
- CO 2: Analyze the Tevara hymns
- CO 3: Discriminate tana & Pada Varnam
- CO 4: Appraise the Panchalingastalakritis and evaluate the lakshana of the raga
- CO 5: Explain the Tamil composition and composer

**Skill Based Elective 3 :Tamizharisai**

- CO 1: Analyze the music in Tolkappiyam
- CO 2: Understand and classify the musicians in Sangam Period
- CO 3: Explain the varieties of Percussion Instruments in Pancharabhu
- CO 4: Criticize the Tiruvagam's music
- CO 5: Evaluate the music in NalayiraDivyaprabandam

**Skill Based Elective 3 : A Dance drama- ThyagesarKuravanji**

- CO 1: Analyze the origin and development of KuravanjiNatakas
- CO 2: Compare with other Kuravanjinatakas
- CO 3: Discriminate the musical forms
- CO 4: Criticize the characters
- CO 5: Explain the Musical and literary aspects

**Major Based Elective 1 :Practical-I Devotional Music**

- CO 1: Assess the musical beauty of the tamil songs
- CO 2: Understand the basic Sanskrit meaning of the songs
- CO 3: Explain and sing the Telugu song with their meaning
- CO 4: Relate the Kannada song with the musical beauties
- CO 5: Apply Singing knowledge to sing the composition with the meaning of that song

**Major Based Elective 1 (Optional): Utsava Sampradaya Kirtana**

- CO 1: Criticize the Hacherika song
- CO 2: Analyze the Shobhanam song
- CO 3: Evaluate the beauty of Lali song
- CO 4: Explain the Pavvalimpu song
- CO 5: Point out the importance of mangalam song

**Major Based Elective 2 :Sacred Music**

- CO1: Analyze the various language compositions
- CO2: Compare & Contrast the musical aspect and bhakthi aspect
- CO3: Categorize the type of bhakthi in each composer
- CO4: Appraise the musical form of various composers
- CO5: Categorize the musical and sahithya aspect of various

**Major Based Elective 2 (Optional) :Bhajans**

- CO1: Analyze the concept of bhakthi through Meerabai Bhajans
- CO2: Evaluate the Thukaram Bhajan

- CO3: Appraise the compositions of Namadevar
- CO4: Criticize the Krishna Bhakthi through Ashtapathi
- CO5: Categorize Narayana TheertharTarangam

#### **Major Based Elective 3 :Pannisai**

- CO1 :Assess the importance of Padigams and Pasurams
- CO2: Pointout the musical aspects in Pannisai
- CO3: Evaluate the historical stories behind the padigam
- CO4: Compare with literary and musical aspects
- CO5 :AnalyzePann with its equivalent ragas

#### **Major Based Elective 3 (Optional): Bharathi Composers**

- CO1: Criticize the theme and forms of Suddhanandha Bharathi songs
- CO2: Analyze the Gopalakrishna Bharathi kritis
- CO3: Appraise the songs of Subramanya Bharathi
- CO4: Explain the compositions of Kavi Kunjara Bharathi
- CO5 :Compare and Contrast the structure and musical forms of Bharathi composers

### **B.Sc. NUTRITION AND DIETETICS**

#### **PROGRAMME SPECIFIC OUTCOMES**

- PSO 1: Conceptualize the various applications of food, nutrition, health and their interrelationship for holistic development of individual, community and industry
- PSO 2: Examine crucial aspects of food and health sectors for alleviating public health problems, nurture their analytical ability and promote avenues for entrepreneurship.
- PSO 3: Evolve strategies to identify and prevent nutritional disorders based on scientific reasoning related to food, nutrition and health
- PSO 4: Develop employability skills suited for various food-based industry, professional and other enterprises.
- PSO 5: Innovate, develop ideas, concepts and suggest remedial measures to overcome the food and nutritional challenges

#### **COURSE OUTCOMES**

##### **Core Course 1 : Food Science**

- CO1: Identifythefoodsandclassifythembasedonthebasic Vfoodgroupssystem
- CO2: Definethefoodsanddescribeitsstructure
- CO3: Demonstratetheirability inselectingthegoodfoodandrejectthosewithlowquality
- CO4: Analysethedifferentnutrientspresentinafood
- CO 5: Compare the nutrients present in thedifferenttypesoffoodandsuggestthenutrientrichfoods
- CO6: Preparerecipesrichinparticularnutrients

##### **CoreCourse 2 : Macronutrients**

- CO1: Describethevariouscomponentsofenergy
- CO2: Listthesourcesandidentifythestructureof macromolecules
- CO3: PredictBMRandtotalenergyexpenditure
- CO4: Show the public to apprehendthe role of macronutrientsinhealthanddisease.
- CO5: Chooseandrecommendmacronutrientsfromfoodsources
- CO6:Assess the hydrationstatusofindividual
- CO7: Recommendways and means for the prevention andtreatmentofnutrientdeficiency

### **Core Course 3 : Micronutrients**

**CO1:** Explain the role of fat soluble vitamins in health and influence of toxicity

**CO2:** Justify the role of water soluble vitamins in various biochemical reactions

**CO3:** Recommend the importance of macrominerals in health and nutrition

**CO4:** Evaluate the role of microminerals in health and diseases

**CO5:** Justify the interrelationship between vitamins and minerals

### **Core Course 4 : Food Preservation**

**CO1:** List best high and low temperature preservation technique

**CO2:** Differentiate various classes of permitted preservative used in food industry

**CO3:** Produce freeze dried value added products

**CO4:** Produce various perishable products into more stable one

**CO5:** Assess the SWOT analysis of food industries

**CO6:** Create entrepreneur avenues

### **Core Course 5 : Nutrition Through Life Cycle**

**CO1:** Relate the different stages of growth and development in the human life cycle.

**CO 2:** Compare the Recommended Dietary Allowance for different age groups based on gender and activity.

**CO3:** Illustrate the food and nutritional requirements for specific groups of people based on their age and food habits

**CO4:** Explain the nutrition related problems common in different stages of life cycle and its impact on health

**CO5:** Recommend specific nutrients and foods for various age groups quantitatively and qualitatively

**CO6:** Plan a balanced meal suitable for each individual based on their food habits and socioeconomic status

### **Core Course 6 : Food Processing And Bakery**

**CO1:** Identify and name the best processing technique for various foods

**CO2:** Prepare extruded products

**CO3:** Produce value added products

**CO4:** Prepare various perishable products into more stable one

**CO5:** Prepare different types of bakery products

**CO6:** Explore entrepreneur avenues

### **Core Course 7 : Functional Foods And Nutrigenomics**

**CO 1:** Identify the sources of functional foods and nutraceuticals

**CO2:** classify antioxidants

**CO3:** Explain the use of functional foods in health and disease

**CO4:** Relate nutrients and genetic makeup of the individual

**CO5:** Prepare personalized diet based on the genotype and phenotype of the individual

### **Core Course 8 : Dietetics**

**CO1:** Relate the need for therapeutic modifications of diet and special feeding methods

**CO2:** Explain the pathogenesis of gastrointestinal, cardiovascular, renal diseases and non-communicable diseases and fevers

**CO3:** Examine the nature and types of diseases and understand their nutritional implications

**CO4:** Recommend food and nutritional modifications pertaining to each disease and special needs

**CO5:** Plan disease and disorder specific diet to individuals belonging to different age group.

### **Core Course 9 : Quantity Food Management**

**CO 1:** Describe the concepts of food planning based on services and equipment

- CO2: Recommend various types of menu in the food industry and its development
- CO3: Explain the methods for healthy and hygienic outcomes in food service institutions
- CO4: Categorize the food services in the food industry
- CO5: Design the plan of methods of purchase and storage for quality food supply

### **Core Practical 1 : Food Science and Macronutrients**

- CO1: Examine the physicochemical changes in the food.
- CO2: Discuss the best methods of cooking food to retain the maximum nutrients.
- CO3: Illustrate the factors that affect the nutritive value and cooking of food
- CO4: Infer the process that could be adopted to retain the quality of food

### **Core Practical 1 : Food Science and Macronutrients**

- CO1: Identify the structure of various sugars
- CO2: Differentiate monosaccharides from disaccharides
- CO3: Estimate the presence of various macronutrients based on socio-economic status
- CO4: Recommend food choices for various subjects based on socio-economic status
- CO5: Plan a menu and calculate nutritive value

### **Core Practical 2 - Micronutrients and Food Preservation**

- CO1: Analyse minerals qualitatively
- CO2: Estimate vitamin C and iron quantitatively
- CO3: Assess calcium and phosphorus content in foods quantitatively
- CO4: Recommend vitamin A and C rich recipes for different socioeconomic groups
- CO5: Plan and prepare recipes rich in vitamins suitable for low and middle income group.

### **Core Practical 2 : Micronutrients and Food Preservation**

- CO1: Identify the quality defects in prepared products
- CO2: Estimate cost for the preservation techniques involved
- CO3: Create entrepreneurship avenues
- CO4: Develop new products based on the techniques

### **Core Practical 3 : Nutrition through Life Cycle & Food Processing and Bakery**

- CO1: Demonstrate the preparation of a balanced meal using five food groups
- CO2: Analyse the nutritional requirements of different age groups quantitatively and qualitatively.
- CO3: Recommend meal pattern and plan a day's meal based on the gender, age and activity and socio-economic status.
- CO4: Prepare and calculate the nutritive value of the balanced meal as recommended by ICMR.

### **Core Practical 3 : Nutrition through Life Cycle & Food Processing and Bakery**

- CO 1: Prepare various baked products
- CO 2: Identify the faults in the baked products and suggest remedies
- CO 3: Appraise the product through sensory evaluation
- CO 4: Create entrepreneurship avenues

### **Core Practical 4 : Dietetics, Quantity Food Management Practicals and Dietary Internship**

**CO1:** Examine the nature of the disease/disorder and decide the food to be included and avoided.

**CO 2:** Justify the diet plan based on the nutritional recommendations pertaining to each disease/disorder.

**CO3:** Plan and prepare disease specific diet based on individual needs.

### **Core Practical-IV- Dietetics, Quantity Food Management Practicals and Dietary Internship**

**CO1:** Prepare a food plan layout

**CO2:** Describe the catering equipment

**CO3:** Demonstrate napkin folding

**CO4:** Prepare standardized recipes

### **First Allied Course 1 : Basic Chemistry**

**CO1:** Discuss the types and uses of fuel gases and fertilizers in various industries.

**CO2:** Explain various types of chemical reactions and its significance in alloys.

**CO3:** Justify the role of halogenated compounds as drugs in pharmaceutical industry.

**CO4:** Uses of Synthetic polymers and synthetic dyes in Industrial chemistry.

**CO5:** Justify the physico-chemical properties of basic foods in food chemistry.

### **First Allied Course 2 : Human Physiology**

**CO1:** Examine the role of blood

**CO2:** Describe the anatomy of the various organ systems in the human body

**CO3:** Differentiate the major organs and the accessory organs

**CO4:** Relate the functions of each organ in the human system

**CO5:** Compare the hypo and hyperfunction of the endocrine glands

### **Second Allied Course 2 : Food Microbiology**

**CO1:** Enumerate the different types and morphology of microorganisms

**CO2:** Associate the sources of contamination that cause spoilage in different plant based foods.

**CO3:** Relate the different types of spoilage caused by contamination in animal based foods.

**CO 4:** Appraise the food borne infections and intoxications caused by microorganism and health effects.

**CO5:** Generalise the beneficial effects of microorganisms in the processing and development of fermented foods.

### **Second Allied Course 2 - General Biochemistry**

**CO1:** Relate the intermetabolic biochemical reactions occurring in the body and its influences over the health aspects

**CO 2:** Summarise the energetics in the metabolism of carbohydrates, amino acids and lipids

**CO3:** Explain the various detoxification mechanisms

**CO4:** Justify the role of enzymes in metabolic reactions

**CO5:** Assess clinical diagnosis by performing biochemical tests in blood and urine

### **First Allied Practical I : Basic Chemistry and Human Physiology**

**CO1:** Identify the organic reactions of carbohydrates and aldehyde

**CO2:** Examine the organic reactions of amide and Acid

**CO3:** Analyse qualitatively the reactions of ketone and Amine

**CO4:** Justify the estimation of sulphuric acid by acidimetry and alkalimetry titration

**CO5:** Estimate ferrous sulphate and oxalic acid by Permanganometry

### **First Allied Practical-II: Basic Chemistry and Human Physiology**

- CO1: Identify and differentiate the different types of cells and organs.
- CO2: Describe the histology of muscles.
- CO3: Distinguish the different blood groups, Rh factor and determine the bleeding time and clotting time.
- CO4: Demonstrate the measurement of blood pressure, respiratory and pulse rate.

### **Second Allied Practical 1 : Food Microbiology and General Biochemistry**

- CO1: Experiment the equipment in a microbiology laboratory.
- CO2: Prepare the laboratory media and special media, cultivation of bacteria, yeasts and moulds.
- CO3: Differentiate the microorganisms using simple staining.
- CO4: Prepare and identify the important moulds and yeast in food items

### **Second Allied Practical 1 : Food Microbiology and General Biochemistry**

- CO1: Analyse sugar and protein in the normal urines specimen qualitatively
- CO2: Identify bile salts and bile pigments in normal urines sample qualitatively
- CO3: Examine sugar and protein in the pathological urines sample.
- CO4: Experiment qualitative analysis of bile pigments and salts
- CO5: Estimate urea in urines sample quantitatively
- CO 6: Demonstrate the estimation of cholesterol quantitatively

### **Major Based Elective 1 : Hospitality Industry And Management**

- CO1: Explain the importance of catering based on various factors in food industry
- CO2: Differentiate between catering and other manufacturing industries
- CO3: Assess the role of hotel industry by various departmental services
- CO4: Categorise the various management plans and organisations in the development of food industry
- CO5: Discuss the role of human resources in the food management
- CO6: Recommend the sources of financial outcome in hotel industries

### **Major Based Elective 2 - Food Evaluation and Quality Control**

- CO1: Name the attributes of a safe food pertaining to the food safety management tools.
- CO2: Compare the quality food with the adulterated food and perform the test for adulterants
- CO3: Examine the food labels for the certifications and standards and confirm their relevance to the food product
- CO4: Justify the use of appropriate instruments to objectively evaluate the food quality and derive inference
- CO5: Design different types of sensory test to ascertain the acceptability of new food products

### **Major Based Elective 3 : Community Nutrition**

- CO 1: List the nutritional problems and their implications in national development.
- CO2: Discuss the methods of nutritional assessment and modes of extending nutrition knowledge to community
- CO3: Relate the objectives and functions of national and international agencies in alleviating the nutrition and health problems
- CO4: Compare the components and beneficiaries of nutrition intervention programmes in India
- CO 5: Plan and develop skills in organizing and evaluating nutrition education programmes in the community

### **Non Major Elective 1 : Nutrition for Women**

- CO1: Explain the basic principles of food in health
- CO2: Discuss the role of macro and micronutrients in human health
- CO3: Appraise the role of nutrition in adolescence

- CO4:** Describe the nutritional influence in pregnancy  
**CO5:** Recommend the nutritional requirements for lactating mother

**Non Major Elective 2 : Basics of Health and Functional Foods**

- CO1:** Compare the relationship between food and diseases  
**CO2:** List the various factors influencing the health and its management  
**CO3:** Differentiate over and under nutrition  
**CO4:** Justify the effects of bioactive components of the minerals in health  
**CO5:** Summarise scientific information about antioxidants, probiotics and prebiotics  
**CO6:** Illustrate the beneficial role of Functional foods in health

**Skill Based Elective 1 : Fundamentals of Food Analysis**

- CO1:** Relate the principles behind the analytical methods associated with food analysis based on government regulations  
**CO2:** Discuss the role of moisture in food technology  
**CO3:** Explain the importance of fat assay  
**CO4:** Assess protein in food through various bio techniques  
**CO5:** Explain the role of carbohydrate assay and its significance in the food analysis

**Skill based Elective 2 : Food Biotechnology**

- CO1:** Differentiate traditional and modern biotechnology  
**CO2:** Discuss the ethical issues of GM foods  
**CO3:** Produce and use spirulina related products  
**CO4:** Develop in production of selected enzymes and fermented products  
**CO5:** List patent and copyright issues

**Skill Based Elective 3 : Palliative Care**

- CO 1:** Outline the prevalence of lifestyle diseases  
**CO2:** Name the types of Palliative care available to the terminally ill patients  
**CO3:** Classify the types of pain and suggest remedies  
**CO4:** Identify the physical symptoms and recommend suitable measures for its management  
**CO5:** Examine the psychosocial symptoms and offer relief  
**CO6:** Articulate effectively as a palliative care volunteer

**Cross Disciplinary Course - Basics of Entrepreneurship Skills (N&D and H.Sc.)**

- CO1:** List the types of entrepreneur  
**CO2:** Apply and develop projects based on ideation  
**CO3:** Select a business plan  
**CO4:** Explain the different types of funding agencies suitable for each business venture  
**CO5:** Develop entrepreneurship as a career

**B.Sc. PHYSICS**

**PROGRAMME SPECIFIC OUTCOMES**

- PSO1:** Provide a systemic understanding of basic physical concepts, principles and theories along with the applications.

**PSO2:** To acquire a wide range of analytical and technical problem solving skills.

**PSO3:** To articulate integrative, scientific reasoning and logical ways to understand various fields of Physics.

**PSO4:** Demonstrate skills and competencies to conduct scientific experiments in laboratories.

**PSO5:** Instil knowledge about material properties and its applications for developing technology to ease the problems related to the society.

### **Corecourse1 : Properties of matter**

**CO 1:** Explain different modulus of elasticity and apply it to evaluate the various modulus of elasticity for a given material.

**CO 2:** Differentiate streamline and turbulent flow and the laws governing them and can able to demonstrate the methods of their determination.

**CO 3:** Describe the principle of surface tension and its relation with intermolecular interactions and also discriminate its variations based on different factors.

**CO 4:** Quote the principle of hydrostatic pressure and can illustrate the concept of centre of pressure and able to analyze the centre of pressure for various objects immersed in a liquid medium.

**CO 5:** Discuss the stability of the floating bodies and the assessment of its equilibrium condition necessary for proper floatation.

### **Core course 2 : Heat and Thermodynamics**

**CO 1:** Understand the concepts of heat transfer, ideal gas and analyze its experimentally.

**CO 2:** Illustrate the concepts of Black body and Quantum theory of radiation.

**CO 3:** Discuss the principles of low temperature Physics.

**CO 4:** Analyze the differences between Carnot's Engine & Refrigerator and gain knowledge about Entropy.

**CO 5:** Describe Maxwell's Thermodynamical relations and explain the concept of Enthalpy.

### **Core course 3 : Mechanics and Special Theory of Relativity**

**CO 1:** Understand and analyze the principles of projectile motion, impulse and the changes in energies of the rigid bodies due to direct and oblique impact.

**CO 2:** Describe the accurate description of the period and distance of the orbits of planets around the sun and appraise the variation of  $g$  with latitude and altitude.

**CO 3:** Express the physical significance of moment of inertia and calculate moment inertia for various rigid bodies.

**CO 4:** Express the symmetry of Laws of physics in all admissible frames of references and summarize the existence of hypothetical luminiferous ether medium which carry the light waves.

**CO 5:** Summarize length contraction, time dilation, relativity of simultaneity, addition of velocities, variation of mass with velocity time dilation and describe the pair production, pair annihilation and appearance of elementary particles when they are irradiated with gamma rays.

### **Core course 4 - Electricity and Electromagnetism**

**CO 1:** Understand the Fundamentals of electrostatics and apply & investigate the laws governing the charge distribution in material bodies for solving electro static potential problems.

**CO 2:** Summarize the laws of current electricity and use it to apply in solving a network and extend it to find the potential at any node in a complex electrical network.

**CO 3:** Illustrate the existence of electromagnetic force in a charged conductor and examine its applications.

**CO 4:** Describe Faraday's principle of electromagnetic induction and analyze its applications in inductors and transformers.

**CO 5:** Understand and analyze the nature of electric currents and its various parameters, and extend its applications in various AC circuits.

### **Core Course 5 : Optics, Lasers and Fiber optics**

**CO 1:** Understand and interpret the important areas of interference with different experiments associated with it.

**CO 2:** Differentiate between Fresnel and Fraunhofer diffraction and apply skill to find the wavelength of spectral lines using plane diffraction grating.

**CO 3:** Distinguish and analyze the concept of polarization by reflection, refraction and scattering & explain Brewster's and Malus law.

**CO 4:** Describe the characteristics and working principle of laser beam and also discriminate the different types of lasers.

**CO 5:** Classify the different types of fiber and explore the various fabrication techniques involved in it.

### **Core Course 6 : Atomic Physics and Spectroscopy**

**CO 1:** Recall the Fundamentals of positive rays and analyze the working of various spectrographs.

**CO 2:** Illustrate the Principles of Photoelectric effect and examine Einstein's equation & Compton effect.

**CO 3:** Understand Bohr atom model and evaluate the quantum numbers associated with Vector atom model, Pauli's Exclusion principle.

**CO 4:** Differentiate Normal and Anomalous Zeeman Effect and also analyzes the principle behind Paschen – Back effect & Stark effect.

**CO 5:** Classify the types of spectra and infer knowledge about Infrared and Ultraviolet spectroscopy and its applications.

### **Core Course 7 : Solid State Physics**

**CO 1:** Understand Bravais lattices and different crystal structures.

**CO 2:** Analyze Bragg's and Moseley's laws and crystal imperfections.

**CO 3:** Acquire knowledge of free electron theory and bonding in solids.

**CO 4:** Evaluate polarizability, dipole moment, Clausius Mosotti equation and magnetic properties of solids.

**CO 5:** Interpret the concept of Superconductivity, BCS theory, types of superconductors and its applications.

### **Core Course 8 : Basic Quantum Mechanics**

**CO 1:** Understand the differences between classical and quantum mechanics.

**CO 2:** Explain basic principles of quantum mechanics.

**CO 3:** Analyze physical systems by solving the Schrödinger's equation

**CO 4:** Apply operator formulation of quantum mechanics

**CO 5:** Appraise about quantitative information regarding microphysical systems.

### **Core Course 9 : Nuclear Physics**

**CO1:** Understand and analyze the basic properties of a nucleus and extend it predict the origin of nucleus and summarize various models governing to nuclear structure.

**CO 2:** Interpret the nature of alpha and beta particles and analyze the origin of gamma rays.

**CO 3:** Explain the concepts of Nuclear fission and fusion reactions and categorize nuclear reactors based on their working principle.

**CO 4:** Understand and explain the basic principle and working of particle accelerators and detectors.

**CO 5:** Distinguish and interpret the elementary particles and summarize the concept of Cosmic rays.

### **Core Practical 1 : Properties of Matter & Heat Experiments**

**CO 1:** Evaluate the young's modulus and Rigidity modulus of the given material.

**CO 2:** Apply the basic principles of surface tension to determine the interfacial surface tension between the liquids.

**CO 3:** Applying the concepts of transmission of heat in material bodies to evaluate the specific heat capacity of the liquid by various methods

**CO 4:** Capable of determining and comparing the coefficients of viscosity of liquids.

**CO 5:** Analyze and demonstrate the method of finding the thermal conductivity of solids.

### **Core Practical 2 : Electricity & Magnetism Experiments**

**CO 1:** Understand and analyze the characteristics of AC circuits

**CO 2:** Understand the ways to calibrate an ammeter using potentiometer

**CO 3:** Understand and apply the basic concepts of electricity by converting Galvanometer to ammeter and voltmeter and doing experiments using BG

**CO 4:** Apply the basic principles of optics to determine refractive and Dispersive power of the material of the prism

**CO 5:** Understand and analyze the characteristics of various diodes

**CO 6:** Analyse the electrical parameters using potentiometer

**CO 7:** Determine earth's Magnetic Moment and horizontal component of earth's magnetic field using Deflection magnetometer.

### **Core Practical 3 : General & Basic Electronics Experiments**

**CO 1 :** Demonstrate and compare various optical phenomena using spectrometer and analyze the results

**CO 2 :** Evaluate and Compare various constants using spectrometer

**CO 3:** Understand the concept of polarization and apply to find the specific rotatory power of the given sugar solution.

**CO 4:** Understand the working principle of diodes and design regulated power supply

**CO 5:** Understand the working of FET and CRO

**CO 6:** Compare the characteristics of different configurations of transistors and construct Hartley oscillator and emitter follower.

### **Core Practical 4 : General & Digital Electronics Experiments**

**CO 1 :** Compare simple electrical quantities using BG

**CO 2:** Understand simple operational amplifier circuits

**CO 3:** Execute simple programs using 8085 microprocessor

**CO 4:** Evaluate the value of important constants

**CO 5:** Analyze and understand simple digital and logic experiments.

### **Allied Course 1 : Foundation Physics-I**

**CO 1:** Explain and estimate the various moduli of Elasticity for a given material.

**CO 2:** Analyze the concepts of architectural acoustics and discuss the properties and applications of Ultrasonic waves.

**CO 3:** Examine the various laws of thermodynamics and illustrate the working of a heat engine.

**CO 4:** Explain the basic theories of nuclear forces and extend it to estimate the energy released in a nuclear reaction.

**CO 5:** Explain the principle, properties and analyze the different types of lasers with its applications.

### **Allied Course 2: Foundation Physics-II**

- CO 1:** Understand and apply the fundamentals of electrostatics, and various laws governing the charge distribution in material bodies for various electrostatic potential problems.
- CO 2:** Describe Faraday's principle of electromagnetic induction and extend its applications in electrical components such as inductors and transformers.
- CO 3:** Analyze the performance of diodes and transistors with respect to voltage-current characteristics and can estimate the voltage gain of a given transistor.
- CO 4:** Construct single stage transistor amplifier and analyze the feedback techniques to functions as oscillators and amplifiers.
- CO 5:** Analyze various logic circuits and extend it to simplify Boolean expressions.

### **Allied Practical - Foundation Physics Experiments**

- CO 1:** Study the concept of Young's & Rigidity modulus of a given material experimentally
- CO 2:** Explain the elastic behavior and working of Torsional pendulum
- CO 3:** Analyze the calibration of ammeter and voltmeter using potentiometer
- CO 4:** Perform experiments independently with various instruments
- CO 5:** Relate the theory and experiment of interference using airwedge and Newtons rings
- CO 6:** Tabulate the binary arithmetic, logics and boolean functions.

### **Allied Course 1 : Applied Physics-I**

- CO 1:** Understand the working of semiconductor diodes and apply it to construct rectifiers and regulators.
- CO 2:** Describe the working of a transistor and analyze its static characteristics in CE and CB mode.
- CO 3:** Illustrate the functioning of a transistor as an amplifier and analyze the importance of transistor biasing for undistorted signal production.
- CO 4:** Demonstrate the design of an Oscillators using transistor and explain the production of time varying electrical waveforms using wave shaping circuits.
- CO 5:** Understand and analyze the characteristics of different types of semiconductor devices.

### **Allied Course –II Applied Physics-II**

- CO 1 :** Classify various number systems and interpret its applications in digital designing.
- CO 2 :** Explains the simplification of logical statements with karnaugh maps and relate it to construct various logic circuits.
- CO 3 :** Analyze and design various combinational and sequential circuits
- CO 4 :** Understand the concepts of different registers and demonstrate different modules of counters.
- CO 5 :** Distinguish between data selectors and data distributors and analyze different coding techniques.

### **Allied Practical - Applied Physics Experiments**

- CO 1:** Recognize various components such as resistor, capacitor, IC's, voltmeter, ammeter and its usage in circuit designs
- CO 2:** Describe and explain the working principle of transistors, diodes and oscillators.
- CO 3:** Assemble simple practical circuits using the electronic components
- CO 4:** Identifies the difference between basic logic gates and universal gates
- CO 5:** Construct and verify Demorgan's laws and Boolean expressions.

### **Major Based Elective 1: Basic Electronics**

- CO 1:** Understand the working of semiconductor diodes and apply them as rectifiers and regulators.
- CO 2:** Illustrate the static characteristics of a transistor in different modes and analyze JFET
- CO 3:** Appraise about amplifier and oscillator

**CO 4:** Explain the need of modulation and demodulation.

**CO 5:** Describe the basic principles of TV and summarize the transmission and reception of radar.

### **Major Based Elective 2 : Digital Electronics**

**CO 1:** Examine the of various number systems and its application in digital design

**CO 2:** Explain the simplification of logical statements with Karnaugh maps

**CO 3:** Analyze and design various combinational and sequential circuits

**CO 4:** Understand the concepts of registers and counters

**CO 5:** To get the knowledge operational amplifiers and their applications.

### **Major Based Elective 3: Microprocessor 8085 and its applications**

**CO 1 :** Describe the architecture of 8085 and illustrate the organization of registers and memory in microprocessors.

**CO 2 :** Identify the addressing mode of an instruction.

**CO3:** Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor

**CO 4:** Explain the need for different interfacing devices.

**CO 5:** Understand the applications of INTEL 8085.

### **Non Major Elective 1 : Energy harvesting and Renewable energy resources**

**CO 1:** Explain the basic concepts and availability of conventional energy resources

**CO 2:** Delineate knowledge in solar energy , its effective utilization and understand the working of solar cooker

**CO 3:** Learn the concepts of wind energy utilization

**CO 4:** Recognize hydro and geothermal energy uses

**CO 5:** Learn the basic concepts of biomass energy.

### **Non Major Elective 2: Medical Physics**

**CO 1:** Understand and analyze the functioning of human physiological systems.

**CO 2:** Describe and summarize the applications of Physics in medical field.

**CO 3:** Examine and extend the applications of the biomedical instrument ECG, EEG in analyzing the physiological characteristics of a human body.

**CO 4:** Describe and evaluate various electronic measurement techniques used as a diagnostic devices like Blood cell counter- Automatic blood cell counter- Blood flow meter-Pace makers-Artificial heart valves.

**CO 5:** Identify and understand the working mechanism of various counters and detectors used in medical instruments for measuring the radiations.

### **Skill Based Elective 1: Troubleshooting Electronic Equipments**

**CO 1:** Recognize the causes and failures of troubleshooting process and describe the troubleshooting procedure

**CO 2:** Categorize hard and soft tools and able to apply the soldering technique skills

**CO 3:** List and classify various active and passive components

**CO 4:** Examine fuse and apply it to replace fuse and reframe the skill of handling switches and batteries

**CO 5:** Apply the skill of testing semiconductor devices using multimeter.

### **Skill Based Elective 2 : Electronic Communication System**

**CO 1:** Understand the fundamentals of communication system by illustrating and evaluating modulation and demodulation techniques.

**CO 2:** Describe the classification of Pulse communication and interpret generation and modulation techniques.

**CO 3:** Analyze the basic principles of Radar and demonstrate the production of colour TV signals.

**CO 4:** Demonstrate the concepts of mobile communication and analyze logical channels.

**CO 5:** Identify the origin of satellite communication and discuss the techniques involved to employ the latest technology.

### **Skill Based Elective 3 : C Programming in Physics**

**CO 1:** Understand the basic concepts of the C-programming language and analyze the data input and output library functions.

**CO 2:** Appraise about the various operators and their uses.

**CO 3:** Illustrate the use of control statements in C programming language.

**CO 4:** Explain about arrays and string handling functions

**CO 5:** Apply the concept of functions to estimate the physical values.

## **B.A. TAMIL**

### **PROGRAMME SPECIFIC OUTCOMES**

**PSO1:** Explain Tamil Literary History

**PSO2:** Enroll in higher studies

**PSO3:** Perform effectively in competitive examinations

**PSO4:** Become proficient in the language

**PSO5:** Acquire knowledge of Tamil History

**PSO6:** Imbibe moral values through Ethics in Literature

**PSO7:** Enhance their social vision

### **COURSE OUTCOMES**

#### **Core Course 1 :IkkalaIlakkiyam I**

**CO1:** Make modern poetries

**CO2:** write short stories

**CO3:** Analyze novels and fiction

**CO4:** Evaluate and Realize esthetic sense of the Literature

**CO5:** Assess the contribution made by modern Tamil writers to Tamil Literature

#### **Core Course 2 :Yappilakkanam**

**CO1:** Assess basic methods of tamil grammar

**CO2:** Acquire knowledge of the poetical parts of the language

**CO3:** Explain the kinds of poem

**CO4:** Write the language without grammatical errors

**CO5:** Speak the language with proper pronunciation

#### **Core Course 3 :Nannulezhuththathikaram**

**CO1:** Describe the characteristics of ancient tamils

**CO2:** Discuss the applications of letters

**CO3:** Explain the structure of 'sandhi'

**CO4:** Assess the knowledge of word behind societal usage



**CO5:** Develop experimental knowledge gained in reading epics

**Core Course 11 Sangam Literature**

**CO1:** Acquire kinds of literature

**CO2:** Assess the unique qualities of tamil literature

**CO3:** Develop research technology

**CO4:** Critic the features of literature

**CO5:** Write poems and short stories

**Core Course 12 : Tamil Iakkiyavaralaru**

**CO1:** Acquire the knowledge of the life style of ancient tamil people

**CO2:** Assess the salient/characteristics features of the sangam age

**CO3:** Discuss the value of sangam literature

**CO4:** Understand the ethics of humanity

**CO5:** Appreciate the reading skill in sangam poems

**Core Course 13 : Literary Criticism and Creative Literature**

**CO1:** Acquire different kinds of criticism

**CO2:** Assess the various aspirations of literature

**CO3:** Develop research techniques

**CO4:** Critic the features of literature

**CO5:** Write poems and short stories

**First Allied Course 1 : Journalism**

**CO1:** To train students to read newspapers properly and understand news by watching radio and television

**CO2:** Training to collect news properly write and send it to newspaper

**CO3:** To develop interest in working in newspaper companies

**CO4:** To gain experience in newspaper editing

**CO5:** Provide training in news reading

**First Allied Course 2 : Computer and Internet access in Tamil language**

**CO1:** Online posting of Tamil on inscriptions, palam oil, copper, coins, papers

**CO2:** Sensing internet participation in the Tamil language Electronic Age

**CO3:** Knowledge of computer Tamil

**CO4:** Educate students about internet and social networking sites

**CO5:** Teaching how to use e-libraries

**First Allied Course 3 : History and culture of Tamil Nadu I**

**CO1:** Explain the land forms, life style and social thoughts of ancient tamils

**CO2:** Acquire knowledge of inscriptions coins and copper plates

**CO3:** Discuss the life of Tamil kings and their administrative techniques

**CO4:** Explain the temple architecture and building techniques

**Second Allied Course 1 : Tourism**

**CO1:** Discuss the importance of tourism

**CO2:** Explain tourists and their significance in development of tourism

**CO3:** Understand tourism rules

**CO4:** Access the significance of tours and travels

### **Second Allied Course 2 : History and culture of Tamil Nadu II**

**CO1:** Explain the structure and features of cave temples

**CO2:** Evaluate and appreciate the art and technology used in building Tanjore Bragadeeshwarar temple

**CO3:** Discuss the rule, social vision and life style of ancient tamil kings

**CO4:** Explain the prospects of tamilnadu after the European invasion

### **Second Allied Course 3 : Translation**

**CO1:** Acquisition of foreign language knowledge

**CO2:** Knowing the Nature of Translation

**CO3:** Multidisciplinary knowledge acquisition through translation

**CO4:** Getting employment through translation

### **Major Based Elective 1 :Art of speech**

**CO 1:** Acquire knowledge of speech skills in political and literary and social aspects

**CO2:** Assess the grammar of speech

### **Major Based Elective 2 :Feminism**

**CO1:** Discuss the importance of Feminism

**CO2:** Explain the significance comparative literature

**CO3:** Understand literature in Feminism

### **Major Based Elective 3 :Folklore literature/ History of language**

**CO1:** Discuss the importance of folklore

**CO2:** Explain the significance folklore literature

**CO3:** Understand language history

### **Non Major Elective 1 : Basic Tamil -I**

**CO1:** Write tamil for students who donot know the language

**CO2:** Read sentences for students who donot know the language

### **Non Major Elective 2 :Basic Tamil - II**

**CO1:** Read short stories

**CO2:** Write applications and letters in tamil

### **Non Major Elective 1 : Advance Tamil - I**

**CO1:** Follow the values imparted in literary works in their life

**CO2:** Develop spirituality through spiritual works

### **Non Major Elective 2 :Advance Tamil - II**

**CO1:** Acquire knowledge of literary art

**CO2:** Write formal and informal letters

### **Skill Based Elective 1 :Lexicography**

**CO 1:** To develop the creativity of creating dictionaries

**CO2:** Teaching different types of dictionaries

**CO3:** Acquiring the ability to form newwords

### **Skill Based Elective 2 :Personality Development**

**CO 1:** Doubts about competitive exams

**CO2:** Sowing the personality development of students

### **Skill Based Elective 3 :Employment application in Tamil language**

**CO 1:** Train the students for Tamilnadu public service commission Examinations

**CO 2:** Developing the mindset to face government exam question papers

## **B.Sc. ZOOLOGY**

### **PROGRAMME SPECIFIC OUTCOMES**

**PSO1** Discuss the significance of diverse fields of Biological Sciences for offering solutions to humanity and society. Describe morphological, anatomical and physiological variations and functions of various organs and organ systems of animals and to develop communicative skill to explain living system and its interactions with environment.

**PSO2** Classify and analyze the living system and its interactions with environment, explain the extinction and existence of biodiversity of past and present and explain how organisms develop and function at the level of the gene, genome, cell, tissue, organ and organ-system. Understand and apply the working principles and applications of bioinstrumentation for designing and performing new experiments.

**PSO3** Interpret the complex processes, behavioral pattern, morphological, physiological and biochemical processes of various animals. Utilize taxonomical, analytical, statistical and entrepreneurial skills in various fields of Biological Sciences.

**PSO4** Understand theoretical basis and practical skills in the use of basic tools, technologies and methods of different disciplines of Biological Sciences. Understand and apply the knowledge of various disciplines of Biological Sciences to one's own life and to pursue for higher studies, employment, entrepreneurship, skill acquisition and to attempt competitive examinations. Apply the core values and environmental awareness with societal responsibility.

### **COURSE OUTCOMES**

#### **Core Course 1: Biology of Invertebrates**

**CO 1:** Distinguish International Nomenclature and classification of Invertebrates

**CO 2:** Categorize the diverse forms of Invertebrate animals & Compare functional activities and its adaptive features

**CO 3:** Describe the morphological features and larval forms of selected Invertebrates

**CO 4:** Categorize economic importance of invertebrates.

**CO 5:** Explain the evolutionary significance and sequence of Invertebrates

#### **Core Course 2: Biology of Chordates**

**CO 1:** Identify the nomenclature, describe the general characters and classify the Phylum Chordata up to classes

**CO 2:** Explain the study of representative animals from different classes of Phylum Chordata

**CO 3:** Describe the adaptive features and parental care in Amphibia

**CO 4:** Demonstrate the morphological, physiological and behavioural patterns of selected chordates

**CO 5:** Recognize the adaptive radiation and structural peculiarities of Mammals and classify the aquatic mammals and their adaptations

#### **Core Course 3: Environmental Biology**

**CO 1:** Describe the scope of environmental biology, biological effect of light and temperature

**CO 2:** Explain the animal relationship, population ecology, community structure and succession

**CO 3:** State the basic concepts and productivity of ecosystem

**CO 4:** Point out the wild life resources, apply conservation strategies, identify the different types of adaptations and its characters

**CO 5:** Describe and demonstrate the pollutants, effects and control, monitoring and assessment of environment.

#### **Core Course 4: Developmental Biology and Immunology**

**CO 1:** Apply the concepts of developmental process and summarize the early embryonic development

**CO 2:** Distinguish the egg membrane and explain fertilization

**CO 3:** Explain the development of organs.

**CO 4:** Differentiate the development of fetal membranes and placenta

**CO5:** Enumerate the types of immunity, lymphoid organs and to discuss the antigen antibody reactions.

#### **Core Course 5 :Principles of Physiology**

**CO 1:** Memorize the importance of food and their functions.

**CO 2:** Summarize the process of digestion and metabolism of food.

**CO 3:** Explain the body functions and life process.

**CO 4:** Describe the various endocrine glands and their associated physiological functions.

**CO 5:** Interpret the hormonal control of menstrual cycle and its hygiene

#### **Core Course 6 :Cell and Molecular Biology**

**CO 1:** Explain the structure and working principles of electron microscope and microtome.

**CO 2:** Identify and compare the prokaryotes and eukaryotes

**CO 3:** Define the ultra structure and categorize the functional aspects of cell and cell organelles.

**CO 4:** Demonstrate the nucleus and its organelles.

**CO 5:** Describe the types of DNA, RNA and criticize the protein synthesizing machinery.

#### **Core Course 7 :Biological Techniques, Toxicology and Biostatistics**

**CO 1:** Explain the basic principle and applications of centrifuge, chromatography and electrophoresis

**CO 2:** Classify the toxicants and its mode of action, identify the effect of toxicants on human health and compare the toxicity at different levels of organ system

**CO 3:** Describe the types and applications of bioassays in toxicology

**CO 4:** Apply the fundamental concepts on biostatistics in their academic

**CO 5:** Analyse the variance coefficient of variation and chi-square test

#### **Core Course 8: Genetics and Evolution**

**CO 1:** Summarize the basic principles of genetics including Mendelian concepts of heredity and to elucidate the multiple alleles and significance of Rh factors

**CO 2:** Explain the mechanism of crossing over, linkage and analyse the sex determination

**CO 3:** Describe the molecular structure of gene, and regulation of gene action

**CO 4:** Define inborn errors of metabolism and syndromes and describe the karyotype and human genome project

**CO 5:** Memorize theories of origin of life, mutation and defend modern synthetic view of evolution and explain the evolutionary significance of isolation and speciation

#### **Core Course 9: Microbiology**

**CO 1:** Demonstrate the features of viruses, bacteria, fungi and protozoa

**CO 2:** Identify the methods of isolation of bacteria and explain the basic concept of culture techniques

**CO 3:** Evaluate the aquatic and sewage microbiology

**CO 4:** Predict the suitable methods of preservation of dairy products and recognize the role of microbes in agriculture and spoilage of foods

**CO 5:** Examine the methods and advantage of bio-mining, bio-degradation and name the microbes involved in oil recovery

### **Major Based Elective 1: Sericulture**

**CO 1:** Name different species of mulberry and non-mulberry silk worms and mulberry plants varieties and they can also Write their species specific characteristics both for mulberry plants and silk worms

**CO 2:** Explain various symptoms of disease infestation in mulberry plants and in mulberry silk worm  
Bombyx mori

**CO 3:** Use the skills to establish their own mulberry cultivation and set up/maintain their own rearing unit/s for culturing mulberry silk worms with necessary facilities and appliances

**CO4:** Compare and contrast the characteristics of cocoon produced by thorough examination and categorize / grade them for sending it to market for sales

**CO 5:** Outline the different steps involved in silk reeling process and by-products of sericulture

### **Major Based Elective 2 :Aquaculture**

**CO 1:** Explain the scope of aquaculture and kinds of aquaculture practices

**CO 2:** Describe the live feed culture, pond construction and management

**CO 3:** Explain the culture of Indian Major carps, integrated fish farming and describe the techniques in induced breeding

**CO 4:** Examine transportation, disease management and culture techniques of carps, cat fishes, pearl oyster, prawns and ornamental fishes.

**CO 5:** List out preservation techniques and economic importance of fish

### **Major Based Elective 3 :Applications of Biotechnology**

**CO 1:** Summarize the applications of genetic engineering and identification of cloned genes

**CO 2:** Demonstrate the cell culture techniques, production of transgenic animals and their applications.

**CO 3:** Describe the assisted reproductive technology

**CO 4:** Demonstrate the fermentation techniques and describe the fermented products.

**CO 5:** Explain the genetic engineering techniques for human welfare.

### **Allied Course 1 :Morphology and Functional Aspects Of Invertebrates and Chordates**

**CO 1:** Identify the invertebrates and chordates around us

**CO 2:** Explain the morphology and functions of the organ system of paramecium, earthworm cockroach and frog

**CO 3:** Demonstrate the parasitic adaptation of liver fluke

**CO 4:** Identify the Mollusca with respect to economic importance

**CO 5:** Discuss the general characteristics and classification of different classes of invertebrates and vertebrates

**CO 6:** Explain the various adaptive features of vertebrates

### **Allied Course 2 :Applied Zoology**

**CO 1:** Explain the rearing of honey bees, methods of bee keeping and economic importance of honey

**CO 2:** Identify the disease of honey bee and silkworm.

**CO 3:** Describe the species of silk worm and rearing operations

**CO 4:** Explain the programming and problems of pearl industry

### **Cross Disciplinary Course : Integrated Farming**

**CO 1:** Understand the values of integrated farming

**CO 2:** Appraise the recent advances in integrated farming

**CO 3:** Explain the scope and importance of dairy farming with special emphasis on nutritive values and products

**CO 4:** Describe the life history of pest and vectors and their control measures

**CO 5:** Point out the skill for cultivation of mushrooms.

**CO 6:** Create the motivation to students for self-employment

### **Skill Based Elective Course 1: Integrated Solid Waste Management**

**CO1:** Classify the wastes based on its property, sources and type and explain its characterization.

**CO2:** Explain the waste generation and identify the waste collection methods

**CO3:** Identify the suitable methods of disposal of wastes

**CO4:** Describe the process of waste management

**CO5:** Identify the recycling methods and understand the process of recycling

### **Skill Based Elective Course 2 Bee Keeping**

**CO 1:** Describe the biology, methods and importance of bee keeping

**CO 2:** Apply the knowledge on care and management of apiary

**CO 3:** Identify the disease of honey bee and its byproducts

**CO 4:** Use the products of honey bees in a proper way

**CO 5:** Choose the appropriate marketing strategies in bee keeping

### **Skill Based Elective Course 3 :Nanotechnology for Life Sciences**

**CO 1:** Identify and characterize the nanoparticles

**CO 2:** Predict the major properties of nanomaterials and methods employed for synthesis

**CO 3:** Demonstrate the nanomaterials used in biomedical imaging and cancer therapy.

**CO 4:** Classify the biomarkers used in the detection of toxicity of nanoparticles.

**CO 5:** Use the nanoparticles in various fields.

### **Non-Major Based Elective Course 1 :Fish Culture**

**CO 1:** Explain the different types of aquaculture and ponds

**CO 2:** Identify and differentiate the freshwater, coastal and marine fishes

**CO 3:** Demonstrate the preparation of ponds, management of fish farms, hatching

**CO 4:** Explain the fishing vessels, marketing and preservation techniques

### **Non-Major Based Elective Course 2 :Vermiculture**

**CO 1:** Classify the earthworms based on its habit and identify the earthworm species utilized for vermiculture

**CO 2:** Describe the different anatomical features and their functions and compare the life cycles of vermicomposting earthworms

**CO 3:** Demonstrate the techniques involved in the vermiculture process.

**CO4:** Analyse the methods involved in vermicompost production and describe the types of vermicomposting

**CO 5:** Discuss earthworms as Farmers' Friend

## **POST GRADUATE PROGRAMMES**

## **PROGRAMME OUTCOMES (POs)**

On completion of programmes offered, the graduates can:

**PO 1** : Demonstrate mastery in the specialised fields

**PO 2** : Showcase developing research attitude and skills

**PO 3** : Organise and effectively prepare technical or research reports

**PO 4** : Use techniques and modern ICT tools in their specialised fields

**PO 5** : Integrate the acquired knowledge and skills to contribute to society and industry

## **M. Sc. BIOCHEMISTRY**

### **PROGRAM SPECIFIC OUTCOME**

#### **PSO 1**

Development of extensive theoretical and cognitive skills in Biomolecules and the relationship between structure and functions of organ and organism level and Gain knowledge in the mechanism of signal transduction necessary for the communication and regulation of endocrine glands.

#### **PSO 2**

Acquire knowledge by providing biochemical facts and the principles to understand the metabolic pathway of macromolecules, its regulation in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and regulation of gene expression.

#### **PSO 3**

Comprehending the importance of microbes in environmental aspects, medical, industrial, agricultural, microbe interaction with plant and animal, food aspects is an integrated part of Biochemistry and also acquiring an appreciation of analytical tools and impact in the existing technical aspects applied in modern technologies utilized in the biological and medical challenges.

#### **PSO 4**

Imbibing the importance of Plant and Animal cells grow as in vitro culture, maintenance and preservation of plant & animal cells, tissues and organs, scale up biochemical process in designing, optimization and analysis for developing the bioproducts required for society, types of pollution, waste management, biopesticides, biofertilizer and composting.

#### **PSO 5**

Motivate for compilation and interpretation of investigative data in life science, to demonstrate research skills and develop technology for commercialization and employability skill to become entrepreneur with proper knowledge on Ethical issues, biosafety and able to do multidisciplinary jobs in the various industries.

### **COURSE OUTCOMES**

#### **Core course 1 : Chemistry of Biopolymers**

CO1: Demonstrate the structure and biological functions of bio molecules

CO2: Analyze the significance of biological macromolecules

CO3: Predict the role of sugars in blood group substances

CO4: Compare the structure and importance of fatty acids and lipids

CO5: Communicate the biochemical activities of amino acids and proteins

CO6: Transmit the knowledge of genetic material Deoxy ribonucleic acid (DNA) & Ribonucleic acid (RNA)

#### **Core course 2 : Analytical Biochemistry**

CO1: Demonstrate the practical aspects of various instruments used in biological sciences

CO2: Design the theoretical knowledge of analytical tools

CO3: Utilize the analytical techniques in diagnosis of biological materials

- CO4: Evaluate and separate the molecular components in plant tissues with accuracy
- CO5: Discuss the role of isotopes in diagnosis and treatment
- CO6: Compute the collection, classification and tabulation of data for research

### **Core course 3 : Cellular mechanism**

- CO1: Critique the structural components of cell membrane.
- CO2: Demonstrate the techniques used to detect the cellular molecules
- CO3: Identify the systematic cell signaling pathways
- CO4: Demonstrate the molecular mechanism of causative agents
- CO5: Apply the acquired knowledge drug designing and treatment of cancer cells
- CO6: Identify the growth and development of cancerous cells
- CO7: Compare the transport mechanism of bacteria and animal cells

### **Core course 4 : Hormonal Regulation**

- CO1: Discuss the types of endocrine glands
- CO2: Compare the mechanism of action of hormones
- CO3: Compile the mechanism and regulation of hormones
- CO4: Explain the regulation, physiological functions and signaling mechanisms
- CO5: Discuss the abnormal consequences of hormone imbalance
- CO6: Communicate social responsiveness about the health problems

### **Core course 5 : Enzyme and Enzyme Technology**

- CO1: Compile the concepts of enzyme kinetics, mechanism of enzyme action and application of enzyme in industries, diagnosis and treatment
- CO2: Discuss the importance and mechanism of enzymes for living organisms
- CO3: Compare the significance of vitamins for enzyme activity
- CO4: Outline the source, isolation, extraction and purification methods of enzymes
- CO5: Identify the inhibitory types, substance and its mechanism
- CO6: Compute the regulatory role of enzymes in metabolism
- CO7: Critique the production methods and significance of immobilized enzymes
- CO8: Assess the concentration of biochemical compounds enzymatically by analyzing devices

### **Core course 6 : Energetics and Metabolic Regulation**

- CO1: Compute the basics of bioenergetics
- CO2: Explain the production and utilization of energy in metabolic pathways
- CO3: Predict various metabolic pathway and its regulatory mechanism
- CO4: Communicate the interrelation between major metabolic pathways
- CO5: Assess the biotransformation reactions
- CO6: Compile the synthetic metabolism of various biomolecule

### **Core course 7 : Genetics and Molecular Biology**

- CO1: Communicate the knowledge in molecular processes of cells
- CO2: Exhibit the fundamental knowledge of Deoxy ribonucleic acid (DNA)& Ribonucleic acid (RNA)
- CO3: Discuss on the molecular aspect of bacterial evolution and microbial diversity
- CO4: Outline the importance of central dogma
- CO5: Compile the knowledge of gene regulatory mechanism
- CO6: Discuss the methods of recombination

CO7: Apply the knowledge in molecular techniques

### **Core Practical 1 : Biochemical analysis**

COP1: Discuss the analytical separation methods for biochemical compounds

COP2: Assay the content of sugars, amino acid and protein from food stuffs

COP3: Evaluate the purification of mineral contents from different food grains

COP4: Outline the methods of isolation and separation of proteins and lipids

COP5: Identify the adulterants in processed food to create awareness

### **Core Practical 2 : Assay of Enzyme activity**

COP1: Assay the various methods for different enzyme activities in plants

COP2: Compile the experimental methods to determine the specific activities of enzymes

COP3: Rate the optimum pH and temperature of the enzymes

COP4: Identify the content of nucleic acids

COP5: Evaluate the concentration of Deoxy ribonucleic acid (DNA) & Ribonucleic acid (RNA)

### **Core course 8 : Advanced Clinical Biochemistry**

CO1: Apply the acquired knowledge metabolic disorders in advanced research

CO2: Work as biochemists in hospitals, clinical laboratories, research centre and health centre

CO3: Discuss the diagnostic methods for tissue functions test

CO4: Compile about the homeostasis of body fluids

CO5: Discuss genetic disorders

CO6: Explain the biochemical and hormonal changes during pregnancy

CO7: Critique clearly about the abnormal concentrations of biochemical substances in serum and urine

### **Core course 9 : Immunology**

CO1: Discuss the structure and functions of all immune components

CO2: Design the role of immune cells and its products during infections

CO3: Compute knowledge of serological techniques to detect the level of antigen

CO4: Assess the methods of Antibody production

CO5: Compile the allergic substances and their adverse effects

CO6: Revise the knowledge of transplantation and immune suppressor drugs

### **Core course 10 : Genetic engineering**

CO1: Outline the role of enzymes in genetic engineering

CO2: Discuss the gene transfer techniques with vectors

CO3: Apply the knowledge in benefits of gene cloning

CO4: Design the facts about the agriculture for human welfare with ethical issues

CO5: Compute with advances for developing new strains and improved crop plants

CO6: Discuss the environment pollution and its remedies

### **Core Practical 3 : Clinical Biochemistry**

CO1: Analyse the biochemical constituents in urine and serum

CO2: Assess the marker enzymes activity

CO3: Plan out hematological studies

CO4: Apply proper methods of specimen collection, handling and transport

CO5: Compute the normal values of biochemical parameters

#### **Core Practical 4 : Plant & Microbial Biochemistry**

COP1: Analyze the phytoconstituents from plant extracts

COP2: Rate the enzyme activities from germinating seeds

COP3: Discuss the grade and purity of water and milk

COP4: Utilize the procedure to separate and identify the plant pigments

COP5: Identify the phases of bacterial growth and antibiotic assay

#### **Major Based Elective 1: Microbial Biochemistry**

CO1: Assess the features of microbes, their implications on environment and uses of microbes in industry

CO2: Compare the characteristic features of bacteria, fungi and viruses

CO3: Apply the working knowledge of tools, instrument used to reveal the structural features of microbes

CO4: Analyse the types of beneficial bacteria used to reduce the chemical fertilizers and their mass production to save the environment and ecosystem

CO5: Critique the methods for water purification

CO6: Critique the food preservatives methods to prevent the food spoilage

CO7: Discuss the metabolism of bacteria and identify the best strain of bacteria and prepare pure culture to produce the novel metabolites to save human beings from diseases

CO8: Compute the role of bacteria in pest, weeds control and protect the atmosphere from pollution caused by the use of chemical fertilizers

#### **Major Based Elective2 :Pharmaceutical and Neuro Biochemistry**

CO1: Predict the sources of drugs.

CO2: Communicate the metabolism of drugs and their delivery system.

CO3: Discuss about the mechanism of action of drugs to avoid the side effects.

CO4: Critique the crucial role of drugs used to treat AIDS and cancer.

CO5: Compile the importance of receptors in drug delivery to target sites

CO6: Evaluate the significance of central nervous system and transmission of impulse

#### **Major Based Elective3 : Bioinformatics and Nanotechnology**

CO1: Apply the knowledge in using software

CO2: Compare DNA sequences, drug designing and microarray in Biological Sciences

CO3: Explain the study of nucleotide sequence information for understanding cell function

CO4: Discuss about the human genome project

#### **Major Based Elective4 : Phytochemistry and Applications**

CO1: Identify the plants used for traditional medicines

CO2: Evaluate secondary metabolites and their therapeutic potential

CO3: Design the sources of drugs

CO4: Identify secondary metabolites and formulation of herbal drugs

CO5: Apply the knowledge to be employed in tissue culture laboratory

CO6: Plan research work in traditional medicines

#### **Non Major Elective - Biochemistry of Diseases**

CO1: Demonstrate the knowledge of the causes, diagnosis, management and treatment of some common diseases

CO2: Revise the normal values of biochemical substances in serum and urine

- CO3: Identify clearly about the abnormal concentrations of biochemical substances in serum and urine  
CO4: Identify the types of genetic disorders and their preventive measures and treatment  
CO5: Discuss the metabolic disorders and the preventive measures

## M.Sc. CHEMISTRY

### PROGRAMME SPECIFIC OUTCOME

- PSO1** : Acquire firm knowledge in concepts of branches of chemistry and able to develop analytical thinking, problem solving and arriving to logical conclusion.  
**PSO2** : Ability to handle advanced instruments; synthesise, analyse, find applications of the compounds, establish the rate and mechanism of reactions and interpret the structure activity relationship.  
**PSO3** : Develop research skills in the fields of chemistry and publish papers in indexed journals.  
**PSO4** : Apply the principles and experimental skills for quality control analysis in industries.  
**PSO5** : Understand the eco-friendly chemical processes and impact of chemistry on health and environment enabling to become an entrepreneur.

### COURSE OUTCOMES

#### Core Course 1 :Inorganic Chemistry I

- CO 1:** Categorize chemical bonding based on Valence Bond Theory, Molecular Orbital theory and Valence Shell Electron Pair Repulsion Theory.  
**CO 2:** Explain the concepts of electronegativity and discuss the properties of f-block elements.  
**CO 3:** Describe the properties of acids, bases and non-aqueous solvents.  
**CO 4:** Illustrate inorganic Cages, rings, clusters and inorganic polymers.  
**CO 5:** Assess the theory of nuclear emissions and assess the applications of isotopes and radiations.

#### Core Course 2 :Organic Chemistry I

- CO 1:** Outline the preparation, properties and stability of reaction intermediates.  
**CO 2:** Describe the methods of establishing reaction mechanism.  
**CO 3:** Illustrate the mechanism of nucleophilic substitution reactions  
**CO 4:** Plan the preparation of aromatic compounds using electrophilic substitution.  
**CO 5:** Design Stereochemical Synthesis and assess stable conformers of Cyclohexane derivatives and decalins.

#### Core Course 3 : Organic Chemistry-II

- CO 1:** Illustrate the aromatic and antiaromatic compounds.  
**CO 2:** Explain the mechanism of addition to carbon-carbon multiple bonds and carbon-hetero multiple bonds.  
**CO 3:** Plan synthesis of compounds using reagents.  
**CO 4:** Construct correlation diagram for electrocyclic and cycloaddition reactions.  
**CO 5:** Explain the effect of stereochemistry of molecules to reactivity and mechanism.

#### Core Course 4 :Physical Chemistry-I

- CO 1:** Outline basic terms and concepts in quantum chemistry.  
**CO 2:** Develop a competent knowledge of classical thermodynamics for real gases.  
**CO 3:** Apply various methods to compute activity coefficient and criticize on choice of standard states for solids, liquids and gases  
**CO 4:** Illustrate the mechanism of explosion reaction.  
**CO 5:** Analyze the theories of electrical double layer.

### **Core Course 5 :PhysicalChemistry-II**

**CO 1:** Applytheknowledgeofquantummechanicstorigidrotor,harmonicoscillatorandatOMICstructure calculation

**CO 2:** EvaluateprobabilitybyMB,BEandFDstatistical methods.

**CO 3:** Understand surface phenomena and various adsorptionisotherms.

**CO 4:** Analyzetheroleofirreversiblethermodynamicsin understandingthebehaviorofchemicalsystemsunderdifferentenvironment.

**CO 5:** Applytheprinciplesofgrouptheorytoformulate selectionrulesforvarious spectraand hybridization

### **Core Course 6 : Physical Methods in Chemistry - I**

**CO 1:** Describethe principles of molecularspectroscopy.

**CO 2:** Assessisotopic massandinternucleardistance.

**CO 3 :** Calculateforceconstant,dissociationenergyand zeropointenergy.

**CO 4:** Analyse10DqvaluesandRacahparameters.

**CO 5:** InterpretUV&IRspectraldatatopredictthe structureofmolecules.

### **Core Course 7 : Inorganic Chemistry - II**

**CO 1:** Discusstheoriesof CFTandLFT.

**CO 2:** Examinechemistryoforganometalliccomplexes.

**CO 3:** Assessthephotochemistryofcobaltandchromium complexes and describe and analyse magnetic behaviour of transition metal complexes

**CO 4:** ExplainandIllustratediffractionstudyinunfurling thestructureofinorganiccompounds

**CO 5:** Classifydifferenttypesofdefectsinsolidsand illustrateandconnectthemwith theirproperties

### **Core Course 8 : Physical Methods in Chemistry- II**

**CO 1:** Explainthetermsandconceptsofprotonand<sup>13</sup>C NMRspectroscopy.

**CO 2:** Describetheprinciplesof<sup>13</sup>C-NMR,2DNMRand ESRtechniquesforanalyzingthe structureofcompounds

**CO 3:** AssessthestructureofInorganiccompoundsusing EPRdatabyapplyingtheprinciplesof EPR.

**CO 4:** Illustratecirculardichroismandopticalrotator dispersion and explain the principles of massspectrometryand analysingthestructure.

**CO 5:** IdentifytheorganiccompoundusingUV,IR,NMR and massspectradata.

### **Core Practical 1 : InorganicQuantitative& Qualitative Analyses and Complexpreparations**

**CO 1:** Synthesizesomemetalcomplexeswhichwillprocreate goodexperience fortheirfuturere search.

**CO 2 :**Examine electronic spectrum of synthesized metal complexes usingthetheoreticalknowledge.

**CO 3:** Investigatethepresence/absenceofcommon andrare cationsthroughsystematic analysis.

**CO 4:** Findthepresenceofcationswhicharepresenttoamicro quantitylevelinthegivenmixture.

**CO5:** Use colorimetricmethodfortheestimationofmetal ionsin agiven samplewhichmaybe appliedfor carryingouttheproject workin thefinalyearof thecourse.

### **Core Practical 2 : InorganicQuantitative Estimations of Mixture of MetallIons**

**CO 1:** Applyknowledgeonstudyofcomplexesfor carryingout theestimation ofmetallions.

**CO 2:** Predictmethodsforseparatingmetallionspresentinagiven mixture.

**CO 3:** Identifyseparatemethodsforestimatingtwodifferentmetall ionspresentinagivensolution.

**CO 4:** Plan efficiency to execute multiple type of works within the stipulated period of time.

**CO5:** Assess hardness of water samples following EDTA method which will be useful for executing water quality projects in future.

### **Core Practical 3 : Organic Mixture Analysis and Single Stage Preparation**

**CO 1:** Identify the solubility of mixture.

**CO 2:** Use the solubility principle to separate the organic mixture.

**CO 3:** Examine the separated components and confirm by derivative preparation.

**CO 4:** Plan the preparation of organic compounds.

**CO5:** Investigate the methods of purification of organic compounds by chromatography.

### **Core Practical 4 : Organic Quantitative Analysis and Double Stage Preparation**

**CO 1:** Analyze and estimate the amount of lactose in milk

**CO 2:** Predict the amount of ascorbic acid in various natural sources

**CO 3:** Evaluate the Iodine value/saponification value of commercial edible oils

**CO 4:** Assess the quantity of aniline/phenol/ketone in solutions

**CO 5:** Plan double stage preparation of organic compounds

### **Core Practical 5 : Non-Electrical Experiments in Physical Chemistry**

**CO 1:** Construct a phase diagram for different systems.

**CO 2:** Predict the order of reactions.

**CO 3:** Perform adsorption experiment which is one of the current research topics for the treatment of industrial effluents.

**CO 4:** Compare the rate of acid-catalyzed reactions

**CO 5:** Examine a clock reaction.

### **Core Practical 6 : Electrical Experiments in Physical Chemistry**

**CO 1:** Demonstrate proper handling of electrical instruments.

**CO 2:** Measure the solubility of sparingly soluble salt by conductance and emf measurements.

**CO 3:** Create awareness on theoretical research.

**CO 4:** Apply C++ program to solve chemical problems and analyze the geometry of simple molecules using MOPAC

**CO 5:** Recognize the application of simple chemical softwares.

### **Major Based Elective Course 1 : Chemistry of Biomolecules, Catalysis and Photochemistry**

**CO 1:** Describe the interaction between metal-ion macrocyclic ligands and chelation therapy

**CO 2:** Outline the interaction between metal and proteins.

**CO 3:** Explain the role of metal complexes in biological process

**CO 4:** Outline the type of catalysis and its applications

**CO 5:** Illustrate the kinetics of photochemical reactions

### **Major Based Elective Course 2 : Chemistry of Supramolecules and Natural Products**

**CO 1:** Assess and categorize various types of interactions present in supramolecular structures.

**CO 2:** Construct self-assembly molecules by using the knowledge on H-bonding & metal-ligand interactions.

**CO 3:** Describe the synthesis of heterocyclic compounds, structural elucidation of alkaloids and antibiotics.

**CO 4:** Plan organic synthesis based on disconnection approach.

**CO 5:** Illustrate the synthesis of proteins, steroids and hormones.

### **Major Based Elective Course 3 : Medicinal Chemistry**

**CO 1:** Apply physicochemical properties to drug design

**CO 2:** Describe the methods of identification of lead compounds that are useful for the synthesis of drugs

**CO 3:** Analyze the metabolism of drugs

**CO 4:** Summarize preclinical, clinical trials and understand the manufacture of drugs

**CO 5:** Compile the different types of drugs

### **Major Based Elective Course 4 : Advanced techniques and Computers in Chemistry**

**CO 1:** Describe the methodology involved in fluorimetry, phosphorimetry, nephelometry and turbidimetry, chromatography and AAS

**CO 2:** Illustrate the basics of thermogravimetric techniques, cyclic voltammetry and ion selective electrodes.

**CO 3 :** Compose a new scientific review report.

**CO 4:** Solve the chemistry problems using C++ programs

**CO 5:** Reframe the Z matrix for some chemical compounds.

### **Non Major Elective Course : Agricultural and Industrial Chemistry**

**CO 1:** Outline the fundamentals of micronutrients, soil chemistry and pesticides and their biological role.

**CO 2:** Summarize the basic knowledge and applications of fertilizers, biofertilizers and manures.

**CO 3:** Appraise the current development in chemistry and contribution of chemistry for sustainable development.

**CO 4:** Understand the importance of Refractories, Adhesives and Leather in industries.

**CO 5:** Create and develop knowledge on sources and deficiency diseases of vitamins

## **M.Com. (COMMERCE)**

### **PROGRAMME SPECIFIC OUTCOMES**

**PSO 1 :** Apply quantitative skill in the area of business decision making in their future careers.

**PSO 2 :** Identify lucrative investments in the market and apply intelligent strategies in their field of profession.

**PSO 3 :** Engage themselves in advanced research in the field of Functional Management.

### **COURSE OUTCOMES**

#### **Core Course 1: Accounting for Managers**

**CO1 :** Acquaint with Accounting Standards.

**CO2 :** Analyze financial statements using comparative and common-size statements and ratio analysis.

**CO3 :** Compare various business alternatives using marginal costing and decision-making

**CO4 :** Construct various budgets for organizations

**CO5 :** Interpret the business results by using cost control techniques.

#### **Core Course 2 : Quantitative Methods**

**CO1 :** Describe and Distinguish the Descriptive Measures of Central Tendency and Dispersion

**CO2 :** Distinguish between Correlation and Regression Analysis and Predicting the variables.

**CO3 :** Categorize the Probability and Non-Probability sampling methods.

**CO4 :** Apply the procedure for testing the hypothesis and interpret the results.

**CO5 :** Apply and interpret the results of Parametric and Non- Parametric tests

#### **Core Course 3 : Advanced Financial Management**

- CO1 : Understand Time value of money and its Techniques
- CO2 : Demonstrate Leverage and its effect on business credibility and liquidity position
- CO3 : Categorize various capital Structure and capital budgeting techniques and incorporate risk analysis.
- CO4 : Interpret and Construct Dividend Policy
- CO5 : Estimating Working capital requirements based on current business Environment

#### **Core Course 4 : Economics for Decision Making**

- CO1 : Understand the concepts, nature and scope of managerial economics in business decision making.
- CO2 : Outline the demand and supply analysis in business applications.
- CO3 : Construct production and cost structure under different stages of production.
- CO4 : Analyze the causes and consequences of different market conditions.
- CO5 : Analyze the business cycle and forecast business needs.

#### **Core Course 5 : Advanced Corporate Accounting**

- CO1 : Understand various methods of valuing Goodwill and shares
- CO2 : Construct Consolidated Final Accounts of Holding Companies
- CO3 : Recall various methods of computing Purchase Consideration and preparing accounts for amalgamation and absorption of companies
- CO4 : Analyze the accounting practice of Inflation Accounting
- CO5 : Construction of the Final Accounts of Banking and Insurance Companies

#### **Core Course 6 : Operations Research**

- CO1 : Understand the nature and scope of Operations Research.
- CO2 : Apply the iterative procedure of Simplex Method in solving Linear Programming Problem
- CO3 : Apply the cost minimization technique to Transportation and Assignment Problem
- CO4 : Understand and facilitate the application of Queuing Models
- CO5 : Construct a network and estimate the time for completing a Project

#### **Core Course 7 : Strategic Management**

- CO1 : Outline the concept and types of Strategies
- CO2 : Analyze the strategic environment at macro level and apply different models used in Industry analysis
- CO3 : Develop the Strategies at Corporate Level
- CO 4 : Evaluate and Construct Strategies for Resource Allocation
- CO5 : Apply the various techniques of strategic evaluation and control process

#### **Core Course 8 : Corporate Tax Management**

- CO1 : Construct Taxable income from Business/Profession
- CO2 : Calculate clubbing and deemed incomes
- CO3 : Categorized deductions from GTIu/s80.
- CO4 : Acquaint Calculation of Total income of a Company.
- CO5 : Outline Administration aspects of Income Tax and GST.

#### **Core Course 9 : Security Analysis and Portfolio Management**

- CO1 : Categorize the various investment avenues and alternatives
- CO2 : Evaluate these securities markets, regulation and its investment
- CO3 : Interpret fundamental analysis of an organisation using financial data

**CO4** :Examine technical analysis of an organisation using required information

**CO5** : Evaluate and construct portfolio of Securities

### **Core Course 10 : Financial Services**

**CO1** :Recall innovative financial services, fund based and non-fund based services.

**CO2** :Illustrate the role of Financial Service Intermediaries as Merchant Banker and Issue Manager

**CO3** :Remember the concepts and functionalities of hire purchase and Leasing

**CO4** :Demonstrate investment decision making skill and Distinguish investment proposals in Mutual Fund and other investments

**CO5** :Analyse how to strengthen the financial and liquidity position of a business firm

### **Core Course 9 : Project Planning and Management**

**CO1** :Demonstrate Project and Capital Budgeting

**CO2** :Outline the Concept of Strategy and Portfolio strategy

**CO3** :Identify Business Investment Opportunities

**CO4** :Analyse SCBA and Options

**CO5** : Develop Business Project Plan, Evaluate and Implement

### **Core Practical 1 : Data Analysis Using SPSS**

**CO 1**: Describe and Demonstrate the SPSS windows.

**CO 2**: Apply the Descriptive measures of statistical Techniques to the research data and interpret the results.

**CO 3**: Apply Correlation & Regression Analysis to the data and interpret the results.

**CO 4**: Demonstrate the application of Inferential statistical techniques viz, t-test, chi-square test, ANOVA, MANOVA & interpret the results.

**CO 5**: Build appropriate interpretations for the analytical results generated by Non-Parametric Test.

### **Core Practical 2 : Programming in PL/SQL**

**CO1** :. Execute the queries used in DDL, DML, TCL and DCL.

**CO2** :Executing & Validating the queries with constraints.

**CO3** :Execute queries using set operators and linking the Tables.

**CO4** :Illustrating the PL/SQL Attributes.

**CO5** :Develop Programs for commercial applications

### **Major Based Elective 1 : Industrial Laws**

**CO1** :Understand the legal provisions relating to health, safety and welfare of the workers

**CO2** :Outline the role of Trade Union and Industrial Polices in relation to settlement of Industrial Disputes and ensure job security for workers

**CO3** :Improve awareness on composition and distribution of workmen compensation and makes better understanding about workers in getting fair wages.

**CO4** :Understand the legal provisions relating to payment of Wages

**CO5** :Acquire knowledge as per the mode and modality of bonus payment and provident fund

### **Major Based Elective 1 : Corporate Laws (Alternative Paper)**

**CO1** :Create awareness of legal principles involved in economic relationships and business transactions.

**CO2** :Outline the functionalities of free enterprise system

**CO3** :Demonstrate clearly and forcibly the generally accepted but not always documented, proposition that law is an expression of the public will

**CO4** :Outline the significant role played by the judiciary in the protection of individual liberty and private property.

**CO5** : Enrich and make more meaningful study of the other social sciences and substantive laws.

### **Major Based Elective 2 : Services Marketing**

**CO1** : Outline the theoretical and practical framework of Services Marketing.

**CO2** : Appraise the nature and develop marketing mix for service products.

**CO3** : Identify service location and determine promotional mix for various services.

**CO4** : Analyse issues involved in Service process.

**CO5** : Ascertain 7P's of the services sector such as hospital, education, tourism, etc.

### **Major Based Elective 2 : Retail Management (Alternative Paper)**

**CO1** : Outline the concept of Traditional and Non-traditional Retailing.

**CO2** : Predict Global Trend in Retailing.

**CO3** : Identify and Distinguish different Retail Formats.

**CO4** : Compare Service Retailing and Product Retailing and decide suitable business policies.

**CO5** : Analyse the shopping pattern and decide the process of CRM retailing.

### **Major Based Elective 3 : Business Research**

**CO1** : Familiarize basic concepts of Research and Various types of Research and Methodology of Research.

**CO2** : Identify and Distinguish different types of Research Design.

**CO3** : Illustrate Sampling and Scaling techniques and formulation of Hypothesis.

**CO4** : Demonstrate Data Collection, Data Processing, Data Analysis and Interpretation.

**CO5** : Improve the Report writing Skill.

### **Major Based Elective 3 Management Information System (Alternative Paper)**

**CO1** : Recall the Fundamentals of Information System.

**CO2** : Impart knowledge on the different types of Information System.

**CO3** : Expose the students to Expert System like Executive Information system and Artificial Intelligence Technologies.

**CO4** : Train them in applying system approach to Problem solving.

**CO5** : To give them guidelines for creating a Virtual Company

### **Major Based Elective 4 : Human Resource Management**

**CO1** : Understand the functions of Human Resource Management and the role of Human Resource Manager and Human Resource Information System (HRIS), Human Resource Accounting and Audit

**CO2** : Develop job specific Recruitment Process, Selection, Interview Procedures, Induction and Placement

**CO3** : Demonstrate different training methods and mode of evaluating the effectiveness of training

**CO4** : Develop methods of performance appraisal of an employee

**CO5** : Remember Quality of Work Life (QWL), Voluntary Retirement Scheme (VRS) and Strategic Human Resource Management.

### **Major Based Elective 4 : Organizational Behaviour (Alternative Paper)**

**CO1** : Remember the various organisational behavioural theories.

**CO2** : Gain knowledge about personality, perception and social learning.

**CO3** : Understand the concept of Group dynamics and Group cohesiveness.

**CO4 :**Outline the various aspects of motivation of employees in an organisation.

**CO5 :** Demonstrate various Leadership styles.

**Non Major Elective : Basics of Management Accounting**

**CO1 :** Gain the knowledge on Management Accounting.

**CO2 :** Analyze the financial statements by applying various Ratios.

**CO3 :** Construct budgets of various types for better future decision making in business.

**CO4 :** Interpret managerial decisions by applying Marginal costing tools.

**M.Sc. COMPUTER SCIENCE**

**PROGRAMME SPECIFIC OUTCOMES**

**PSO 1: Technical Concepts:** Demonstrate adequate technical skills and traits with domain knowledge by applying appropriate technological tools.

**PSO 2: Software Development:** Design and develop solutions by following standard software engineering principles and implement by using suitable programming languages and platforms.

**PSO 3: Recent Trends:** Obtain in-depth knowledge of technology on demand that can provide more economic and affordable solutions to transform innovative ideas into reality.

**PSO 4: Employability:** Adapt successfully as a professional in multi-disciplinary environments which enhances their profile in accordance with the advancement of technologies.

**PSO 5: Life-long Learning:** Upgrade their core skills to take up higher studies, research and entrepreneurship in the incredibly changing modern computing environment.

**COURSE OUTCOMES**

**Core course 1 : Java Programming**

**CO 1:** Explaining Object Oriented Programming concepts with its base for future applications.

**CO 2:** Discussing the theoretical basis of method overloading, method overriding in Java

**CO 3:** Creating Knowledge on Inheritance and explaining packages and interfaces in Java for software development skills

**CO 4:** Understanding the deeper significance of process states and thread life cycle and developing Programs in Java.

**CO 5:** Discussing applet programming with applet life cycle and introducing Java Swing for applications.

**Core Course 2 : Linux Operating System**

**CO 1:** Describe the design issues of Linux operating systems

**CO 2:** Classify the design and implementation issues of Distributed Shared Memory

**CO 3:** Explore the Resource Management & Process Management techniques

**CO 4:** Explicate the File Models & File Caching Schemes of DOS

**CO 5:** Depict the Linux Kernel concepts as Case Study

**Core Course 3 : Design and Analysis of Algorithms**

**CO 1:** Understand the steps needed for efficient development of algorithm, and tools for various algorithms

**CO 2:** Develop algorithms using heuristics, greedy, and know some probability and statistical problems

**CO 3:** Develop algorithm for minimum weight

spanning tree, searching and sorting algorithms

**CO 4:** Evaluate arithmetic expressions, parallel sorting, parallel spanning tree algorithms

**CO 5:** Determine the minimum cost, minimum weight, shortest path. Understand magic square algorithms and random number generations

### **Major Based Elective 1 : Artificial Intelligence and Machine Learning**

**CO 1:** Describe the concepts of AI, application and advancements in AI

**CO 2:** Explain the characteristics of AI problems and state space representation

**CO 3:** Elucidate various heuristic search algorithms

**CO 4:** Identify and analyze different types of AI agents and virtual environments

**CO 5:** Describe ML techniques and algorithms

#### **Core Practical 1 : Linux**

**CO 1:** Know the basic set of commands and utilities in Linux systems.

**CO 2:** Know the advanced set of commands and utilities in Linux systems

**CO 3:** Write shell script programs to perform and check the file and directory permissions

**CO 4:** Build programs for process creation

**CO 5:** Illustrate AWK programs to display file in the given

#### **Core Practical 2 : Java and Visual C# Programming**

**CO 1:** Developing skills to write object oriented Java Programs with various control structures and looping structures and VB.NET applications.

**CO 2:** Apply the method overloading, method overriding concepts for programming applications in Java. Developing object oriented programming applications with knowledge on Inheritance, packages and interfaces in Java.

**CO 3:** Developing looping structures and control structures in VB.NET

**CO 4:** Understand applet life cycle and developing applet based Programs in Java. Developing programs in Arrays and Buttons of VB.NET and VC#.NET

**CO 5:** Understanding the significance of Multi-threading concepts with priorities and developing programs for the same. Developing Java Swing for GUI based applications. Developing looping structures and control structures in VC#.NET. Developing database applications in VC#.NET

#### **Core Course 4 : Internet of Things**

**CO 1:** Describe the new and important IoT concepts with the essential concepts

**CO 2:** Explore the programming knowledge of Arduino focusing on IoT applications with the case studies

**CO 3:** Illustrate the Raspberry Pi architecture and its implementation in IoT applications.

**CO 4:** Acquire the knowledge about the fog computing with its specific characteristics and challenges.

**CO 5:** Depict different IoT applications and its implementation as Case Study

#### **Core Course 5 : Programming with Visual C#**

**CO 1:** Understand the basic architecture of .NET framework with Automatic Memory management in .NET framework.

**CO 2:** Develop strong theoretical base about VB.NET programming applications with looping control structures and arrays.

**CO 3:** Understanding COM, DCOM, COM+ technologies and developing VC#.NET programming applications with looping, control structures and arrays

**CO 4:** Implement event driven programming with VC# .NET and windows applications using GUI based tools.

**CO 5:** Developing object oriented programming in VC# and work on the ADO .NET based database applications in VC#.NET

### **Major Based Elective 2 : Software Testing**

- CO 1:** Describe the context of testing in software development and define key terms verification, validation, quality assurance and quality control
- CO 2:** Ability to enlist the types of tests and perform White box testing
- CO 3:** Performs Black box testing to tests the product behavior
- CO 4:** Describe integration, System and Acceptance testing
- CO 5:** Elucidate the need and methodology for doing performance and Regression Testing

### **Non Major Elective – Principles of Java Programming**

- CO 1:** Explain the overview of Java language with History of development and salient features of Java Programming.
- CO 2:** Discuss the various types of operators and control structures and looping structures of Java language with simple programs.
- CO 3:** Describe the features of object oriented programming in Java using constructors, nested methods and method over loading with simple programs.
- CO 4:** Acquiring knowledge about applet life cycle and developing simple applet programs. Understanding various types of Inheritance in Java with programming examples.
- CO 5:** Developing skills using basics of HTML tags for creating small scale HTML applications.

### **Core Course 6 : Mobile Communications**

- CO 1:** Understand the concept of mobile devices and history of mobile communication and wireless transmission
- CO 2:** Know the working principles of mobile phone systems, applications, security or IP networks
- CO 3:** Illustrate new techniques such as voice, data and solutions in mobility
- CO 4:** Explain different functionalities on one device - operating on Internet technologies
- CO 5:** To understand and analyze various supports for mobility using i-mode, syncML and WAP.

### **Core Course 7 : Computer Networks and Network security**

- CO 1:** Explain the overview of Networking models and preference of TCP\_IP model with various applications of Networks.
- CO 2:** Discuss the various protocols used in Networking and understand the same.
- CO 3:** Gain knowledge about various routing algorithms and understand dead lock and congestion control algorithms.
- CO 4:** Describe the efficient connections and disconnections methods in Networks avoiding delay. Describe the various blue tooth features and the protocols stack.
- CO 5:** Understand various cryptographic methods and implement security algorithms with trial data and realize the working of the same

### **Core Course 8 : Data Mining Concepts and Techniques**

- CO 1:** Describe Knowledge discovery process and the kinds of data bases
- CO 2:** Explain attribute types and basic statistical descriptions of data with clarity
- CO 3:** Ability to demonstrate how to clean and pre-process the real-world data
- CO 4:** Describe the methods for mining frequent patterns and classification
- CO 5:** Define unsupervised learning method and outlier detection

### **Major Based Elective 3 : Distributed Technologies**

- CO 1:** Understand the XML and CSS
- CO 2:** Explain the importance of Name Spaces

- CO 3:** Know how the Java Scripts
- CO 4:** Know how the Java Scripts and Window Object methods
- CO 5:** Discuss about JSP Fundamentals and Java Beans

### **Core Course 9 : Embedded Systems**

- CO 1:** To understand the concepts of embedded system architecture, design, interfacing and advanced processors
- CO 2:** To know the various real world development of embedded systems, platform descriptions, debugging tools and achieve better performance
- CO 3:** To describe the concept of interrupts, services and mechanisms
- CO 4:** Ability to know various interprocess communication and synchronization methods
- CO 5:** Ability to write embedded software development process, and identify the various debugging aids and techniques

### **Core Course 10 : Principles of Big Data**

- CO 1:** Explain the basic concepts of Big Data
- CO 2:** Describe about Data Model for Big Data
- CO 3:** Understand the processing concepts
- CO 4:** Discuss the storage technology and analysis techniques.
- CO 5:** Apply the knowledge on Hadoop

### **Major Based Elective 4 : Web Series**

- CO 1:** Explain web services and client/server architecture.
- CO 2:** Discuss the SOAP Modelling.
- CO 3:** Understand Web Services Description Language and UDDI
- CO 4:** Apply scripting language in ASP
- CO 5:** Work with ASP cookies

## **M.A. ECONOMICS**

### **PROGRAMME SPECIFIC OUTCOMES**

- PSO1:** Examine and interpret the current issues in the economy.
- PSO2:** Predict fiscal and monetary policy on the economic performance of the country.
- PSO3:** Analyse and assess economic variables with statistical tools and techniques.
- PSO4:** Develop analytical thinking skills in socio-economic issues and facilitate research.

### **Core Course 1 : Micro Economic Analysis - I**

- CO 1:** Understand and apply the theories of demand.
- CO 2:** Predict the economic behaviour of individuals, firms and markets in economy.
- CO 3:** Acquire the basic knowledge in the theory of risk and uncertainty.
- CO 4:** Identify and explain the types of imperfect competition.
- CO 5:** Discuss various concepts and theories of Production Function.
- CO 6:** Assess the applications of micro economics in real life

### **Core Course 2 : Macro Economic Analysis**

- CO 1:** Comprehend the macro economics concepts and their relevance to the economy.
- CO 2:** Compute National Income Accounting by using various macroeconomic concepts.
- CO 3:** Apply macro economic theoretical structure and empirical knowledge in real life.

**CO 4:** Explain the various consumption theories in economic environment.

**CO 5:** Analyse the theories of investment function.

**CO6:** Compare the theories of Trade cycle.

### **Core Course 3 : Mathematical Methods in Economics**

**CO 1:** Compare the relations of economic concepts with mathematical tools and techniques.

**CO 2:** Apply mathematical tools and techniques in economic theories.

**CO 3:**Analyse the mathematical tools in differential calculus.

**CO 4:** Prepare and apply for the competitive examinations.

**CO 5:** Estimate the economic problems through mathematical tools.

**CO6:** Demonstrate ability to solve Simultaneous equations

### **Core Course 4 : Tourism Economics**

**CO 1:** Acquire basic knowledge in Tourism.

**CO 2:** Understand the Historical development of Tourism.

**CO 3:** Analyse the economic impact of tourism.

**CO 4:** Estimate and Predict the future demand and Supply of Tourism.

**CO 5:** Discover the cultural heritage of our country.

**CO6:** Explain the Development of Tourism.

### **Core Course 5 : Micro Economic Analysis - II**

**CO 1:** Demonstrate Marginal Productivity Theory of Distribution.

**CO 2:** Analyse general equilibrium of production and exchange.

**CO 3:** Understand the difference between partial and general equilibrium.

**CO 4:** Recognize the importance of economic analysis in dealing with different economic Phenomenon.

**CO 5:** Evaluate the theories of externality.

**CO6:** Assess the concept of social welfare function and compensation principles.

### **Core Course 6 : Monetary Economics**

**CO 1:** Discuss the components of money supply.

**CO 2:** Analyse the post Keynesian approaches to demand for money.

**CO 3:** Recognize the practical applicability of monetary variables.

**CO 4:** Explain the Phillips Curve.

**CO 5:** Compare the relationship between tax rate and tax revenue through Laffer curve.

**CO6:**Apply the Knowledge about policy implications of supply side economics.

### **Core Course 7 : Statistical Methods in Economics**

**CO 1:** Apply the statistical tools in solving economic problems.

**CO 2:** Analyze the various statistical methods in Economics.

**CO 3:** Recognize the applicability of statistical tools in research and in real life.

**CO 4:** Create the hypothesis for their research work.

**CO 5:** Compare the measures of central tendency.

**CO6:** Differentiate Correlation and Regression.

### **Core Course 8 : Economics of Development**

**CO 1:**Analyze the concepts of growth and development.

**CO 2:** Discuss the theories of growth and development.

**CO 3:** Evaluate the significance of capital formation in economic development.

- CO 4: Understand the difference between Balanced and Unbalanced growth strategy.
- CO 5: Knowledge about the contemporary issues on economic growth and development.
- CO:6 Explain the needs of various growth models in economic development.

#### **Core Course 9 :Environmental Economics**

- CO 1: Compare the interrelationship between environment and economic system.
- CO 2: Understand the functions and type of ecological systems.
- CO 3: Demonstrate the management of environmental issues at the present world.\
- CO 4: Discuss the methods of conservation of resources.
- CO 5: Explain the significance of environmental planning and management for protecting Environment.
- CO6: Knowledge about the various environmental Issues and Realize the importance of environmental Protection.

#### **Core Course 10 : Public Economics**

- CO 1: Knowledge about the functions of the Government.
- CO 2: Discuss the basic concepts of Public Debt.
- CO 3: Analyze various theories of Public Expenditure.
- CO 4: Apply the fiscal policy for the sustainable development of the economy.
- CO 5: Assess the Centre-State Financial relations.
- CO6: Explain the role of fiscal policy in developed and underdeveloped countries.

#### **Core Course 11 : International Economics**

- CO 1: Understand the importance of international economics.
- CO 2: Compile the theories of international trade and restrictions.
- CO 3: Analyse the various measures to correct the balance of payment.
- CO 4: Discuss the importance of foreign exchange in development of the economy.
- CO 5: Identify the various international organizations.
- CO:6 Apply the concepts of international economics in practical life.

#### **Core Course 12 : Industrial Economics**

- CO 1: Analyze the process of industrialization in Indian Economy.
- CO 2: Compare the size of firm and industry.
- CO 3: Gain Knowledge in setting up of an industrial location.
- CO 4: Discuss the various industrial location theories.
- CO 5: Demonstrate industrial structure and finance.
- CO6: Explain the role of SEBI in capital market.

#### **Core Course 13 : Indian Economy- Problems and Policies**

- CO 1: Understand the basic characteristics of Indian economy.
- CO 2: Analyze the demographic characteristics of a population.
- CO 3: Assess the importance of agriculture in food security of Indian economy.
- CO 4: Prepare and plan for the competitive examinations.
- CO 5: Examine the unemployment problems in India.
- CO6: Interpret the significance of LPG in economic reform of the economy.

#### **Core Course 14 : Entrepreneurship Development**

- CO 1: Discuss the various types of entrepreneurs.

- CO 2: Describe the various process of Production management.
- CO 3: Analyze the scope of entrepreneurship in India.
- CO 4: Plan the project appraisal to undertake a business venture.
- CO 5: Utilize the various institutions supporting for entrepreneurship development.
- CO6: Evaluate the role of women in entrepreneurial development.

#### **Major Based Elective 1 : Econometrics**

- CO 1: Discuss the basic concepts and techniques of Econometrics.
- CO 2: Assess the economic relationships of statistical methods in Econometrics.
- CO 3: Apply the models of Econometrics in Economics.
- CO 4: Recognize the importance of Econometrics in research.
- CO 5: Examine the quantitative technique skills.
- CO6: Illustrate the economic theories and its applications.

#### **Major Based Elective 2 : Computer Applications in Economics**

- CO 1: Discuss the basic concepts of computer system.
- CO 2: Demonstrate the various parts of desktop.
- CO 3: Construct and creating documents in M.S Word.
- CO 4: Apply computer-aided skills in social science research.
- CO 5: Design the usage of MS-Excel in research.
- CO6: Recognize the importance of computer application in employment.

#### **Major Based Elective 3 : Research Methods in Economics**

- CO 1: Identify the various methods of social science research.
- CO 2: Analyze the research work through various statistical tools.
- CO 3: Able to develop literature review and research methodology.
- CO 4: Compile and analyzing data.
- CO 5: Apply the skill of analysis of research.
- CO6: Explain the importance of research methods in analyzing the practical problem.

#### **Major Based Elective 4 : Women and Economy**

- CO 1: Understand the Historical aspects of Women.
- CO 2: Analyze the contribution and problems of Women in India.
- CO 3: Demonstrate the recent trend in Women's Education.
- CO 4: Gain Knowledge of various indicators of health for women.
- CO 5: Evaluate the various women health programmes.
- CO6: Develop the importance of Women Empowerment.

#### **Non- Major Based Elective : Managerial Economics**

- CO 1: Assess the nature and scope of Managerial Economics.
- CO 2: Evaluate various pricing methods and cost analysis in business.
- CO 3: Design the various business techniques in present scenario.
- CO 4: Discuss the Products price fixation .
- CO 5: Understand the significance of demand forecasting.
- CO6: Employ the Managerial skill and its applications.

### **M.A. ENGLISH**

#### **PROGRAMME SPECIFIC OUTCOMES**

- PSO 1** Apply the knowledge of theories in the field of literature
- PSO 2** Demonstrate the semantic and syntactic structure of the English Language
- PSO 3** Apply teaching methodologies and nuances
- PSO 4** Enhance writing techniques for the holistic professional development
- PSO 5** Clear the qualifying examinations like TET, TRB, SET, NET and other competitive examinations

**Core Course 1 : British Literature–I (Chaucerian, Elizabethan and Augustan Age)**

- CO 1:** Demonstrate the understanding of the spirit of Chaucerian, Elizabethan and Augustan age
- CO 2:** Assess the seminal works of the period
- CO 3:** Analyze the representative literary works of the age
- CO 4:** Demonstrate a critical approach to the literary works
- CO 5:** Apply the knowledge acquired for research

**Core Course 2 : American Literature**

- CO 1:** Trace the evolution of American civilization
- CO 2:** Outline the history of America
- CO 3:** Demonstrate the knowledge of American history and culture
- CO 4:** Analyze and appreciate the seminal works in American Literature
- CO 5:** Describe the main currents of developments in American Literature
- CO 6:** Categorize works of writers according to American History
- CO 7:** Assess contributions made by the American writers to American Literature

**Core Course 3 : Indian Writing in English**

- CO 1:** Analyze trends in Indian Writing in English
- CO 2:** Criticize Indian Writing in English
- CO 3:** Distinguish the rich and complex heritage of India
- CO 4:** Identify the works of the representative Indian writers in English
- CO 5:** Demonstrate the understanding of the uniqueness of Indian values that underlies such contributions

**Core Course 4 : Literary Criticism**

- CO 1:** Understand and appreciate the evolution of English critical tradition
- CO 2:** Analyze the works of famous critics of literature
- CO 3:** Appreciate the critical contribution made by prominent critics from the 16<sup>th</sup> century to twentieth century
- CO 4:** Demonstrate their critical acumen
- CO 5:** Apply the knowledge in further research in various branches of literature

**Core Course 5 : British Literature–II (Romantic and Victorian Age)**

- CO 1:** Demonstrate the understanding of the spirit of the Romantic and the Victorian age
- CO 2:** Assess the seminal works of the period
- CO 3:** Analyze the representative literary works of the age
- CO 4:** Train to appreciate and analyse the literary devices employed in the literary works
- CO 5:** Apply the knowledge acquired for research

**Core Course 6 : Shakespeare**

- CO 1:** Appreciate the representative plays of Shakespeare
- CO 2:** Appreciate and analyze the dramatic devices and techniques employed in his plays
- CO 3:** Acquire knowledge of Elizabethan theatre and audience

- CO4: Analyze the tragedies, comedies and histories of Shakespeare
- CO5: Understand the characteristics of Shakespeare's Plays
- CO6: Recognize and discuss qualities of Shakespeare's Plays
- CO7: Use of rhetorical and dramatic strategies in creating a play
- CO8: Write coherent and compelling essays that begin to explore the complex questions Shakespeare raises.

### **Core Course 7 : Literary Theory and Practice**

- CO1: Understand and appreciate the cross currents of several movements in English literary criticism from 1950 onwards
- CO2: Analyze the postcolonial perspectives in literary criticism
- CO3: Understand the impact of the critical theories of the West on Indian Aesthetics
- CO4: Demonstrate the ability for critical appreciation of literary texts
- CO5: Apply the knowledge in further research in various branches of literature

### **Core Course 8 : British Literature-III (Modern Age)**

- CO1: Demonstrate the understanding of the spirit of the Modern age
- CO 2: Assess the seminal works of the period
- CO3: Analyze the representative literary works of the age
- CO 4: Demonstrate a critical approach to the literary works
- CO5: Apply the knowledge acquired for research

### **Core Course 9 : Women's Writing**

- CO1: Analyze the oeuvre of literary writings in English by women
- CO 2: Identify and analyze many and varied voices of women silenced down the ages
- CO3: Demonstrate new perspectives on various women's issues
- CO4: Evaluate attitudes of life's realities
- CO5: Evolve a feminist identity

### **Core Course 10 : Research Methodology**

- CO 1: Apply knowledge of the methodology for research
- CO2: Develop an appropriate methodology for research studies
- CO3: Develop a research proposal and hypothesis
- CO4: Apply different research methods
- CO 5: Apply the knowledge of research techniques for further research
- CO 6: Apply knowledge of mechanics of research
- CO7: Demonstrate the knowledge in documenting
- CO 8: Apply the technicalities of research writings

### **Core Course 11 : Diasporic Writing in English**

- CO1: Demonstrate the contribution made by diasporic writers to English literature
- CO2: Assess the culture of various lands
- CO3: Analyze the condition of the immigrants through the works of diasporic writers
- CO4: Demonstrate the elements of diasporic literature and identify the diasporic consciousness in contemporary literature
- CO5: Apply the concepts, theories and challenges of diaspora in research

### **Core Course 12 : Postcolonial Writing in English**

- CO 1: Identify the new portals of Postcolonial writings
- CO2: Assess the social, political and cultural conditions prevailing in the once-colonized countries,

through the representative writings from these countries.

**CO3:** Analyze and appreciate literatures in English written by non-native speakers of English

**CO4:** Understand and appreciate the creative fusion of Native and English literary texts

**CO5:** Understand devices found in Postcolonial Literatures

**CO6:** Develop an understanding of the poetic and the theatrical devices of the once-colonized countries

**CO7:** Identify a common pattern in body of Postcolonial literatures

**CO8:** Appreciate the contribution made by Postcolonial writers to literature

### **Core Course 13 : World Classics in Translation**

**CO1:** Recognize the cultural and historical backgrounds of the various societies or civilizations of the past

**CO2:** Exhibit knowledge of classical mythology

**CO 3:** Apply the style and language of the canonical literatures of the Classical languages around the world

**CO4:** Demonstrate the differences between Oriental and Western literary landscapes

**CO5:** Apply the knowledge in further research in branches of literature like Comparative Literature

### **Core Course 14 : Asian Literatures in English**

**CO 1:** Demonstrate the literary atmosphere of different countries

**CO2:** Assess the contribution made by Asian writers to English literature

**CO3:** Analyze the culture of Asian countries

**CO 4:** Demonstrate to compare the culture and functioning of different Asian societies through representative works

**CO5:** Apply critical thinking skills by engaging the students in crosslinguistic, cultural, comparative and historical analysis

### **Major Based Elective 1 : Advanced Linguistics**

**CO1:** Trace the evolution of human language

**CO2:** Apply knowledge of Phonology and Morphology

**CO3:** Assess important notions in Diachronic Linguistics

**CO4:** Assess important notions in Synchronic Linguistics

**CO5:** Demonstrate knowledge of theoretical notions and problem solving activities

### **Major Based Elective I : History of English Language**

**CO1:** Familiarize the students with the origin of English

**CO 2:** Enable them to understand the development of English Language

**CO3:** Understand the growth of vocabulary of the language

**CO4:** Introduce the students to the theories of language

**CO5:** Understand the influence of other languages on English language

### **Major Based Elective 2 : English Language Teaching**

**CO1:** Apply knowledge of English Language Teaching Theories

**CO2:** Apply principles of framing syllabus

**CO3:** Apply nuances in content development

**CO4:** Demonstrate the skills of teaching of the four skills – Listening, Speaking, Reading, Writing at the secondary and tertiary level of language learning

**CO5:** Apply teaching methodology and techniques

**CO 6:** Apply techniques of testing and evaluation

**CO7:** Demonstrate skills of classroom management

**CO8:**Demonstrateemployabilityskills

**MajorBasedElective2 : BasicSkillsinEnglishLanguageTeaching**

**CO1:**Demonstrateskillsforeffectiveclassroom Teaching

**CO2:**Applyknowledgeinclassroom Management andinevaluation Process

**CO3:** Demonstratevariousstrategies in Preparingteachingaids

**CO4:**Demonstratelanguageability

**CO5:**Demonstrateemployabilityskills

**MajorBasedElective3 : Single Author Study -RabindranathTagore**

**CO1:**Demonstrateanin-depth insightintothestudy ofTagore’s Works

**CO2:**AssessTagore’sworksinvariousgenres

**CO 3:**Evaluatethe contributionofTagoreto Indian WritinginEnglish

**CO4:**UnderstandtheinfluenceofTagoreonIndianspiritualityandIndianWritinginEnglish

**CO5:**Demonstrate acriticalapproachtothe literaryworks

**CO5:**Applytheknowledgeacquiredfor research

**MajorBasedElective 3 : Single AuthorStudy-ThomasStearnsEliot**

**CO1:**AnalyzeandappreciateT.S.Eliot’sWorks

**CO2:**AssessT.S.Eliot’sworksinvariousgenres

**CO3 :** Gain insight into the modern age of T.S. Eliot and the uniqueness of his creative output with regard to both his poems and plays

**CO4:**DemonstrateacriticalapproachtotheworksofT.S.Eliot

**CO 5 :**Appreciate and evaluate Drama Poetry and criticism of T.S. Eliot

**CO6:**Applytheknowledgeacquiredforresearch

**CO7:**Understandthesignificanceofthevariousculturalproductions ofT.S.Eliot

**MajorBasedElective4 :EnglishLiteraturefor UGCExaminations**

**CO1:**Exhibitconfidencetofacevarious competitiveExaminations

**CO2:**DemonstrateknowledgeinEnglish Languageand Literature

**CO3:**ApplytheknowledgerequiredforgettingthroughSET/NET/JRF

**CO4:**Exhibitcomprehensiveunderstandingof various literaturesinEnglish

**CO5:** Relatetheacquiredknowledgeat competitiveexaminations

**MajorBasedElective 4 : EnglishforScienceand Technology**

**CO1:**Applyskillsindevelopingcontentandinresearch Writings

**CO2:**Exhibit acquiredknowledgeinspecificprofessional Purposes

**CO3:**Demonstratetechnicalwritingskillsinwork Environment

**CO4:**Demonstratethelanguagenecessaryforthe fieldof scienceandtechnology

**CO5:** Applytheknowledgeacquiredforresearch

**NonMajorElectiveEnglish for CareerAdvancement**

**CO1:**Demonstratelanguageproficiency

**CO 2:**Assessthe seminalworksoftheperiod

**CO3:** Analyzethelanguageabilityneededtoworkforoffices

**CO4:**Demonstratethetheoriesofwriting,speaking, intercultural communication,correspondenceandleadership skills

**CO5:**Applythenuancesofficecommunication

## M.A. HISTORY

### PROGRAMME SPECIFIC OUTCOMES

**PSO 1 :** Secure admissions in B.Ed., M.A., M. Phil., Ph. D., B.L., MSW, Sociology, Political Science, Public Administration, Journalism, International Relations etc. Ensuring Horizontal and Vertical progress

**PSO 2 :** Demonstrate understanding of skills acquired with the learning of Tamil Epigraphy, Temple Architecture, Travel Management, Sociology of Mass Communication, Social Psychology, Public Administration, Archives Keeping etc.

**PSO 3 :** Acquire research skills such as the ability to find, critically evaluate, contextualize, compare and interpret historical events.

**PSO 4 :** Serve as faculty in schools and colleges. Work in the Department of Archaeological Survey of India

**PSO 5 :** Act as tourist guides

**PSO 6 :** Get placed in counseling centers and NGO's

**PSO 7 :** Work as HR Managers

### COURSE OUTCOMES

#### Core Course 1 : History of Tamil Nadu up to 1336 C.E.

**CO1:** Tabulate the pre-historic sites and period. List out the Sangam literary works and its author. Discuss and analyse the society and economy of Ancient Tamilakam.

**CO2:** List out the important temples of the Tamil dynasties. Appreciate the contribution of the Pallava's, Pandya, Cholas to art and architecture.

**CO3 :** Chart out the genealogy of rulers in the given dynasties. Identify the differences and similarities between Early and Medieval Tamil society.

**CO4 :** Infer and illustrate the features of Pallava, Pandya and Chola Administration.

**CO5:** Identify the influence of Tamil culture in the South-east Asian countries. Critically analyse the Civil war in the Pandya Kingdom.

#### Core Course 2 : Indian Civilization and Culture upto 1206 C.E.

**CO1:** Tabulate the sources of Ancient India. Locate the pre-historic sites in India. List out the major places of Harappan Culture. Categorize the features of Indus culture.

**CO2 :** Classify the Vedic literatures. Distinguish the early and later Vedic societies, enumerate the factors for the rise of new religions, summarize their contribution to Indian culture.

**CO3:** Name the Mahajanapathas and point out the rise of Magadha, discuss impact of Alexander's invasion, assess the polity and society under Mauryas.

**CO4:** Summarize the cultural contributions of Satavahanas, Kushans & Guptas.

**CO5:** Outline the Political condition of India on the eve of Muslim Conquests. Analyse the rich cultural heritage of India in terms of Values & beliefs.

#### Core Course 3 : Constitutional History of England up to 1714 C.E.

**CO1:** Trace the origin of Great Council, Value the historical significance of the Magna Carta, Illustrate the growth of features of parliament in the 13<sup>th</sup> & 14<sup>th</sup> centuries.

**CO2:** Sketch the personality and ideology of Early Stuarts, Dramatize the relationship between the Early Stuarts and their Parliaments.

**CO3:** Illustrate the factors led to civil war in England and the abolition of Monarchy, Appraise the features of Commonwealth Government, evaluate the role of Cromwell

**CO4:** Dramatize the restoration of Later Stuarts, List out the important legislations during Later Stuarts period, examine the factors led to the struggle between the king and the parliament

**CO5:** Examine the impact of Glorious revolution. Evaluate the development of various features of

Parliament in the 17<sup>th</sup> Century C.E.

### **Course Outcome Core Course 4 :History of Science and Technology**

**CO1:** Tabulate the ancient scientists and their inventions, compare and contrast the science and technology of west and the orient.

**CO2:** Point out the findings of Modern astronomers, assess the development of modern medicine, summarize the impact of invention of printing machine

**CO3:** Estimate the role of Scientific academies in the development of science. Identify the major scientists and their inventions of 18<sup>th</sup> Century.

**CO4:** Identify the factors led to Industrial Revolution, List out the major inventions that revolutionized Europe, assess the changes in world commerce

**CO5:** List out the Indian Scientists and their contributions in various fields. Summarize the development of Science & Technology in Modern India

### **Core Course 5 : History of Tamil Nadu 1336 - 1800 C.E.**

**CO1:** Tabulate chronologically the rulers of Madurai Nayaks, Marathas and Sethupathis. Analyze the socio-political condition of Tamil Nadu in the later Medieval period.

**CO2 :**Trace the advent of Europeans in Tamil Nadu. Locate their trading centres, analyze the commercial conflict of the Europeans. Explain the role of Christian missionaries.

**CO3:** Examine the causes for the Anglo-French rivalry, summarize the factors that led to the success of British

**CO4:** List out the contribution of Nayaks and Marathas to Architecture, Literature. Discuss the features of the Nayak architecture. Assess their cultural contribution

**CO5:** Sketch the consolidation of British in Tamil Nadu, Outline the resistance against British rule. Evaluate the contribution of Missionaries to Tamil society.

### **Core Course 6 : History of India 1206 – 1858 C.E.**

**CO1 :** Table the sources for the study of Medieval India. Arrange the genealogy list of Sultans, Vijayanagar and Mughals. Examine the Administrative features of the given dynasties.

**CO2:** List the literary works and the authors of Medieval India. Outline the monuments of Sultans and Mughals. Discuss and appreciate the special features of Muslim architecture.

**CO3:** Determine the Polity, Society & Economy under Vijayanagar and Bahamini kingdoms. Appraise the contribution of Vijayanagar &Bahamini to Art and Architecture.

**CO4:** Trace the advent of Europeans, debate their commercial activities and their rivalries, Summarize the establishment of British and expansionist policy.

**CO5:** Determine the consolidation of British rule in India. Value the administrative reforms of the British to eradicate social evils. Appraise the various causes, course & consequences of the revolt of 1857

### **Core Course 7 : Revolutions in the Modern World.**

**CO1:** Identify the unity of thirteen colonies for the cause of Independence. Demonstrate knowledge on the key events and themes in the history of the American Revolution.

**CO2:** Define the old regime in French society, evaluate the role of French philosophers, discuss the significance of Estate General, fall of Bastille, Value the French Declaration of Rights of Man

**CO3:** Trace the development of Chinese nationalism, estimate the role of Sun-Yat-Sen, analyze the causes, course and results of the Revolution.

**CO4:** Outline the condition of Russia on the eve of 20<sup>th</sup> century, Determine the position of Monarch and role of Rasputin, Evaluate the nature of the Bolshevik revolution and emergence of Lenin and Communist ideologies.

**CO5:** Explain the agrarian system and factor led to the agrarian revolution. Summarize the different stages of the Industrial Revolution

**Core Course 8 : History of Tamil Nadu 1800 - 1996 C.E.**

**CO1:** Trace the consolidation of British rule and estimate the revenue administration. Identify the contribution of Christian Missionaries.

**CO2 :** Outline the growth of nationalism and early organisation, Discuss and appreciate the strategies of Swadeshi leaders, Assess the role played by Tamil Nadu in the freedom struggle.

**CO3:** Outline the condition of society in the late 19<sup>th</sup> century, analyze the causes that led to the emergence of Non-Brahmin Movement in Tamil Nadu, estimate the role of EVR.

**CO4:** Arrange chronologically the Governors and Chief Ministers. Estimate the achievements of various chief Ministers. Discuss the developments under different governments

**CO5:** Illustrate the growth and development of education and economy, Assess its impact in the transformation of Tamil Nadu as a developed State.

**Core Course 9 : HISTORY OF INDIA 1858 - 1947 C.E.**

**CO1:** Arrange the list of Governor-Generals, Estimate the administrative development under British, discuss the growth of education, Identify the evils in the society and the role of reformers.

**CO2:** Enumerate the factors that led to the rise of nationalism, Sketch the methods and demands of early nationalists, Estimate the role of early nationalists.

**CO3:** Explain the British policy of divide and rule. Write how far British fan the seed of Communalism. Discuss the solidarity shown by the Indians

**CO4:** Value the ideals and strategies of Gandhiji against British. Illustrate the emergence of Freedom Movement as mass movement under Gandhiji

**CO5:** Formulate the plan and tactics of British to hold India and estimate the reactions of Indians. Tabulate Acts chronological and its important provisions, Determine the Constitutional development under British

**Core Course 10 : Indian Administration**

**CO1:** Lay out the organization and structure of a Ministry. Explain the functions of the important ministries. Distinguish between Line, Staff and Auxillary agencies.

**CO2:** Examine the functioning of Secretariat in Central and State Administration. Interpret the place of Chief secretary in State. Estimate the role of various Civil servants in the District administration.

**CO3:** Outline the Constitutional and Statutory Commissions in India. Analyze the functions of the important commissions. Explain the peculiar features of Corporation and its functions

**CO4:** Trace the origin of Civil services in India, categorize the civil services, distinguish direct and indirect recruitment, appraise the present system of recruitment.

**CO5:** Debate about the corruption in India. Analyze the mechanism to check corruption. Comprehend the relationship between Political Executive and Civil Servants.

**Core Course 11 : History of Europe 1815 - 1945 C.E.**

**CO1:** Outline Europe politics after Napoleon, Illustrate the diplomacy behind various Alliances, Interpret the phrase if France Sneezed, the whole Europe got Cold.

**CO2:** List out the inventions that led to Industrial and Agrarian Revolution, Justify the impact of Socialism as a reaction to Capitalism. Determine the internal and external policy of Napoleon III

**CO3:** Discuss the diplomatic role of Cavour in unifying Italy and role of Bismarck in unifying Germany. Justify the role of Kamal Pasha as father of Modern Turkey

**CO4:** Explain the causes for the Greek war of Independence, Examine of consequences of Crimean war, Review the significance of Balkan Wars.

**CO5:** Define Nazism and Facism, Justify Fascism and Nazism were Imperialistic, anti-democratic

and anti-communistic movements. Estimate the role of Industrial Revolution in changing the course of History and society

### **Core Course 12 : History of India 1947 to 1989 C.E.**

**CO1:** Discuss the problems of Independent India, Illustrate the process of Integration at various stages. Summarize the process of Linguistic reorganization of State

**CO2:** Illustrate the economic ideology of Nehru, analyze the economic development in contemporary India. Justify the fact that Nehru as the architect of Modern India.

**CO3:** Evaluate the Indian democratic politics, Assess the role of Indira Gandhi in the birth of Bangladesh. Trace the emergence of regional organizations

**CO4 :** Explain the rise and fall of Janta Party, Illustrate the development in Education, Estimate the advancement of science, space and nuclear technology

**CO5:** Outline the emergence of Rajiv Gandhi in Indian Politics. Assess the part played by India in International politics. List out the Presidents and Prime Ministers of India

### **Core Course 13 : International Relations Since 1945 C.E.**

**CO1:** Define International relations. Discuss the widening scope of International relations. Identify the elements of National Power, Outline the kinds of foreign policies, debate the collective security in the Post World War period

**CO2:** Determine the origin of bi-polar politics, discuss its causes, phases and impact, Outline the decolonization and emergence of Third World, Justify the role of NAM in the bi-polar world. Trace the disintegration of USSR.

**CO3:** Illustrate the structure and functions of UNO and its agencies, Tabulate the Specialized Agencies and its headquarters. Value the role of UN as a Peace maker. Debate the emergence of regional organisations. List out the various regional organization.

**CO4:** Analyze the development of International Economic System, Trace the transformation of GATT to WTO, Outline the demand of Third World for NIEO. Summarize the impact of globalization.

**CO5:** Justify the efforts of disarmament in the bi-polar world. Explain the nuclear energy as a determinant of Power politics. Debate on the major international issues like Terrorism, Environment, Refugee problems, Child trafficking

### **Core Course 14 : Historiography & Research Methodology**

**CO1:** Define History, explain its scope and nature, Examine the uses and abuses of History, Justify the dependence of History on Auxillary Disciplines

**CO2:** Outline the basic concepts in History, compare and contrast objectivity and subjectivity, Relate the need of objectivity in Historical writing, Value the philosophy of History.

**CO3:** Tabulate the important Greek, Roman, Church, Arab Historians and their works, Outline the major historical traditions of Modern period and List out the historians and their works.

**CO4:** Analyze the characteristics of Indian Historiography, compare the colonial and oriental historiography, analyze the development in the modern period. List the important Modern Indian historians and their works

**CO5** Categorize different levels of Research, Illustrate the prerequisites for collection of sources, value the application of internal and external criticism, analyze the role of synthesis in research. Demonstrate the knowledge in thesis and article writing

### **Major Based Elective 1 : Temple Architecture of Tamil Nadu**

**CO1:** Trace the evolution of temple architecture. Outline the features of vimana, categorize the different types of vimanas

**CO2:** Identify the features of a cave temple, List out the cave temples of Pallavas, Pandyas. Appreciate the architecture of important cave temples of the given dynasties.

**CO3:** List out the monolithic rathas in Tamil Nadu. Explain the salient features of Monolithic Temples, Compare the Pallava and Pandya monolithics

**CO4:** Analyze the architectural features of the Pallavas, Pandyas and Cholas temples. Identify the unique features of the given dynasties

**CO5:** Explore the rock-cut caves and structural temples in Tiruchirappalli. Write a report/ppt about your field study.

### **Major Based Elective 1 :Archaeology**

**CO1:** Outline the meaning and the scope of the study of Archaeology

**CO2:** Evaluate Archaeology as a source for history

**CO3:** Analyze the Methods of Exploration and Excavation

**CO4:** Discuss the Meaning and the importance of Epigraphy and Numismatics

**CO5:** Compare the various Functions of Archaeologist

### **Major Based Elective 2 : Working of Indian Constitution**

**CO1:** Trace the historical evolution of our Constitution, discuss the salient features, justify the ideals enshrined in our constitution, evaluate the functioning of our constitution.

**CO2:** Discuss the composition of the Indian Parliament, compare and contrast functions of the two houses, Sketch the role of executives, distinguish the relation between executive and legislature

**CO3:** List out the Unicameral and bicameral Legislative Assemblies. Discuss the composition of the State Legislature, Explain the powers and functions of Chief Minister, Council of Ministers in State

**CO4:** Distinguish Local government and Local-self- government. Sketch the Rural Local-self-government and Urban Local-self Government. Apply the knowledge and chart out the Local-self- government in your locality

**CO5:** Outline the single integrated judicial system of India. explain the concept of Judicial review, Justify the role of judiciary as the guardian of Fundamental rights.

### **Major Based Elective 2 : India and Her Neighbours**

**CO1:** Explain the foreign policy of India

**CO2:** Assess the relationship of India with the neighbouring states

**CO3:** Assess the role of India in SAARC

**CO4:** Evaluate the ethnic crisis in Srilanka, Pakistan, Bangladesh

**CO5:** Explain the concept of Non-Aligned movement

### **Major Based Elective 3 : Women Studies**

**CO1:** Explain the nature and scope of Women studies, Trace the position of Women in India through the ages, Interpret the various Feminist theories.

**CO2:** Illustrate the problems of women at different level, Discuss the Dual stress of Working Women in India, review the discrimination of women at home and work place.

**CO3:** Outline the equality enshrined in our Constitution, Sketch the functions of the Ministry and National Commission for Women.

**CO4:** Discuss the policies and steps taken by government to safeguard and empower women. Determine the role of NGOs, SHGs in women empowerment, Identify the NGOs and SHGs in your locality.

**CO5:** Debate the role of education in the empowerment of women, List out the noted women personalities of India, Summarize the life & achievements of Indra Gandhi, Sarojni Naidu, ArunaAsaf Ali, Pt.Ramabai, J. Jayalalitha.

### **Major Based Elective 1 : Journalism**

**CO1:** Explain the meaning of Journalism

**CO2:** Discuss the history of the Press

**CO3:** Assess the meaning of Editing, Reporting

**CO4:** Evaluate the works of the news agency

**CO5:** Analyze Indian press Laws

### **Major Based Elective 4 : Human Rights**

**CO1 :**Explain the meaning and nature of Human Rights, trace the historical development of Human Rights, Classify the three generations of Human Rights

**CO2:** List the important International Covenants and their Clauses. Discuss and debate the International Covenants as protector of social, economic and cultural rights. Enumerate the role of UNHR and other NGOs for Human Rights.

**CO3:** Outline the ideas of Human Rights enshrined in Our Constitution. Illustrate the functions of various commissions constituted by the government of India for the enforcement of Human Rights.

**CO4:** Outline the various Human Rights issues of India, Debate on the various Human Rights violations and Value your suggestions to eradicate it. Organize awareness about Human rights.

**CO5:** Summarize various International Human Rights issues. Debate on the issues and propose ways and means to fight it. Contribute your role as a responsible global citizen.

### **Major Based Elective 4 : Environmental History (With Reference to India)**

**CO1:** Discuss the various aspects of Eco-system and importance of Conservation

**CO2:** Explain the cultural tradition and colonial policy towards preservation of environment in India

**CO3:** Analyze the various steps taken towards the preservation of forests in India

**CO4:** Assess the dangers of Environmental threats due to various kinds of pollutions

**CO5:** Outline the activities of various movements engaged in Environmental protection

### **Non -Major Elective : Temple Architecture of Tamil Nadu**

**CO1:** Trace the evolution of Temple Architecture. Memorize and recollect the technical terms of Temple Architecture.

**CO2:** Identify the features of Vimana, categorize the different types of Vimanas. Summarize the genesis and growth of Vimana.

**CO3:** Identify the features of a cave temple. Explain the salient features of Monolithic Temples, Appreciate the architecture of important monoliths of the Pallavas.

**CO4:** Explain and compare the architecture of Lower and Upper rock-cut caves of Tiruchirappalli, Categorize and appreciate the features of Kailasanatha temple at Kanchipuram

**CO5:** Explore the rock-cut caves and structural temples in Tiruchirappalli. Write a report/ppt about your field study.

### **Non- Major Elective :Tamil Epigraphy**

**CO1:** Explain the Importance of Epigraphy in the reconstruction of History

**CO2:** Demonstrate skills in reading inscriptions

**CO3:** Explain the importance of newly discovered Epigraphs

**CO4:** Discuss the historical significance of important inscriptions and copper plates.

**CO5:** Assess the significance of Dates and Eras.

## **M.SC. MATHEMATICS**

### **PROGRAMME SPECIFIC OUTCOMES**

**PSO 1:** Analyse advanced concepts in Algebra, Analysis, Differential Equations, Graph Theory, Optimization Techniques, Topology, Fluid Dynamics, Differential Geometry to be applied in real life problems.

**PSO 2:** Apply the axioms and outcomes of Mathematical problems to solve the related Mathematical and social problems

**PSO 3:** Impart sound knowledge to enhance the research attitudes in recent advancements in Mathematics

**PSO 4:** Nurture problem solving skills, logical reasoning and creativity to face the competitive examinations and prepare to crack National, State level eligibility tests for pursuing research and acquire jobs.

#### **Core Course 1: Linear Algebra**

**CO 1:** Explain about solution of linear systems and the construction of vector spaces.

**CO 2:** Analyze the algebra of linear transformations and their representation.

**CO 3:** Explain the algebra of polynomial and prime factorization of the polynomial

**CO 4:** Evaluate characteristic values and describe annihilating polynomials.

**CO 5:** Analyze the proof of the primary decomposition theorem

#### **Core Course 2: Real Analysis**

**CO 1:** Explain the Riemann –Steiltjes integral.

**CO 2:** Discuss about sequences and series of functions.

**CO 3:** Analyze the proof Stone Weirestrass theorem.

**CO 4:** Describe the Exponential, logarithmic and Gamma function

**CO 5:** Demonstrate the contraction principle, Inverse function theorem and implicit function theorem.

#### **Core Course 3: Advanced Numerical Analysis**

**CO 1:** Analyze the methods to find solutions of Transcendental and polynomial equations

**CO 2:** Determine the solution of the system of linear algebraic equations and eigen values.

**CO 3:** Solve problems using Lagrange's and Newton's interpolation method.

**CO 4:** Explain the concepts of numerical differentiation.

**CO 5:** Discover the solutions of numerical integration problems.

#### **Core Course 4: Optimization Techniques**

**CO 1:** Explain Gomory's method and Fractional cut method

**CO 2:** Discuss simplex method and Revised simplex method

**CO 3:** Apply sequencing method to Process jobs through machines

**CO 4:** .Demonstrate Dynamic Programming /algorithm- Solution of Discrete D.P.P.

**CO 5:** Describe Non-Linear programming problem

#### **Core Course 5: Topology**

**CO 1:** Demonstrate the basic concepts in topological spaces.

**CO 2:** Explain the theorems on continuous functions and compare topologies

**CO 3:** Discuss theorems on connected spaces and compact spaces and illustrate them

**CO 4:** Analyze countability axioms and separation axioms.

**CO 5:** Describe Urysohn Metrization theorem and summarize complete metric space.

### **Core Course 6: Complex Analysis**

**CO 1:** Define Analytic functions, polynomials and rational functions with examples.

**CO 2:** Apply the proof of Cauchy's theorem for a rectangle and Cauchy's theorem in a disc.

**CO 3:** Discuss about harmonic functions, Mean Value property, Poisson's formula and reflection principle

**CO4:** Discuss the proof of Riemann mapping theorem and Schwartz-Christoffel formula.

**CO5:** Explain about Partial fractions, Infinite products, Canonical products, the Gamma function and Entire functions

### **Core Course 7: Abstract Algebra**

**CO 1:** Discuss counting principle and Sylow's theorem.

**CO 2:** Explain and classify polynomial rings and commutative rings.

**CO 3:** Discuss about extension fields and explain roots of polynomials.

**CO 4:** Analyse and Explain Galois theory, solvability by radicals.

**CO 5:** Demonstrate and classify the concept of linear transformation.

### **Core Course 8: Measure and Integration**

**CO 1:** Explain the measures on the real line

**CO 2:** Discuss the general integral Riemann and Lebesgue integrals

**CO 3:** Discuss metric spaces

**CO 4:** Explain Jensen's inequality, the inequalities of Holder and Minkowski's.

**CO 5:** Demonstrate Hahn decomposition and Jordan decomposition.

### **Core Course 9: Stochastic Processes**

**CO 1:** Categorize the Stochastic processes, Stationary processes and Markov chains with examples.

**CO 2:** Determine the stability of a Markov system.

**CO 3:** Analyse the Poisson processes and Markov processes with discrete state space.

**CO 4:** Out line about the Renewal processes and obtain the proofs of renewal theorem.

**CO 5:** Determine the queueing systems and discuss about the different types of Stochastic model.

### **Core Course 10: Ordinary differential equations**

**CO 1:** Determine the general solution of Second Order Linear Equations

**CO 2:** Analyze the power series solutions and special functions and understand the concepts of Ordinary points, regular singular points

**CO 3:** Outline the concepts of some special function Legendre polynomials, Bessel functions, Gamma function.

**CO 4:** Evaluate the system of first order equations and explain the concepts of types of critical points and stability

**CO 5:** Examine Sturm Separation theorem and Sturm Comparison theorem

### **Core Course 11: Functional Analysis**

**CO 1:** Analyze the proof of Hahn Banach theorem and the open mapping theorem.

**CO 2:** Discuss about Hilbert spaces with examples.

**CO 3:** Explain about orthogonal complements and orthonormal sets.

**CO 4:** Discuss the proof of Spectral theorem.

**CO 5:** Demonstrate Banach algebra with examples.

### **Core Course 12: Fluid Dynamics**

**CO 1:** Discuss and explain Velocity of a fluid at a point, Stream lines, Path lines, Velocity Potential and Vorticity vector

**CO 2:** Explain and show the Euler's equation of motion, Bernoulli's equation and some potential theorems

**CO 3:** Analyze and use the concepts of three dimensional flows of the fluid

**CO 4:** Analyze and use the concepts of two dimensional flows of the fluid

**CO 5:** Demonstrate and analyze the Navier-Stokes equation of a viscous fluid

### **Core Course 13: Partial Differential Equations**

**CO 1:** Analyse the first order partial differential equation and explain Cauchy's problem

**CO 2:** Apply Charpits method, Jacobi's method for obtaining solutions of first order equations.

**CO 3:** Classify the about linear partial differential equations with constant coefficients and equations with variable coefficients.

**CO 4:** Examine the methods of obtaining solution of linear hyperbolic equations.

**CO 5:** Examine the solutions of Laplace equation and Explain the boundary value problems.

### **Core Practical: Object Oriented Programming in C++**

**CO 1:** Compile a program to sort numbers using different methods.

**CO 2:** Prepare a program using classes and objects.

**CO 3:** Design a program to add and subtract complex numbers using operator overloading.

**CO 4:** Formulate a program to arrange strings in alphabetical order using pointers.

**CO 5:** Design a program to solve quadratic equation by bisection method.

### **Major Based Elective Course 1: Graph Theory**

**CO 1:** Discuss about graphs, trees, cut edges and cut vertices by giving examples. Analyze the concepts of Euler tours and Hamilton cycles.

**CO 2:** Discuss about matchings, coverings in bipartite graphs, edge colourings and vertex colourings. Describe Vizing's theorem and Brook's theorem.

**CO 3:** Explain Independent sets and Cliques. Describe Ramsey's Theorem – Turan's Theorem, Brooks' Theorem .

**CO 4:** Discuss about planar graphs. Describe Five-Colour Theorem and the Four-Colour Conjecture.

**CO 5:** Analyze the concept of Directed Graphs and Networks

### **Major Based Elective Course 1 (Optional): Theory of Automata**

**CO 1:** Explain Finite automata

**CO 2:** Describe Formal Languages and Chomsky Classification of Languages

**CO 3:** Distinguish between the concept of regular sets and regular grammars

**CO 4:** Compute Regular Grammar generating  $T(M)$  for a given DFAM and Transition system  $M$  Accepting  $L(G)$  for a given regular Grammar  $G$

**CO 5:** Analyze the context-free languages

### **Major Based Elective Course 2: Differential Geometry**

**CO 1:** Enumerate the concepts arc length, tangent, curvature and torsion.

**CO 2:** Describe about evolutes and involutes.

**CO 3:** Evaluate first fundamental form and second fundamental form

**CO 4:** Analyze proof of Meusnier's theorem and Euler's theorem.

**CO 5:** Explain Dupin's Indicatrix.

### **Major Based Elective Course 2 (Optional): Fuzzy Mathematics**

**CO 1:** Understand the concept Fuzzy sets

**CO 2:** Classify the types of operation on Fuzzy sets

**CO 3:** Understand the concept of Fuzzy Arithmetic

**CO 4:** Analyze operations of Fuzzy Graph

**CO 5:** Justify Decision making problems

### **Major Based Elective Course 3: Mechanics**

**CO 1:** Express the basic concepts in mechanics like generalized coordinates, Holonomic constraints, virtual work, potential energy, kinetic energy, angular momentum and generalized momentum.

**CO 2:** Compute the Lagrange's equations for holonomic and non holonomic systems.

**CO 3:** Explain the method of obtaining integrals of the motion for conservative systems, natural systems and Liouville's system.

**CO 4:** Manipulate Lagrange's equations involving Rayleigh's dissipation functions.

**CO 5:** Explain Hamilton's principle of obtaining stationary values of a definite integral and Solve Hamilton's principal function

### **Major Based Elective Course 3 (Optional): Algebraic Topology**

**CO 1:** Explain about Fundamental groups

**CO 2:** Compute- The Borsuk-Ulam Theorem

**CO 3:** Analysis Deformation Retracts and Homotopy type

**CO 4:** Describe Separation Theorems in the plane

**CO 5:** Classify about Surfaces

### **Non Major Based Elective Course: Numerical and Statistical Methods**

**CO1:** Solve Algebraic and Transcendental Equations.

**CO 2:** Explain Newton's formula for interpolation.

**CO 3:** Determine various measures of central tendency and measures of dispersion, skewness and kurtosis for the given data.

**CO 4:** Calculate correlation and regression

**CO 5:** Apply  $\chi^2$ -test for population variance -  $\chi^2$ -test to test the goodness of fit

## **M.SC. PHYSICS**

### **PROGRAMME SPECIFIC OUTCOME**

**PSO1:** Acquire wide spectrum of knowledge and understanding in advanced and frontier areas of Physics.

**PSO2:** Master analytic and critical thinking skills to solve problems in branches of Physics.

**PSO3:** Empower students to perform experiments and projects in general Physics and Electronics.

**PSO4:** Analyze the applications of mathematical techniques to interpret complex physical problems.

**PSO5:** Aim to pursue research careers in academics, industries and allied fields through research oriented learning.

### **Core course 1 : Classical Mechanics & Relativity**

- CO 1:** Solve problems in Physics in the light of Lagrangian and Hamiltonian Formulations.
- CO 2:** Realize canonical transformations using Poisson Bracket and apply it to solve related problems.
- CO 3:** Model mechanical systems, both in inertial and rotating frames, using Lagrange and Hamilton equations.
- CO 4:** Analyze the applications of Hamiltonian Jacobi's theory and explore Poisson's and Lagrange's Brackets.
- CO 5:** Describe the fundamental concept of relativistic mechanics.

### **Core course 2 : Mathematical Physics**

- CO 1:** Analyze complex variables and their practical applications in solving Physical problems.
- CO 2:** Interpret group theory and representation theory and correlate their applications in various branches of Physics.
- CO 3:** Illustrate the properties of Special functions and evaluate their importance in mathematical analysis and other applications.
- CO 4:** Identify patterns in normalized time series to simplify complex data by trigonometric functions.
- CO 5:** Connect compact forms of matrices to study systems of linear equations.

### **Core course 3 : Numerical methods and Programming in C++**

- CO 1:** Apply Numerical analysis which has enormous application in the field of Science and some fields of Engineering.
- CO 2:** Apply different methods in real-life scenarios.
- CO 3:** Evaluate different solutions acquired through Numerical Methods and implement the desired ones.
- CO 4:** To describe the advantages of a high level language like C/C++, the programming process, and the compilation process
- CO 5:** To apply good programming principles to the design and implementation of C/C++ programs.

### **Core course 4 : Electromagnetic Theory**

- CO 1:** Describe the fundamentals of electrostatics and apply it to solve electrostatic boundary value problems and analyze the concepts of magneto statics.
- CO 2:** Analyze the behaviour of electromagnetic wave in different media and understanding the behaviour of components of electric and magnetic field vectors.
- CO 3:** Understand the concept of reflection of plane electromagnetic waves in different media.
- CO 4:** Analyze the characteristics of fields of a moving charge and retarded potential
- CO 5:** Discuss the concept of waveguides and its properties in different medium.

### **Core course 5 : Statistical Mechanics**

- CO 1:** Understand the fundamental concepts in thermodynamics and interpret the kinetic theory of gases.
- CO 2:** Distinguish the various classifications in statistical mechanics and express the properties of micro and macro states and their probable distribution function
- CO 3:** Describe the basic concepts of phase space, ensemble and partition functions and its relations and discuss the Maxwell's distribution of velocities.
- CO 4:** Differentiate between classical and quantum statistical Mechanics and quantum statistics and learn about quantum statistical distribution laws.
- CO 5:** Analyze the applications of radiation phenomena and Pauli's theory of paramagnetism in quantum statistical mechanics.

### **Core course 6 : Condensed Matter Physics**

- CO 1:** Understand the concepts of crystal structures and demonstrate Fourier analysis of basis vectors.

- CO 2:** Analyze the concept of Kronig Penny model and illustrate the significance of Brillouin zones and Hall effect.
- CO 3:** Construct and explain the quantization of Lattice vibrations and their thermal properties.
- CO 4:** Categorize the susceptibilities of para and diamagnetic materials and obtain the knowledge about the theory of spontaneous magnetization and Domain theory.
- CO 5:** Interpret the concept of Ferroelectricity and explain the classification and applications of superconductors in various fields.

### **Core course 7 : Quantum Mechanics**

- CO 1:** Describe the inadequacy of Classical mechanics, uncertainty relations and solve time dependent Schrodinger equation
- CO 2:** Examine and interpret time independent and dependent perturbation methods
- CO 3:** Analyze matrix representation of operators and concept of symmetry
- CO 4:** Describe concept of angular momentum, angular momentum operator and apply to calculate the Clebsch Gordon coefficients (CG coefficients)
- CO 5:** Evaluate Dirac equation and describe negative energy states.

### **Core course 8 : Nuclear and Particle Physics**

- CO 1:** Explain the fundamental properties of an atomic nuclei and analyze the origin of nuclear force that govern its behavior.
- CO 2:** Examine various radioactivity process and illustrate the existence of mixture of activities in radioactive isotopes.
- CO 3:** Describe the Scattering process and associate the importance of scattering cross section in nuclear reactions process and illustrate various theories governing it.
- CO 4:** Describe the sources of stellar energy and fission energy through the study of fusion and fission process and assess the foundation of nuclear energy by harnessing the power of atoms.
- CO 5:** Summarize the properties of elementary particles and compare various symmetry schemes.

### **Core course 9 : Atomic and Molecular Spectroscopy**

- CO 1:** Illustrate the electronic configuration of molecules on the basis of Molecular orbital theory.
- CO 2:** Classify molecules based on rotational spectra using microwave spectrometer and explain vibration spectra obtained using IR spectrometry and Fourier Transform techniques.
- CO 3:** Understand the concept of Raman scattering and applications of Raman Spectroscopy.
- CO 4:** Evaluate magnetic properties of nuclei using Nuclear Magnetic Resonance (NMR) and Nuclear Quadrupole Resonance (NQR) spectroscopy techniques.
- CO 5:** Determine and identify free radicals in solution using Electronspin Resonance Spectroscopy (ESR) techniques.

### **Core course 10 : Nano Physics**

- CO 1:** Understand the various dimensional nanostructured materials and explain the impact of nanomaterials on environment
- CO 2:** Appraise the physical and chemical synthesis of nano structured materials
- CO 3:** Analyze the different properties of nano structured materials
- CO 4:** Describe the instruments involved in evaluating the characteristics of nano materials.
- CO 5:** Summarize the application of nano materials in various fields.

### **Core Practical 1 : General Experiments and Programming in C++**

- CO 1:** Evaluate the young's modulus and Poisson's ratio of the given material.
- CO 2:** Measure and Compare the value of Specific charge of an electron and analyze the reason for error.

**CO 3:** Explain the principle of Unidirectional device through its V-I characteristics, which are currently used in high voltage AC Power control application.

**CO 4:** Determine the resistivity of any semiconductor material and can assess the behavior of special type of resistor like LDR through its characteristics study.

**CO 5** Executing numerical programming exercising C++ language.

### **Core Practical 2 : Electronics Experiments**

**CO 1:** Design and construct the combinational and sequential circuits and extend its applications in variety of electronic devices.

**CO 2 :** Analyze and interpret the characteristics of three terminal electronic semiconductor devices such as Transistor, UJT, FET and their applications as oscillators and pulse generators and phase control applications.

**CO 3:** Explain the performance and applications of electronic components like DIAC and TRIAC as a triggering circuit and starter circuits and to interpret the functioning of 555 timer integrated circuit used in a variety of timer, delay, pulse generation, and oscillator applications.

**CO 4:** Able to construct a Schmitt trigger circuit and extend its applications in digital circuits and in switching circuits as a signal conditioning device to remove noise from signals.

**CO 5:** Illustrate the effects of Feedback in improving the performance of transistors as an amplifier circuits in terms of gain stability, linearity, frequency response and analyze the working of Multi-stage amplifier circuit in terms of its frequency and gain response for its extensive usage in electronic circuits.

### **Core Practical 3 : Advanced Experiments**

**CO 1:** Perform experiments independently with variety of scientific equipment.

**CO 2 :**Understand and apply the physical phenomena of interference, diffraction, etc, to measure the material properties such as elastic modulus, wavelength, etc.,

**CO 3 :** Measure and compare the values of wavelength, determine the thickness of thin sheets using the specific equipment and analyse the reason for error.

**CO 4:** Gain hands on experience to study the characteristics of Klystron tube and to measure the characteristics of Hall Coefficient.

**CO 5:** Analyse and identify the function of an Op-amp as phase shift oscillator and Schmitt trigger.

### **Core Practical 4 : Digital Electronics and Microprocessor Experiments**

**CO 1:** Describe and develop various combinational logic circuits

**CO 2:** Illustrate the functioning of different counters

**CO 3:** Correlate the operations of ALU and RAM

**CO 4:** Develop assembly language program to perform various 8 bit operations using INTEL 8085 microprocessor

**CO 5:** Interpret the operation of interfaces through traffic control system and stepper motor.

### **Major Based Elective course 1 : Analog and Digital Electronics**

**CO 1:** Describe the functioning of Special diodes and Optoelectronic diodes and extend their applications in power devices and Optical sensors.

**CO 2:** Analyze dc and ac characteristics of op-amp and demonstrate the features of various wave shaping circuits using op-amp.

**CO 3:** Classify the various solving procedures of Karnaugh map method and able to summarize combinational and arithmetic logic circuits.

**CO 4:** Illustrate basic functioning of digital circuits such as flipflop and counters and analyze its applications in signal processing.

**CO 5:** Summarize the working principles of temporary and semi permanent data storage memories and correlate its benefits in data storage, data terminal, and electronic switching system.

**Major Based Elective course 2 : Crystal growth and Thin film Physics**

**CO 1:** Analyse the thermodynamics of crystal growth.

**CO 2 :** Explain the method of crystal growth from solution and gel growth.

**CO 3:** Describe melt and vapour technique.

**CO 4:** Prepare thin films by different methods.

**CO 5:** Discuss , analyze and characterize the given sample.

**Major Based Elective course 3 : Microprocessors and Microcontroller**

**CO 1:** Outline the architecture of 8085,8086 microprocessor and 8051 microcontroller.

**CO 2:** Describe the addressing modes and instruction set of 8085,8086 microprocessor and 8051 microcontroller.

**CO3:** Compare and contrast microprocessor and microcontroller.

**CO 4:** Develop programming skills in assembly language.

**CO5 :** Explain the need for different interfacing devices.

**Major Based Elective course 4 : Communication Electronics**

**CO 1:** Discover the characteristics of networks, transmission lines to illustrate and evaluate their principles and classification.

**CO 2:** Knowledge about the generation and demodulation of signal waves and infer the significance of multiplexing in communication

**CO 3:** Illustrate the principle and working of klystron, magnetron and analyze the various RADAR systems

**CO 4:** Discover the concept of light propagation through fibre and categorize fibre optic communication

**CO 5:** Analyze and illustrate the role of satellite communication in broadcast services and mobile communication.

**Non Major Elective : Modern Communication Systems**

**CO 1:** Analyze the concept of typical communication system and formulate the types of modulation

**CO 2:** Illustrate the modulation techniques in cellular communication.

**CO 3:** Understand the basic principles of radar and construct TV transmitting and receiving systems.

**CO 4:** Demonstrate the principle of light propagation through fibre optic cable.

**CO 5:** Apply computer network topologies in satellite communication systems.