JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF COMMERCE

Program : B.COM(General)

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	Enable preparation of books of accounts, cost sheets, and balance sheets via accounting application software
PO-2	Apply various Provisions of company and Business Laws and IRDA
PO-3	Fundamentals of Taxation, Auditing and Budgeting
PO-4	Application of statistical tools for research
PO-5	Understand the various functions of business Management- Finance, HR, Marketing's & Systems

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Acquire the knowledge, skills in different areas of communication, decision making, innovations and problem- solving in day to day business activities
PSO-2	Helps to demonstrate knowledge in setting up a computerised system of accounting
PSO-3	Gain proficiency with the ability to encourage in competitive exams like CA, CS, ICMA and other courses
PSO-4	Students also acquire skills to work as tax consultant, Audit Assistant.
PSO-5	Students are able to play the roles of Entrepreneur etc

Course Objectives	
Title	**I FINANCIAL ACCOUNTING**
Course Code	**CZ21A**
CO-1	To enable the students to understand the system of preparing financi statements for various types of organisation
CO-2	To familiarize the students with knowledge about financial reporting standards
CO-3	To familiarize the students with knowledge about financial reporting standards
CO-4	The students will be aware of the various amendments in financial reporting
CO- 5	To familiarize the students with the concepts of hire purchase system

Course Outcome	
Title	**I FINANCIAL ACCOUNTING**
Course Code	**CZ21A**
CO-1	Students would prepare financial statements in accordance with appropriate standards.
CO-2	Students would prepare ledger accounts using double entry book keeping and record journal entries accordingly.
CO-3	Students would interpret the business implications of financial statement information.
CO-4	Students would prepare accounting information for planning and control and for the evaluation of finance, prepare bank reconciliation statement from incomplete statement.
CO-5	Explain the purpose of double entry system to understanding the accounting system properly, preparation of rectification errors.

Syllabus	
Title	**I FINANCIAL ACCOUNTING**
Course Code	**CZ21A**
Unit 1	**Preparation of Financial Statement:** Final accounts of sole trading concern-Adjustments-Receipts and Payments-Income and expenditure-Balance sheet of non-trading organisation
Unit 2	**Depreciation and Insurance Claims:** Depreciation Accounting: Depreciation- Meaning –Causes-Types-Straight Line Method-Written down value method- Concept of useful life under Companies Act 2015 Insurance Accounting: Insurance claims –Calculation of Claim amount-Average clause(Loss of stock only)
Unit 3	**Single entry system:** Meaning and Features of Single entry-Defects-Difference between single entry and double entry system-Methods of calculation of Profit-Statement of Affairs Method-Conversion Method
Unit 4	**Rectification of Errors and Bank Reconciliation Statement**: Classification of Errors – Rectification of Errors – Preparation of Suspense a/c. Bank Reconciliation Statement – Need and preparation.
Unit 5	**Hire Purchase and Installment System:** Hire Purchase System- Default and repossession-Hire purchase trading account Installment System-Calculation of Profit.

Course Objectives

Title	**BUSINESS COMMUNICATION**
Course Code	**CZ21B**
CO-1	To facilitate the students to understand the concept of Communication.
CO-2	To know the basic techniques of the modern forms of communication.
CO-3	To develop the communication skills among students.
CO-4	To learn how write different types of letter related to business.
CO-5	To learn how to prepare report to the management

Course Outcome	
Title	**BUSINESS COMMUNICATION**
Course Code	**CZ21B**
CO-1	Applying business communication strategies and principles exchange information.
CO-2	Learn to write business letters.
CO-3	Attain oral communication skill for effective oral presentation.
CO-4	Acquire skills to prepare reports.
CO-5	Enrich written communication skill employability.

Syllabus	
Title	**BUSINESS COMMUNICATION**
Course Code	**CZ21B**
Unit 1	**Communication:** Definition – Methods – Types – Principles of effective Communication – Barriers to Communication – Business Letters – Layout.
Unit 2	**Business Letters:** Kinds of Business Letters: Interview – Application for a situation – Interview -Appointment – Acknowledgement – Promotion – Enquiries – Reply letter – Orders – Sales letter – Circular letter – Complaint letter.
Unit 3	**Correspondence:** Bank Correspondence – Insurance Correspondence Agency Correspondence – Correspondence with Shareholders, irectors.
Unit 4	**Reports and Meetings:** Report Writing – Meetings – Agenda - Minutes of Meeting – Memorandum – Office Order – Circular – Notes.
Unit 5	**Forms of Communication:** Modern Forms of Communication: Fax – E-mail – Video Conferencing – Internet – Websites – uses of the various forms of communication.

Course Objectives	
Title	**BUSINESS ECONOMICS**
Course Code	**CZ31A**
CO-1	To facilitate the students to understand the concept of Economics
CO-2	To Know the basic techniques of the modern forms of Economics
CO-3	To introduce students to the basic elements of commerce and economics.
CO-4	To analyse operations of markets under varying competitive conditions and make optimal business decisions.
CO-5	To illustrate what elements are considered while policy and decision making at the level.

Syllabus	
Title	**BUSINESS ECONOMICS**
Course Code	**CZ31A**

Course Outcome	
Title	**BUSINESS ECONOMICS**
Course Code	**CZ31A**
CO-1	Students understand the concept of communication and familiarise with modern form of Economics
CO-2	Gain basic knowledge of the operation of the business economics.
CO-3	To apply marginal analysis to the firm under different market conditions.
CO-4	Apply the different concept of price and output decisions of firms under various market structure.
CO-5	Understand and gain analytical skills for understanding market structures.
Unit 1	Introduction to Economics – Wealth, Welfare and Scarcity Views on Economics - Positive and Normative Economics - Definition – Scope and Importance of Business Economics - Concepts: Production Possibility frontiers – Opportunity Cost – Accounting Profit and Economic Profit – Incremental and Marginal Concepts – Time and Discounting Principles – Concept of Efficiency- **Business Cycle:- Inflation, Depression, Recession, Recovery, Reflation and Deflation**.
Unit 2	Demand and Supply Functions: - Meaning of Demand – determinants and Distinctions of demand – Law of Demand – elasticity of Demand – Demand Forecasting – Supply concept and Equilibrium
Unit 3	Consumer Behaviour: Law of Diminishing Marginal utility – Equimarginal Utility – Indifference Curve – Definition, Properties and equilibrium
Unit 4	Production: Law of Variable Proportion – Laws of Returns to Scale – Producer'sequilibrium – Economies of Scale - Cost Classification – Break Even Analysis
Unit 5	Product Pricing: Price and Output Determination under Perfect competition ,Monopoly – Discriminating monopoly – Monopolistic Competition – Oligopoly – Pricing objectives and Methods

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Course Objectives	
Title	FUNDAMENTALS OF INSURANCE
Course Code	**AR51B**

CO-1	To enable the students to understand the fundamentals of insurance.
CO-2	Learn how to attain the agency license
CO-3	Learn the organization functions, structures &promotional strategies.
CO-4	Learn to create company profile and demand for shares in market
CO -5	To gain knowledge on functional agent of insurance company.

Course Outcome	
Title	FUNDAMENTALSOFINSURANCE
Course Code	**AR51B**
CO-1	Acquire the basics of insurance and types of insurance.
CO-2	Acquire the skills of Agency Law and its Compensation.
CO-3	Apply the procedural aspects of agency license and identify the code of conduct
CO-4	Apply the procedure for settlement of Policy claims
CO-5	Re cognize the organization function, structures &promotional strategies.

Syllabus	
Title	FUNDAMENTALS OF INSURANCE
Course Code	**AR51B**

Unit 1	**Introduction to Insurance**: Purpose and need of insurance, insurance social security tool insurance and economic development, Fundamentals/Principles of insurance, various kinds of insurance: life, marine, fire, medical, and general insurance, features, insurable interest.
Unit 2	**Fundamentals of Agency Law**: Definition of an agent; Agent's Regulation; Insurance Intermediates, Agents compensation
Unit 3	**Insurance Agents**: Procedure, Pre – requisite for obtaining a License, Duration of license, Cancellation of License: Revocation or Suspension/Termination of Agency; Right Appointment; Code of Conduct; Unfair Practices.
Unit 4	**Function of an Agent**: Proposal Form and other Forms for Agent of Cover, Financial and Medical Under writing; Material Information; Nomination and Assignment; Procedure for Settlement of Policy Claims.
Unit 5	**Company profile**: Organizational of the Company; Structure Market Share; Product Pricing – Actuarial Aspects, Distribution Channels Promotion Strategies - J.R.Aandits Functions.

Course Objectives	
Title	**ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
CO-1	To enable the students to understand the system of preparing

	financial statements for various types of organisation
CO-2	To familiarize the students with knowledge about financial reporting standards.
CO-3	To understand the preparation of financial statements for business units other than corporate undertaking and their utility.
CO-4	To understand the importance of preparation branch accounting system under different sector
CO- 5	To make familiarize in the concept of partnership terms and conditions

Course Outcome	
Title	**ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
CO-1	Students would familiarize the concept branch account and its system.
CO-2	Students would understand the scope of departmental accounting.
CO-3	Enable the students to understand the scope of departmental accounting.
CO-4	Students would understand the dissolution partnership firm, dissolution accounts insolvency of partners.
CO-5	Students would prepare Indian accounting standard. IFRS-International financial reporting standards.

Course Objectives	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**CZ22B**
CO-1	To make the students to understand the basic concepts of management.
CO-2	To prepare the students to know about the significance of the management in Business.

Syllabus	
Title	**ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
Unit 1	**Branch Accounts:** Dependent Branches - Stock and Debtors system - Distinction between Wholesale Profit and Retail Profit – Independer Branches (Foreign Branches excluded)
Unit 2	**Departmental Accounts:** Basis of Allocation of Expenses – Calculatic of Profit - Inter-departmental Transfer at cost or Selling Price.
Unit 3	**Partnership Accounts:** Admission of a Partner – Retirement of a Partner – Death of a Partner.
Unit 4	**Partnership Accounts:** Dissolution of a Partnership Firm – Insolvency of a Partner – Insolvency of all Partners- Piecemeal Distribution of cash in case of Liquidation of Partnership Firm.
Unit 5	**Accounting Standards for financial reporting** Objectives and uses of financial statements for users-Role of accounting standards- Development of accounting standards in India- Requirements of international accounting standards - Role of developing IFRS- IFRS adoption or convergence in India- Implementation plan in India- Ind AS- Difference between Ind AS and IFRS.
CO-3	Learn to take decision making own.
CO-4	To make students to know how management will apply the planning and control concept in the process and projects.
CO – 5	To make the students to understand the controlling capacity in different functional areas of the concern

Syllabus	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**CZ22B**
Unit 1	**Introduction** Definition – Importance – Nature and Scope of Management – Process of Management - Role and functions of Managers - Levels of Management Scientific Management Contributions to Management by different Schools of thought.

Course Outcome	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**CZ22B**
CO-1	Students able to develop knowledge and evolution of management thoughts.
CO-2	Students would able to better understanding of planning and decision making.
CO-3	Students able to give an idea about organisation structure and different types of organisation.
CO-4	Students would able to provide idea about motivation, importance of communication and leadership.
CO-5	Students would able to understand the principles of co-ordination.
Unit 2	**Planning** Nature – Importance -Types of Planning - Steps in planning - Objectives of Planning – Policies - Decision making Process-Types of Decisions. HRM- Meaning, -Nature and scope of HRM.
Unit 3	**Organization** Meaning and Types of organizations - Principles – Formal and Informal organization - Organisation Structure – Span of Control– Departmentalization – Basis - Meaning and Importance of Departmentalization. Policies - Meaning and Types – Procedures - Forecasting.
Unit 4	**Authority and Responsibility** Authority – Definition – Sources Limitations – Difference between Authority and Responsibility Delegation of Authority – Meaning – Principles and importance Centralization Vs Decentralization- Leadership & Communication.
Unit 5	**Direction Co-ordination & Control** Direction – Nature - Purpose. Co-ordination – Need – Types and Techniques – Requisites for Excellent Co-ordination. Controlling – Meaning – Importance – Control Process.

Course Objectives	
Title	**INDIAN ECONOMY**
Course Code	**CZ32A**
CO-1	To have the fundamental knowledge of Economic Developments.
CO-2	To teach the Economic problems and five year Plans.

CO-3	To provide understanding of core economic terms, concepts and theories.
CO-4	To prompt students to have economic way of thinking.
CO-5	To indue critical thinking skills without the contest of subject matter of economics.

Course Outcome	
Title	**INDIAN ECONOMY**
Course Code	**CZ32A**
CO-1	After completion of the syllabus students well versed with the features of Indian economy and known the five year plans.
CO-2	Understand the aspects of Indian economy.
CO-3	Develop a perspective on the different problems and approaches to economic planning and development of INDIA.
CO-4	Understand the role of the Indian economy in the global context and how different factors have effected this process.
CO-5	Not only be aware of the economy as a whole, sources of revenue, how the state government finance its programmes and projects.

Syllabus	
Title	**INDIAN ECONOMY**
Course Code	**CZ32A**
Unit 1	**Economic Growth and Economic Development- Transition on Indian Economy-– Indian Economy from 1950.- Indicators of economic development- National Income- Basic Concepts and computation of national income.**
Unit 2	**Major problems of Indian Economy- Human Development Index. Present Scenarios of population, unemployment, Poverty**

	and inequality. Demographic trends in Population. Measures to control the population-Foreign trade
Unit 3	**Agriculture**: Contribution to economic development- Green Revolution- **Organic farming**- Food policy and Public distribution system.
Unit 4	**Industry**- Role of industries in economic development-Large scale industries and small scale industries- New Economic Policy 1991- **Industrial development before and after globalization in India.**
Unit 5	**Five year plans in India**- Achievement and strategy and failures- **Nidhi Aayog.**

Course Objectives	
Title	**OFFICE MANAGEMENT**
Course Code	**AR52B**
CO-1	To enable the students to gain knowledge about structure and functioning of an office
CO-2	To Gain knowledge on Filing system ,Records Management
CO-3	To learn Office Layout and Forms Control.
CO -4	To learn how to maintain reports in the concern
CO -5	To learn the importance of controlling system in the corporate sector

Course Outcome	
Title	**OFFICE MANAGEMENT**
Course Code	**AR52B**
CO-1	Plan and Practice the functions of office and office manager
CO-2	Devise and practice the record management system
CO-3	Analyse the cost control methods and prepare office budget
CO-4	Acquire the skill of effect form control and control over the office stationeries and supplies

CO-5	Practice the office layout principles and maintain office environment

Syllabus	
Title	**OFFICEMANAGEMENT**
Course Code	**AR52B**
Unit 1	**Office Management**: Meaning, Definition of office, Functions of Office management - Definition of Functions, Duties, and Qualities of Office Manager Role of Manager in Office, Planning and Schedul in office Work.
Unit 2	**Record Management**: Meaning, Needs, Principles, Filing Objectives, Characteristics of Good Filing System, Centralised and Decentralised Filing, Filing and Indexing, OfficeCorrespondenceBusinessInformationSystem– ElectronicDataProcessing.
Unit 3	**Office Maintenance Management**: Cost Control - Methods of cost reduction and savings-, Organisation and methods (O&M), Need and objectives- Office Work- Work Simplification, Budgetary Control, organization for budgetary control – office budget-Store Management, House keeping and Waste Management.
Unit 4	**Forms Control and Stationery**: Objectives of Form control, Steps in Form control, Types of Forms and Design, Principles and Control Office Stationary and Supplies, Types of Stationary and Continuous Stationary Purchases.
Unit 5	**Office Accommodation and Layouts**: Location of Office, steps in office layout, principles of office layout, Office Environment

Course Objectives	
Title	**CORPORATE ACCOUNTING – I**
Course Code	**CZ23A**
CO-1	To make the students familiarize with corporate accounting procedures
CO-2	To enable the students to acquire conceptual knowledge about the preparation of the company accounts.

CO-3	Learn the accounting procedures of corporate undertaking and their financial statement preparations
CO 4	Learn the entire process of issues of share under different price level
CO 5	To familiarize with the concept and preparation of accounts under insurance company

Course Outcome	
Title	**CORPORATE ACCOUNTING – I**
Course Code	**CZ23A**
CO-1	To provide the knowledge of issue of shares and debentures along with regulation of companies act.
CO-2	To give an exposure to the company final accounting.
CO-3	To understand the methods of valuation of goodwill in corporate sectors.
CO-4	Keep them aware about accounts of insurance company.
CO-5	To provide knowledge regarding how to underwrite shares and debenture along with redemption concept in corporate sector.

Syllabus	
Title	**CORPORATE ACCOUNTING – I**
Course code	
Unit 1	**Share Capital** Issue of Shares - Types of Shares – Forfeiture of Shares- Reissue of Shares- Redemption of Preference Shares.

Unit 2	**Debentures & Underwriting** Issue of Debentures – Redemption of Debentures- Profit prior to incorporation. Underwriting of Shares & Debentures.
Unit 3	**Final Accounts** Final Accounts - Preparation of Profit & Loss account and Balance sheet- Managerial Remuneration.
Unit 4	**Valuation of Goodwill & Shares** Valuation of Goodwill & Shares – Meaning – Methods of valuation.
Unit 5	**Accounting for Insurance Companies** Insurance Accounts- Types- Final accounts of Life Insurance- Profit determination of Life Insurance

Course Objectives	
Title	**BUSINESS LAWS**
Course Code	**CZ23B**
CO-1	To highlight the Provisions of Law governing the General Contract and Special Contract.
CO-2	To enable the students to understand the Legal Remedies available in the Law to the Business and other People.
CO-3	To highlights the Contemporary Issues in Business Law as per latest company act
CO 4	To gain knowledge on sales of goods act
CO 5	To gain knowledge on legal term used in business.

Syllabus	
Title	**BUSINESS LAWS**
Course Code	**CZ23B**

Course Outcome	
Title	**BUSINESS LAWS**
Course Code	**CZ23B**
CO-1	Apply the basic concept of business law.
CO-2	To enable the students to understand the legal forms of offer acceptance and consideration.
CO-3	To conclude about the agreement become enforceable when it fulfills certain condition.
CO-4	Understand the legal remedies available in the law
CO-5	gaining knowledge about the importance and other people.
Unit 1	Indian Contract Act -Formation-Nature and Elements of Contract – Classification of Contracts- Contract Vs Agreement.
Unit 2	Offer – Definition – Forms of offer – Requirements of a Valid Offer. Acceptance – Meaning - Legal rules as to a Valid Acceptance. Consideration – Definition – Types - Essentials. Capacity of Parties – Definition – Persons Competent to contract. Free consent – Coercion – Undue Influence – Fraud – Misrepresentation - Mistake. Legality of object - Void agreements Unlawful Agreements.
Unit 3	**Performance of Contract** Performance of Contracts – Actual Performance – Attempted Performance - Tender. Quasi Contract – Definition and Essentials. Discharge of Contract - Modes of Discharge – Breach of Contract – Remedies available for Breach of Contract.
Unit 4	**Sale of Goods Act** Sale – Contract of Sale – Sale Vs Agreement to Sell – Meaning of Goods – Conditions and Warranty – Caveat Emptor – Exceptions of Caveat Emptor – Buyer and Seller of Goods - Unpaid Seller – Definition – Rights of an Unpaid Seller.
Unit 5	**Contemporary Issues in Business Law** Right to Information Act, 2005 - Meaning of 'Information', 'Right to Information' 35 -Need for Right to Information. Public Information - Request for obtaining information. Grounds for rejection of information. Central Information Commission - Constitution and powers. Information Technology Act - Purpose and significance. Cyber Crimes - Types of crimes, nature and punishment Intellectual Property Law - Patent, trademark, copyright and industrial design and laws of Insurance.

Course Objectives	
Title	**Banking Theory Law and Operations**
Course Code	**CZ23C**

CO-1	To facilitate the understanding of the origin and the growth of the Indian Banking System
CO-2	To understand the modern day Developments in Indian Banking Sector.
CO-3	Learn the concept of online transaction and E- banking concept in present scenario
CO -4	To gain knowledge on functioning of RBI
CO -5	To develop skills in banking sector.

Course Outcome	
Title	**Banking Theory Law and Operations**
Course Code	**CZ23C**
CO-1	It helps students to know about the importance of saving liquidity and banking rules and it also helps to career in banking field.
CO-2	Helps to know about promoting price stability and also makes money at every cheaper rate.
CO-3	It gives a clear definition about online payment. it helps student to know about the advantages and disadvantages of online payment.
CO-4	Its helps to know about the security which public get from bank and also the regulations of the banks.
CO-5	Throughout the reading endorsement programme its provides all students with a broad scope of reading understanding the importance of it and it helps then to apply practically on their future

Course Objectives	
Title	**MARKETING**

Syllabus	
Title	**Banking Theory Law and Operations**
Course Code	**CZ23C**
Unit 1	**Introduction to Banking** - History of Banking- Components of Indian banking -Indian Banking System-Phases of development- Banking structure in India-Payment banks and small banks-Commercial Banking-Definition-Classification of banks. Banking System- Universal banking-Commercial Banking-functions-Role of Banks in Economic Development. Central Banking-Definition –Need-Principles- Central Banking Vs Commercial banking-Functions of Central bank.
Unit 2	**RBI** -Establishment-objective-Legal frame work-Functions-SBI-Origin and History-Establishment-Indian subsidiaries -Foreign subsidiaries-Non-Banking-Subsidiaries-Personal Banking-International banking- Trade Financing-Correspondent banking. Co-operative banks-Meaning and definition-Features-Co-operative banks vs Commercial banks-Structure.-**NBFC-Role of NBFC-RBI Regulations- Financial sector reforms-Sukhmoy committee 1985-Narasimham committee I and II-Prudential norms: capital adequacy norms-classification of assets and provisioning.**
Unit 3	**E-Banking** - Meaning-Services-e-banking and Financial services-Initiatives-Opportunities-Internet banking-Meaning-Internet banking Vs Traditional banking-Services-Drawbacks-Frauds in Internet banking. Mobile banking–**Anywhere Banking-Any Time Banking**- Electronic Mobile Wallets. ATM-Evolution -Concept- Features - Types-. Electronicmoney-Meaning-Categories-Meritsofe-money-ElectronicFunds Transfer (EFT)system - Meaning- Steps–Benefits- Monetary policies- final sector reforms- sakmoy Chakravarthy committee 1985- Narasimhan Committee I & II- prudential norms capital adequacy norms- classification of assets & provisionary meaning- Structure of Interest rates (short and long term)-impacts on saving and borrowings.
Unit 4	**Bank Account** -Opening – Types of Accounts-FDR-Steps in opening Account-Saving vs Current Account- 'Donatio Mortis Causa' - Passbook-Bank Customer Relationship-Special Types of currents-KYC norms. Bank Lending – Lending Sources-Bank Lending Principles-Forms of lending-Loan evaluation process-securities of lending- Factors influencing bank lending – Negotiable Instruments –Meaning –Characteristics-Types. Crossing – Definition – Objectives-Crossing and negotiability-Consequences of Crossing.
Unit 5	**Endorsement** -Meaning-Components-Kinds of Endorsements-Cheques payable to fictitious person- Endorsement by legal representative –Negotiation bank-effect of endorsement-Rules regarding endorsement. Paying banker-Banker's duty-Dishonoring of Cheques-Discharge of paying banks-Payments of a crossed cheque payment. Collecting bankers-Statutory protection under section 85-Refusal of cheques Payment. Collecting Banker- Statutory protection under section 131- Collecting bankers' duty –RBI instruction – Paying Banker Vs Collecting Banker- Customer grievances-Grievance redressal –Banking Ombudsman.

Course Code	**CZ23D**
CO-1	To facilitate the students to understand the importance and the relevance of marketing in to- day's Business world
CO-2	To facilitate the students to understand the importance and the relevance of marketing in to- day's Business world
CO-3	To understand the basic concepts of Marketing, Market Segmentation, Marketing Mix and Recent trends in Marketing.
CO-4	To enable the features of the Indian marketing
CO-5	To facilitate understanding relevance and need of e-marketing.

Course Outcome	
Title	**MARKETING**
Course Code	**CZ23D**
CO-1	Student would able to understand marketing concept and environment.
CO-2	Students acquire knowledge about products and channels of distribution.
CO-3	Learn knowledge about promotion.
CO-4	Learn how to fix the product pricing and product mix.
CO-5	Students would able to know CRM concept.

Syllabus	
Title	**MARKETING**

Course Code	**CZ23D**
Unit 1	Introduction to Marketing –Meaning – Definition and Functions of larketing – Marketing Orientation – Role and Importance of larketing – Classification of Markets
Unit 2	Market Segmentation – Concept – Benefits – Basis and Levels. ıtroduction to Consumer Behaviour – Need for study – Consumer ıying decision process – Buying motives.
Unit 3	Marketing mix. Product – Meaning – Introduction to Stages of New Product Development – Types – Introduction to PLC – Product Mix – Price – Pricing Policies and Methods.
Unit 4	Channels of Distribution (Levels) -Channel Members -Promotion,- ommunication Mix – Basics of Advertising, Sales promotion and ersonal selling.
Unit	Recent trends in marketing , a basic understanding of E- marketing , ɔnsumerism , market research , MIS and marketing regulation.

Course Objectives	
Title	**RURAL ECONOMICS**
Course Code	**CZ33B**
CO-1	To teach the rural economy and its development.
CO-2	To market he students to know about non- form sector in the rural economy.
CO-3	To bring the awareness of RBI and NABARD and un employment problem in rural economy.
CO-4	To reach the international economics.
CO-5	To acquire the knowledge of rural indebtedness of rural economy.

Course Outcome	
Title	**RURAL ECONOMICS**

Course Code	**CZ33B**
CO-1	By learning this subject students will have thorough knowledge of rural economics.
CO-2	Introduction to rural economy of India, rural demography.
CO-3	Agriculture rural economy , rural occupations, employment analysis of decision making.
CO-4	Acquiring the structure of rural economy farming industry and possible interaction.
CO-5	Competency developed on familiarizing practical way to carry out field survey of relating to rural economics.

Syllabus	
Title	**RURAL ECONOMICS**
Course Code	**CZ33B**
Unit 1	Structure of the Rural Economy of India- Predominance of the Rural Sector in the Indian Economy-Features of the Indian Rural Economy.
Unit 2	RoleofAgricultureinRuralDevelopment-PatternofAgriculturalHolding-Strategy of Agricultural development and Green Revolution- Problems of Agricultural Labourers and Artisans in the Rural Economy-Measures to solve their problems.
Unit 3	Non-farm sector in the Rural Economy- Role of Small Scale Industries, Cottage Industries, Khadi and Village Industries in the Rural Economy.
Unit 4	Rural indebtedness- Causes and magnitude- Role of RBI, Commercial Banks, RRBs and NABARD in Rural Economy**.**
Unit 5	PovertyandunemploymentproblemintheRuralEconomy-Stepstakentosolvetheproblems- Rural Development- Strategy for Rural Development with special reference to PURA.

Course Objectives

Title	ADVANCED CORPORATE ACCOUNTING
Course Code	CZ24A
CO-1	To provide the students with an understanding of accounting procedure for corporate restructuring.
CO-2	To make the students understand the applications of Accounting Transactions in Corporate Sector.
CO-3	Apply the concept and legal rules of amalgamation, reconstruction of the company
CO-4	Make understand the liquidation process of company
CO-5	Gain knowledge on banking company accounts

Course Outcome	
Title	ADVANCED CORPORATE ACCOUNTING
Course Code	CZ24A
CO-1	Student would able to understand amalgamation, absorption and External reconstruction.
CO-2	Student would aware about preparation of final accounts in banking sectors as per schedules.
CO-3	Students would able to families with the liquidation process of company.
CO-4	Students would able to introduce and develop the knowledge of holding company accounts as per schedule.
CO-5	Students would compute the internal reconstruction.

Syllabus

Title	ADVANCED CORPORATE ACCOUNTING
Course Code	CZ24A
Unit 1	**Internal Reconstruction** Meaning - Alteration of share capital – Accounting Procedures.
Unit 2	**Amalgamation, Absorption & External Reconstruction** Meaning- Amalgamation in the nature of Merger, Purchase - External Reconstruction – Applicability of AS 14- Calculation of Purchase consideration (all methods) – Journal Entries in the books of Transferor and Transferee Companies, Revised Balance Sheet (excluding inter - company holdings)
Unit 3	**Liquidation** Meaning – Preparation of Liquidator's Final Statement of Accounts – Calculation of Liquidator Remuneration.
Unit 4	**Consolidation** Holding Company –Subsidiary company - Meaning – Preparation of Consolidated Final Statement of Accounts.
Unit 5	**Accounting For Banking Companies** Bank accounts - Concept of Non-Performing Assets (NPA)-Preparation of Profit and Loss Account - Asset classification - Preparation of Balance Sheet.

Course Objectives	
Title	COMPANY LAW
Course Code	CZ24B
CO-1	To make the students aware on the recent amendments to companies Act.
CO-2	To enlighten the students on the provisions governing the company law.
CO-3	The students will gain knowledge on Company Law provisions and amendments.
CO-4	To facilitate the understanding of the concept of corporate social responsibility committee.
CO-5	To help the students to understand the various kinds of shares.

Course Outcome	
Title	**COMPANY LAW**
Course Code	**CZ24B**
CO-1	To enlighten the students on the provision governing the company law.
CO-2	To enable the students to learn the various kinds of securities.
CO-3	Aim to understand how to increase in remuneration if KMP by a public company.
CO-4	Discuss the students to know about the meeting and resolution regarding special notice.
CO-5	To facilitate the understanding of various mode of liquidation process in concern.

Syllabus	
Title	**COMPANY LAW**
Course Code	**CZ24B**
Unit 1	**Joint Stock Company** Meaning-Kinds of companies (Special Provisions with respect to Private Company, Public Company, One Person Company, Small Company, Dormant Company) Formation – Memorandum of Association- Contents- Restriction on "Other Objects"- Doctrine of Ultra Vires- Articles of Association-Contents- Prospectus-contents-Types(Statement in Lieu of Prospectus, Shelf Prospectus, Red Herring Prospectus)-Underwriting-Book Building Process- Green Shoe option- E- Flying – Dematerialisation.
Unit 2	**Share Capital and Debentures** Meaning of Shares – Kinds of Shares- Voting rights – Issue of Shares at a Premium and Discount – Partly paid shares- Bonus Shares- Rights shares – Sweat Equity Shares. Debentures – Meaning – Types.
Unit 3	**Managerial Personnel** Directors – Women Directors – Independent Directors- director Identification Number- Other Key Managerial Personnel- Related Party Transactions.
Unit 4	**Meetings and Resolutions** Meeting - Statutory Meeting – Annual general meeting – Extraordinary general Meeting - Notice of meeting- Quorum- Proxy- Board of Directors Meeting- committee- Types of Committee- Corporate Social Responsibility committee. Resolutions – Ordinary & Special -Resolution requiring special notice.
Unit 5	**Winding up of company** Modes of winding up – winding up by the court – Voluntary winding up – Types – Members' voluntary winding up – Creditors' voluntary winding up. National company Law- Appellate Tribunal.

Course Objectives	
Title	**FINANCIAL SERVICES**
Course Code	**CZ24C**
CO-1	To enable the students to understand the world of financial services.
CO-2	To facilitate the understanding of the various Financial Services.
CO-3	On the completion of modules, the students will understand the various financial services.
CO-4	To acquire the knowledge of money market.
CO-5	To enable the students to gain knowledge of SARFAESI act 2002.

Course Outcome	
Title	**FINANCIAL SERVICES**
Course Code	**CZ24C**
CO-1	To understand the operation and structure of different financial institutions.
CO-2	Describe various types of insurance contracts and their user in financial services in merchant banking.
CO-3	describe the factors clients dispositions towards risk and identify appropriate strategies' to pursue money market and stock exchange.
CO-4	Identify the factors that affect interest rates mechanics of consumer finance.
CO-5	Analyses the venture capital credit rating process and pension fund.

Syllabus

Title	**FINANCIAL SERVICES**
Course Code	**CZ24C**
Unit 1	**Introduction** Financial Services - Concept - Objectives - Functions - Characteristics - Financial Services Market - Concept - Constituents - Growth of Financial Services in India - Financial Services Sector Problems - Financial Services Environment - The Forces - Players in Financial Markets
Unit 2	**Merchant Banking and Public Issue Management** Definition - Functions - Merchant Bankers Code of Conduct - Public Issue Management - Concept - Functions - Categories of Securities Issue - Mechanics of Public Issue Management - Issue Manager - Role of issue Manager - Marketing of Issue - New Issues Market Vs Secondary Market.
Unit 3	**Money Market and Stock Exchange** Characteristics - Functions - Indian Capital Market - Constituents of Indian Capital Market - New Financial Institutions and Instruments - Investor Protection - Stock Exchange - Functions - Services - Features - Role - Stock Exchange Traders -Regulations of Stock Exchanges - Depository - SEBI - Functions and Working.
Unit 4	**Leasing and Factoring and Securitisation** Characteristics - Types - Participants - Myths about Leasing - Hire Purchase – Lease Financing Vs Hire Purchase Financing - Factoring - Mechanism - Functions of a Factor - Factoring - Players- Types - Operational Profile of Indian Factoring - Operational Problems in Indian Factoring - Factoring Vs bills Discounting - Securitisation of Debt- Parties involved- Steps of securitisation - Types of securitisation- Advantages- Limitations – SARFAESI Act 2002- Background- Purpose of the Act- Main provisions
Unit 5	**Venture Capital, credit rating and pension Fund** Origin and Growth of Venture Capital - Investment Nurturing Methods - Mutual Funds - Portfolio Management Process in Mutual Funds - Credit Rating System - Growth Factors - Credit Rating Process - Global and Domestic Credit Rating agencies - Pension Fund - Objectives - Functions - Features - Types - Chilean Model - Pension Investment Policy - Pension Financing.

Course Objectives

Title	INDIRECT TAXATION
Course Code	CZ24D
CO-1	To facilitate the students to gain knowledge of the principles of Indirect Taxation.
CO-2	To enable the students to gain knowledge of Goods and Services (GST)
CO-3	To highlight the students about customs duty.
CO-4	The students will be able to understand the concepts of Indirect taxation, types and Assessment procedures
CO-5	To enable the students to gain knowledge of GST audit and tax.

Course Outcome	
Title	INDIRECT TAXATION
Course Code	CZ24D
CO-1	A tax is a compulsory charge imposed by government.
CO-2	Goods to serve tax that are CGST, SGST, IGST, UGST
CO-3	GST Assessment procedure its self-assessment.
CO-4	GST Audit is enabling to turnover based audit.
CO-5	Custom duty is a tax imposed on import and export of goods.

Syllabus	
Title	**INDIRECT TAXATION**
Course Code	**CZ24D**
Unit 1	History and Objectives of Taxation – Tax System in India- Direct & Indirect Taxes – Meaning and Types – Powers of Union and State to levy taxes. **Constitutional Amendments leading to introduction of GSTand their importance**
Unit 2	Background behind implementing GST- The need for GST- objectives of GST- Business impact- Benefits of GST-SGST- CGST and IGST- Taxes covered by GST- Definitions - Scope and Coverage Scope of supply- Levy of tax- Rate Structure- Taxable Events. **Types of Supplies – Composite and Mixed Supplies – CompositionLevy.**
Unit 3	Return- Refunds- Input Tax Credit- Reverse charge Mechanisr Transitional Provisions composition under GST- Administrative structu of GST-Officers as per CGST Act- Officers as per SGST Act-Jurisdictio Appointment Powers. **Relevance of Cross Empowerments**
Unit 4	Assessment and Audit under GST- Demands and Recovery- Appeals and revision- Advance ruling Offences and Penalties. **National Anti-Profiteering Authority – GST Practitioners – eligibility and Practiceand Career avenues**
Unit 5	The custom duty- Levy and collection of customs duty- Organisations custom departments- Officers of customs- powers- Appellate Machiner Infringement of the Law-Offences and Penalties- Exemptions from du customs duty draw back- duties free Zones. **Export incentive schemes**

Course Objectives	
Title	**INTERNATIONAL ECONOMICS**
Course Code	**CZ34B**
CO-1	To teach the International Economics
CO-2	To acquire the knowledge 0f Export Import.
CO-3	To know about International Economic Organizations and its Functions.
CO-4	To enable students understand basic and theories of international trade.
CO-5	To know various international financial institutions structure and functions.

Course Outcome

Title	INTERNATIONAL ECONOMICS
Course Code	CZ34B
CO-1	Equip the students to have the thorough knowledge of International Economics.
CO-2	Show the benefits of international trade in the way how nations with the strong international trade theories.
CO-3	Understand the world trade financial organisation objectives, structures of working IMF, WTO, ADB, IBRD, IFA
CO-4	Show the importance of maintaining equilibrium in the balance of payment and suggest suitable measures to correct disequilibrium as well.
CO-5	Students are awareness of Indian patent law latest amendment and non-patent articles.

Syllabus

Title	INTERNATIONAL ECONOMICS
Course Code	CZ34B
Unit 1	International Trade _ Importance of International Trade, Theories of Foreign Trade:- Theories of Adam Smith, Ricardo, Haberler‟sHechsher -Ohlin
Unit 2	Balance of Trade, Balance of Payment – Concepts – Causes of Disequilibrium, Methods to Correct Disequilibrium – Fixed and Floating Exchange Rates – Euro – Dollar Marketing (An Over View)
Unit 3	Export Management – Export Procedure and Documents – Export Finance _ Export Promotion – Export Pricing
Unit 4	International Economic Organizations and its Functions IMF, IDA, IFA, IBRD, ADB, UNCTAD, UNIDO
Unit 5	WTO and Trade Liberalization – Liberalization of Trade in Manufacturing and in Agricultural Trade – TRIPS, TRIMS – Indian Patent Law

Course Objectives

Title	ENVIRONMENTAL STUDIES
Course Code	ENV4B
CO-1	To develop an understanding of the process of eco system function.
CO-2	To understand the process of recycling.
CO-3	To enable the students of knowledge of renewable and non-renewable resources.
CO-4	To develop the functions of preventing the pollution.
CO-5	To acquire knowledge of the bio-diversity of the environmental surroundings.

Course Outcome	
Title	ENVIRONMENTAL STUDIES
Course Code	ENV4B
CO-1	To enable the students to acquire knowledge of solving environmental problems
CO-2	Understand and evaluate the global scale of environmental problems.
CO-3	Demonstrate the awareness and values of ecological processes and communities.
CO-4	To enable the students to approach to know about the environmental issues with a focus sustainability.
CO-5	To give a exact way of ability to integrate the discipline and field of environmental concern.

Syllabus

Title	**ENVIRONMENTAL STUDIES**
Course Code	**ENV4B**
Unit 1	**Introduction to Environmental Studies** Multidisciplinary nature of environmental studies; Scope and importance; concept of sustainability and sustainable development.
Unit 2	**Ecosystem (2lectures)** What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem Food chains, food webs and ecological succession, Case studies of the following ecosystem: a) Forest ecosystem b) Grassl and ecosystem c) Desert ecosystem d) Aquatic ecosystem (ponds,stream,lakes,rivers,ocean, estuaries)
Unit3	**Natural Resources: Renewable and Non–renewable Resources** Land resources and land use change: Land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam build in go environment, forests, biodiversity and tribal populations. Water: Use and over exploitation surface and ground water, floods, droughts, conflicts over water (international and inter-state). Energy resources: Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.
Unit 4	**Biodiversity and Conservation** Levels of biological diversity: genetics, species and ecosystem diversity, Bio geographic zones of India: Bio diversity patterns and global biodiversity hotspots India asamega-biodiversity nation, Endangered and endemic species of India. Threats to biodiversity: Habitat loss, poaching of wildlife, man- wildlife conflicts, biological invasions; Conservations of biodiversity: In-situ and Ex-situ Conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value

Unit 5

Environmental Pollution

Environmental pollution: types, causes, effects and controls: Air, Water, soil and noise Pollution.
Nuclear hazards and human health risks
Solid waste management: Control measures of urban and industrial waste
Pollution case studies.

Unit 6

Environmental Policies &Practices

Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture. Environment Laws: Environment Protection Act, Air (Prevention &Control of Pollution) Act; Water (Prevention and Control of pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity(CBD).Nature reserves, tribal populations and rights, and human Wildlife conflicts in Indian context.

Unit 7

Human Communities and the Environment

Human population growth, impacts on environment, human health and welfare.
Resettlement and rehabilitation of project saffected persons; case studies.
Disaster management: floods, earthquake, cyclone and landslides.
Environmental movements: Chipko, Silent Valley, Bishno is of Rajasthan.
Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
Environmental communication and public awareness, case studies (e.g.CNGV ehicles in Delhi)

Unit 8

Field Work

Visit to an area to document environmental assets: river /forest /flora fauna etc. Visit to a local polluted site – Urban/Rural/Industrial/Agricultural.
Study of common plants, insects, birds and basic principles of identification.
Study of simpleeco system-pond, river, Delhi Ridge etc.

Course Objectives	
Title	**ELEMENTS OF COST ACCOUNTING**
Course Code	
CO-1	To make the students to know the Process of Accounting for Cost Elements.
CO-2	To understand the advantages of Costing to the Stakeholders, Workers, Creditors and the Public.
CO-3	At the end of the course students will understand the basic elements of costing
CO-4	To enable students to classify cost and to prepare cost sheet.
CO-5	To enable students to reconcile result as per cost and financial accounts.

Course Outcome	
Title	**ELEMENTS OF COST ACCOUNTING**
Course Code	
CO-1	Aimed to familiarize the concept of cost accounting.
CO-2	Helps together knowledge on preparation of costs and its practical point of view.
CO-3	Accrue basic knowledge on cost accounting concept, element of cost, classification of cost, labour, various system of remuneration and incentive
CO-4	Need for material control, valuation
CO-5	Tounder stand the concept to overhead

Syllabus	
Title	**ELEMENTS OF COST ACCOUNTING**
Course Code	
Unit 1	**Introduction of Cost Accounting** Definition - Nature and Scope – Principles of Cost Accounting – Cost Accounting and Financial Accounting - Cost Accounting Vs Management Accounting – Installation of Costing System –Classification of Costs – Cost Centre – Profit Centre
Unit 2	**Cost sheet and methods of costing** Preparation of Cost Sheet. Reconciliation of Cost and Financial Accounts.- Unit Costing- Job Costing.
Unit 3	**Material Costing** Material Control – Meaning and Objectives – Purchase of Materials – Stock Levels of Materials – EOQ – Stores Records – ABC Analysis – Issue of Materials – Methods of Issue – FIFO – LIFO – HIFO – Base Stock Method – Specific Price Method – Simple and Weighted Average Method – Standard and Inflated Price Method.
Unit 4	**Labour Costing** Direct Labour and Indirect Labour – Time Keeping – Methods and Calculation of Wage Payments – Time Wages – Piece Wages – Incentives – Different Methods of Incentive Payments – Idle time – Overtime – Labour Turnover - Meaning, Causes and Measurement.
Unit 5	**Overheads Costing** Overheads – Definition – Classification – Allocation and Apportionment of Overheads – Basis of Allocation – Absorption of Overheads - Preparation of Overheads Distribution Statement – Machine Hour Rate – Computation of Machine Hour Rate.

Course Objectives	
Title	**PRACTICAL AUDITING**
Course Code	
CO-1	To make the students to understand the concept of present day Auditing Practices.
CO-2	To enable the students to gain knowledge of various techniques of Auditing.
CO-3	On the completion of syllabus students will gain in sight of the Auditing practices prevailing in the present scenario.
CO-4	Students will understand the general approach of audit in EDP environment.
CO-5	To study about Internal audit.

Course Outcome	
Title	**PRACTICAL AUDITING**
Course Code	
CO-1	Student would understand the basic concepts in auditing.
CO-2	Able to familiarizes the vouching terms in auditing.
CO-3	Student able to identify the duties liabilities and role play by auditor in concern.
CO-4	Student would prepare the audit report.
CO-5	Student would again knowledge in auditing and non -profit organisation.

Syllabus	
Title	**PRACTICAL AUDITING**
Course Code	
Unit 1	**Introduction** Meaning and Definition of Auditing – Distinction between Auditing and Accounting - Objectives - Advantages and Limitations of Audit - Scope of Audit - Classifications of Audit – Audit Planning - Meaning. Audit programme – Meaning – Objectives and Contents. Audit Note Book, contents, Usefulness of Audit Note Book - Aud working NAMEs - meaning. Ownership and Custody – Test checking and Routine checking - Meaning. Internal control – Meaning – Definition Objectives – Technique for evaluation of Internal Control System. Internal check – Meaning - Objectives difference between Internal control, Internal check and Internal Audit.
Unit 2	**Vouching and Verification** Vouching – Meaning and Definitions – Objectives. Trading Transactions – Audit of Ledger - Scrutinizing of ledgers Vouching of cash Receipts and Payments - Vouching of outstanding Assets and Liabilities – Verification – Meaning - Objectives and Process – Valuation of Assets and liabilities – Distinction between Verification and Valuation.
Unit 3	**Audit and Accounting Standards** Types of Audit – Statutory Audit – Concurrent Audit – Stock Audit – Cost Audit – Secretarial Audit – CAG Audit – Management Audit. Accounting Standards – Standards on Auditing Standards on Internal Audit – Penal Provisions – Role of National Financial Reporting Authority (NFRA)
Unit 4	**Auditors and Audit Report** Appointment – Procedures – Eligibility and Qualifications – Powers and Duties – Rotation and Removal of Auditors Resignation of Auditors – Remuneration of Auditors - Audit report – Preparatio and presentation. Auditor's Responsibilities and liabilities towards Shareholders, Board and Audit Committee. Restriction on other Services.
Unit 5	**Recent Trends in Auditing** EDP Audit – Meaning – Division of auditing in ED environment. Impact of Computerization on Audit Approach – Online Computer System Audit – Types of Online Computer System Audit – Audit around with the Computers – Procedure of Audit under EDP system- Green Audit- Introduction

Course Objectives	
Title	**LOGISTICS AND SUPPLY CHAIN MANAGEMENT**
Course Code	
CO-1	The students to gain deeper insights into logistics and supply chain management.
CO-2	To highlight the integrated nature of working in logistics and supply chain industry.
CO-3	To prepare students to work in logistics and allied industries.
CO-4	To enable the students the students to understand the concepts and the types of transportation.
CO-5	To prepare the students to know about the significance of the logistical information system.

Course Outcome	
Title	**LOGISTICS AND SUPPLY CHAIN MANAGEMENT**
Course Code	
CO-1	Student would able to understand the element of environment and its important on business.
CO-2	Student would able to familiarize economic environment of business
CO-3	Student would able to aware government policies.
CO-4	Student would able to identify new technique and policies in present scenario.
CO-5	Help to identify the different types of entrepreneur.

Syllabus	
Title	**LOGISTICS AND SUPPLY CHAIN MANAGEMENT**
Course Code	
Unit 1	Concepts of Logistics – Evolution – Nature and Importance Components of Logistics Management- Competitive advantages Logistics – Functions of Logistics management – Principles Logistics Network- Integrated Logistics system, Supply cha management – Nature and Concepts – Value chai- Functions – Supply chain effectiveness – Outsourcing – 3PLs and 4PLs – Supply chain relationships – Customer services.
Unit 2	Elements of Logistics and Supply chain management – Invento carrying – Ware housing, Technology in the ware hous Computerisation, Barcoding, RFID and WMS – Material hand ling Concepts and Equipments: Automated Storage and Retrieval Systen – Order Processing – Transportation – Demand Forecasting – Impa of Forecasts on Logistics and Supply chain Management- Performanc measurements.
Unit 3	Transportation – Position of Transportation in Logistics and Supply chain management- Road, Rail, Ocean Transport - Ships- Types- Measurement capacity of ships – shipping information, Air, Transport Multi model transport – containerization – CFS – ICDS- Cross Docking- Selection of transportation mode – Transportation Network and Decision – Insurance aspects of logistics.
Unit 4	Logistical Information System (LIS) - Operations – Integrated I solution for Logistics and supply chain management- Emergi technologies in Logistics and Supply chain management. Componen of a logistic system-transportation-Inventory carrying-warehousin order processing – Distribution channels- Difference betwee warehouse and distribution centre.
Unit 5	Performance- Bench marking for supply chain improvement- Dimensions and achieving excellence- Supply Chain Measures – SCOR model- Logistics score board- Activity Based Costing - Economic Value Added Analysis- Balance Score card approach- Lean thinking and six sigma approach in Supply Chain.

Course Objectives	
Title	**FINANCIAL MANAGEMENT**
Course Code	
CO-1	To impart the basics of Financial Management for the benefit of Commerce students.
CO-2	To enable the students to know the concepts of the Investment, Financing and Working Capital.
CO-3	At the end of syllabus students will understand the basics of financial management, investing, financing and dividend decisions.
CO-4	To enable the students to familiarize with the capital structure and cost of capital.
CO-5	To advance the understanding of fundamental concepts of finance, financial market and market participants.

Course Outcome	
Title	**FINANCIAL MANAGEMENT**
Course Code	
CO-1	To learn theoretical foundation of financial management decisions.
CO-2	To families the theories of Capital structure and concept of cost of capital.
CO-3	To provide basic knowledge about working capital management.
CO-4	To evaluate feasibility of various investment options.
CO-5	Calculate contemporary measures of financial measures of performance and risk.

Syllabus	
Title	**FINANCIAL MANAGEMENT**
Course Code	
Unit 1	**Introduction** Meaning and Objectives of Financial Management – Functions of Financial Management. Finance - Sources of Financing- Role of Financial Manager in Financial Management- Financial Goals- Profit maximization Vs. Wealth maximization – Concept of Time Value of Money- Risk and Return.
Unit 2	**Capital Structure and Cost of Capital** Capital Structure- Meaning- Capital Structure Theories-Definition - Cost of Equity Capital – Cost of Preference Capital – Cost of Debt – Cost of Retained Earnings – Weighted Average (or) Composite cost of capital (WACC) Capital Structure – Theories of Capital Structure - Leverage concept.
Unit 3	**Dividend** Meaning – Dividend Policies – Factors affecting Dividend Payment – Provisions on Dividend Payment in Company Law – Dividend Models - Walter's Model Gordon's Model - M. M. Model – Hypothesis Model.
Unit 4	**Working Capital** Working Capital - Meaning and importance – Factors Influencing Working Capital – Determining (or) Forecasting of Working Capital requirements – Working Capital Operating cycle-
Unit 5	**Capital Budgeting** Capital Budgeting Process – Cash flow estimation- Payback period _ Accounting Rate of Return – Net Present Value (NPV) – Net Terminal Value - Internal Rate of Return Profitability Index – Capital Budgeting under Risk- Certainty Equivalent Approach and Risk – Adjusted Discount Rate – Decision Tree Analysis.

Course Objectives	
Title	**VISUAL BASIC THEORY**
Course Code	
CO-2	To bring the awareness of functions and procedures
CO-3	To train the students to do even the and ling and MDI forms and DAO note.
CO-4	To accumulate the students and the concept of display information technology.
CO-5	To facilitate the students to know the techniques of form writing and control arrays.

Course Outcome	
Title	**VISUAL BASIC THEORY**
Course Code	
CO-1	Students will acquire Knowledge of communication and its types
CO-2	To students will be able to understand the concept of elements of design line and shape.
CO-3	knowledge of visual and sensory perception of verbal communication.
CO-4	Students train to over come the errors of command and visualizing.
CO-5	Students understand the basic concept of visual basic theory and progress.

Syllabus	
Title	**VISUAL BASIC THEORY**
Course Code	
Unit 1	Data Types – String - Numbers – Variables – Text Boxes – Labels – Creating Controls – Tool Box – Name Property Command button – Access keys – Image controls message Boxes Grid Editing tools.
Unit 2	Displaying Information-Determinate Loops– Indeterminate Loops–Conditional Built in Functions – Customizing Form– Writing Simple Programs.
Unit 3	Functions and Procedures – Lists – Arrays – Control Arrays – Combo Boxes – Grid control – Do Events and Sub Main.
Unit 4	Event Handling – Module – Monitoring Mouse Activity – Dialog Boxes – Common controls –Menus.
Unit 5	MDIF norms–Data base connectivity using Data control and DAO. Note :Theory only

Course Objectives	
Title	**VALUE EDUCATION**
Course Code	
CO-1	Value are socially accepted norms to evaluate objects, persons and situations that form part and parcel of sociality. A value system is a set of consistent value and measures.
CO-2	Knowledge of the values are inculcated through education.
CO-3	It contributes in forming true human being, who are able to face life and make it meaningful.
CO-4	There are different kinds of values like, ethical or moral values, doctrinal orideo logical values, social values and aesthetic values.
CO-5	Values can be defined as broad preferences concerning appropriate courses of action or outcomes. As such, values reflect a person's sense of right and wrong or what "ought" to be.

Course Outcome	
Title	**VALUE EDUCATION**
Course Code	
CO-1	Students will understand the importance of value based living.
CO-2	Students will become value based professionals.
CO-3	To realize the value of human life.
CO-4	To identify the pain areas of humanity and find solutions for human problems.
CO-5	Lead a balanced life with emotional stability.

Syllabus	
Title	**VALUE EDUCATION**
Course Code	
Unit 1	Value education-its purpose and significance in the present world Value system – The role of culture and civilization – Holistic living –balancing the outer and inner–Body, Mind and Intellectual level– Duties and responsibilities.
Unit 2	Salient values for life – Truth, commitment, honesty and integrity, forgiveness and love, empathy and ability to sacrifice, care, unity, and inclusiveness, Selfesteem and self confidence, punctuality – Time, task and resource management – Problem solving and decision making skills–Interpersonal and Intra personal relationship–Teamwork–Positive and creative thinking.
Unit 3	Human Rights – Universal Declaration of Human Rights– Human Rights violations–National Integration–Peace and non-violence Dr.APJKalam' stenpoints for enlightened citizenship – Social Values and Welfare of the citizen – The role of media in value building.
Unit 4	Environment and Ecological balance–inter dependence of all beings–living and non-living. The bin dig of man and nature– Environment conservation and enrichment.
Unit 5	Social Evils – Corruption, Cyber crime, Terrorism – Alcoholism, Drug addiction – Dowry –Domestic violence – untouchability female in fanticide – atrocities against women – How to tack let hem.

Course Objectives	
Title	**ADVANCED COST ACCOUNTING**
Course Code	
CO-1	To make the students to understand the process of ascertaining, classification and controlling costs.
CO-2	To enable the students to learn the various methods of cost elements.
CO-3	The students will understand the concepts of cost accounting, methods and its usage in decision making.
CO-4	To provide the students with an understanding of accounting procedure of corporate restructuring.
CO-5	To provide the student with knowledge of recent development in corporate accounting.

Course Outcome	
Title	**ADVANCED COST ACCOUNTING**
Course Code	
CO-1	Students would analysis the job cost in production unit.
CO-2	Students able to under stand the work certified &uncertified.
CO-3	Students would evaluate the input and output of process manufacturing and understand the need for process costing.
CO-4	Students would able tore lates the normal and abnormal loss.
CO-5	Students would able to evaluate no profit and no loss concept through HBEP.

Syllabus	
Title	**ADVANCED COST ACCOUNTING**
Course Code	
Unit 1	Definition - Features of Contract costing- Calculation of Profit on Contracts- Cost plus Contract-Contract Costing Vs job Costing- Preparation of Contract A/c
Unit 2	**Process Costing** Features of Process Costing - Process Loss - Norma and Abnormal Loss - Abnormal Gain - Joint Products - By Product - Concept of Equivalent Production – Process Accounts - Proces Loss and Gains.
Unit 3	**Operation Costing** Operating Costing – Meaning – Preparation of Operating cost Sheet – Transport costing – Power Supply Costing – Hospital Costing – Simple Problems.
Unit 4	Meaning – Features – Absorbtion Costing – Marginal Costing V Absorbtion Costing – Contribution – PV Ratio – Break Even point Key Factor – Margin of Safety – Preparation of Marginal Co Statement.
Unit 5	Definition – Objectives – Advantages – Standard Cost and Estimate Cost – Installation of Standard Costing – Variance analysis – Materia Labour, Overhead, and Sales Variances – Calculation of Variances.

Course Objectives	
Title	**MANAGEMENTACCOUNTING**
Course Code	
CO-1	To enable the students to get knowledge about the various techniques of Management Principles.
CO-2	To make the students to get practical skill in solving management problems.
CO-3	Understand the primary purpose of management accounting namely financial statement analysis and budgetary control
CO-4	Develop and apply budget for planning and controlling purpose.
CO-5	To make the students develop competence with their usage in managerial decision making and control.

Course Outcome	
Title	**MANAGEMENTACCOUNTING**
Course Code	
CO-1	Helps to understand the basic concept of managerial principle techniques.
CO-2	Help to analyse financial statement.
CO-3	To evaluate financial position of company by using ratio analysis.
CO-4	Fund flow statement helps to schedule working capital changes in business concern.
CO-5	Evaluate cash inflow or outflow in business operations.

Syllabus	
Title	**MANAGEMENTACCOUNTING**
Course Code	
Unit 1	**Introduction** Management Accounting - Meaning- Scope- Importance- Limitations - Management Accounting Vs Cost Accounting – Management Accounting Vs Financial Accounting.
Unit 2	**Financial Statement Analysis:** Analysis and Interpretation of Financial Statements – Nature and Significance – Types of Financial Analysis – Tools of Analysis – Comparative Statements – Common size Statement – Trend Analysis.
Unit 3	**Ratio Analysis** Meaning – Advantages – Limitations – Types of Ratios – Liquidity Ratios – Profitability Ratios Turnover Ratios – Capital Structure Ratios – Leverage Ratios – Calculation of Ratios.
Unit 4	**Fund Flow Analysis & Cash Flow Analysis** Introduction, Meaning o Funds Flow Statement-Ascertainment of flow of funds- Technique o preparing funds flow statement- Schedule of Changes in Workin Capital- Adjusted Profit and Loss account-Funds Flow Statemer Meaning of Cash Flow Statements – Advantages – Limitations Preparation of Cash Flow Statement – Types of Cash flows - Operating Financing and Investing Cash flows.
Unit 5	**Budgetary Control & Marginal Costing** Budgetary Control – Meanin – Preparation of various Budgets – Cash Budget - Flexible Budget Production Budget – Sales Budget. Capital Expenditure Control Application of Marginal Costing in Decision Making – Make or Buy Shut down or Continue – Exploring New Markets.

Course Objectives	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	
CO-1	To enable the students to understand the concept of Entrepreneurship and to learn the professional behavior expected of an entrepreneur.
CO-2	To identify significant changes and trends which create business opportunities and to analyze the environment for potential business opportunities.
CO-3	To provide conceptual exposure on converting idea to a successful entrepreneurial firm.
CO-4	On completion of syllabus student will understand on the basic concepts of entrepreneurship and business opportunities to familiars with knowledge about business and project reports for starting a new ventures on team based.
CO-5	To contribute to their entrepreneurial and managerial potentials.

Course Outcome	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	
CO-1	Students could able to understand the concept of entrepreneur.
CO-2	Help to identity project and feasible analysis.
CO-3	Students understand government policy for young entrepreneur.
CO-4	Gain knowledge on financial literacy toward entrepreneur.
CO-5	Help to identify the different types of entrepreneur.

Syllabus	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	
CO-1	**Entrepreneurship -**Entrepreneur : Meaning of entrepreneurship – Types of Entrepreneurship – Traits of entrepreneurship – Factors promoting entrepreneurship- Barriers to entrepreneurship- the entrepreneurial culture- Stages in entrepreneurial process – Women entrepreneurship and economic development- SHG.
CO-2	**Developing Successful Business Ideas -**Recognizing opportunities – trend analysis – generating ideas – Brainstorming, Focus Groups, Surveys, Customer advisory boards, Day in the life research – Encouraging focal point for ideas and creativity at a firm level- Protecting ideas from being lost or stolen – Patents and IPR.
CO-3	**Opportunity Identification and Evaluation -**Opportunity identification and product/service selection – Generation and screening the project ideas – Market analysis, Technical analysis, Cost benefit analysis and network analysis- Project formulation – Assessment of project feasibility- Dealing with basic and initial problems of setting up of Enterprises.
CO-4	**Business Planning Process -**Meaning of business plan- Business plan process- Advantages of business planning- preparing a model project report for starting a new venture (Team-based project work).
CO-5	**Funding -**Sources of Finance- Venture capital- Venture capital process- Business angles- Commercial banks- Government Grants and Schemes.

Course Objectives	
Title	**HUMAN RESOURCE MANAGEMENT**
Course Code	
CO-1	To facilitate the students to know about the importance of Human Resources.
CO-2	To make the students to understand the various aspects of the Human Resources Management
CO-3	Understanding of basic concepts, functions and functioning of Human resource department of the organisations
CO-4	Examine current issues, trends, practices, and processes in HRM.
CO-5	Develop employability skills of the Canadian workplace.

Course Outcome	
Title	**HUMAN RESOURCE MANAGEMENT**
Course Code	
CO-1	Student would able to understand importance, scope and function of HRM.
CO-2	Student would able to implement training method and performance appraisal technics.
CO-3	Student would able to understand the concept of compensation and administrator wage and salary.
CO-4	Student would able to understand the concept of trade union and collective bargaining process.
CO-5	Student would able to analysis HR Audit.

Syllabus	
Title	**HUMAN RESOURCE MANAGEMENT**
Course Code	
Unit 1	**Introduction** Nature and Scope of Human Resources Management – Differences between Personnel Management and HRM – Environment of HRM- HRM Accounting– Human Resource Planning – Recruitment – Selection – Methods of Selection – Uses of various Tests – Interview techniques in Selection and Placement.
Unit 2	**Training** Meaning – Induction – Methods – Techniques – Identification of the Training needs – Training and Development – Performance appraisal – Transfer – Promotion and Termination of services –Career Development.
Unit 3	**Compensation & Labour Relation** Cost to Company – CTC Fixed and FlexiblePay - Components – Incentives – Benefits – Motivation – Talent Retention- Welfare and Social Security Measures - Opportunities, Challenges, and Recent Trends in Compensation. Need – Functions of Trade Unions – Forms of Collective bargaining – Workers Participation in management - Types and effectiveness. Industrial Disputes and Settlements (laws excluded)- Social Ethics and Responsibility
Unit 4	**Human Resource Accounting & Audit** Human Resource Accounting- Meaning- Objectives- Need & Limitations. Human Resource Audit – Nature – Benefits – Scope – Approaches.
Unit 5	**Corporate Ethics & Corporate Social Responsibility** Business Ethics – Concept, Characteristics, Importance and Need for ethics- Sources of Ethics, Concept of Corporate Ethics, code of Ethics- Guidelines for developing code of ethics, Ethics in Human Resource Management Corporate Social Responsibility: Concept, Scope & Relevance and Importance of CSR in Contemporary Society. CSR towards employees and workers- CSR and environmental concerns- Role of HR professionals in CSR.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF COMMERCE

Program : B.COM A/F

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	Enable preparation of books of accounts, cost sheets, and balance sheets via accounting application software
PO-2	Apply various Provisions of company and Business Laws and IRDA
PO-3	Fundamentals of Taxation,Auditing and Budgeting
PO-4	Application od statistical tools for research
PO-5	Understand the various functions of business Management-Finance,HR, Marketing's & Systems

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Acquire the knowledge, skills in different areas of communication, decision making, innovations and problem-solving in day to day business activities
PSO-2	Helps to demonstrate knowledge in setting up a computerised system of accounting
PSO-3	Keep the students conversant with the contemporary knowledge of Accounting, Taxation, GST etc
PSO-4	Equip the students to be well versed in the legal framework governing the business world.
PSO-5	Intends to provide well-trained talent to manufacturing & service sector Scope to pursue Indian & International Professional Courses in Accounting

Course Objectives	
Title	**I FINANCIALACCOUNTING**
Course Code	**CZ21A**
CO-1	To enable the students to understand the system of preparin financial statements for various types of organisation
CO-2	To familiarize the students with knowledge about financial reporting standards
CO-3	To analyses and prepare financial statement of different types of organisation
CO-4	The students will be aware of the various amendments in financial reporting
CO-5	To help in the measurement of profit and loss of business

Course Outcome	
Title	**I FINANCIAL ACCOUNTING**
Course Code	**CZ21A**
CO-1	Students would prepare financial statements in accordance with appropriate standards.
CO-2	Students would prepare ledger accounts using double entry book keeping and record journal entries accordingly.
CO-3	Students would interpret the business implications of financial statement information.
CO-4	Students would prepare accounting information for planning and control and for the evaluation of finance, prepare bank reconciliation statement from incomplete statement
CO-5	Explain the purpose of double entry system to understanding the accounting system properly, preparation of rectification errors.

Syllabus	
Title	**FINANCIAL ACCOUNTING**
Course Code	**CZ21A**
Unit 1	**PREPARATION OF FINANCIAL STATEMENT:** Final accounts of sole trading concern-Adjustments-Receipts and Payments-Income and expenditure-Balance sheet of non-trading organisation
Unit 2	**DEPRECIATION AND INSURANCE CLAIMS:** Depreciation Accounting: Depreciation- Meaning –Causes-Types-Straight Line Method-Written down value method- Concept of useful life under Companies Act 2015 Insurance Accounting: Insurance claims Calculation of Claim amount-Average clause(Loss of stock only)
Unit 3	**SINGLE ENTRY SYSTEM:** Meaning and Features of Single entry-Defects-Difference between single entry and double entry system-Methods of calculation of Profit-Statement of Affairs Method-Conversion Method
Unit 4	**RECTIFICATION OF ERRORS AND BANK RECONCILIATION STATEMENT**: Classification of Errors Rectification of Errors – Preparation of Suspense a/c. Bank Reconciliation Statement – Need and preparation.
Unit 5	**HIRE PURCHASE AND INSTALLMENT SYSTEM:** Hire Purchase System- Default and repossession-Hire purchase trading account Installment System-Calculation of Profit.

Course Objectives	
Title	**II–Financial Planning & Performance**
Course Code	**CA21A**
CO-1	To make the students to understand the basic concepts of financial planning.
CO-2	To prepare the students to know about the significance of the Performance of finance in Business.
CO-3	Learn to take decision making own choosing suitable financial mix.
CO-4	To make students to know how management will apply the planning and control concept in the Finance department.
CO-5	To ensure availability of funds whenever these are required

Course Outcome	
Title	**II –Financial Planning & Performance**
Course Code	**CA21A**
CO-1	To under standing of strategic planning ,forecasting and budgeting
CO-2	To recall he models of strategic planning with the process, classify the forecasting techniques and demonstrate the budget
CO-3	To make use of budget to prepare annual profit plan,
CO-4	To analyze performance by using flexible budgets und compare actual results to planned results.
CO-5	To explain the importance and use of standard cost systems ,propose performance measures and discuss key performance indicators.

Syllabus	
Title	**II –Financial Planning & Performance**
Course Code	**CA21A**
Unit 1	**STRATEGICPLANNING** Analysis of external and internal factors affecting strategy - Long-term mission and goals -Alignment of tactics with long-term strategic goals - Strategic planning models and analytical techniques - Characteristics of successful strategic planning process.
Unit 2	**BUDGETINGANDFORECASTING** Operations and performance goals - Characteristics of a successful budget process – Resource allocation - Regression analysis - Learning curve analysis - Expected value - Annual business plans (master budgets) - Project budgeting - Activity-based budgeting - Zero-based budgeting -Continuous(rolling)budgets-Flexiblebudgeting-Annualprofitplanandsupportingschedules - Operational budgets - Financial budgets - Capital budgets - Pro forma income – Financial statement projections - Cash flow projections.
Unit 3	**COSTANDVARIANCE MEASURES** Comparison of actual to planned results - Use of flexible budgets to analyze performance -Management by exception - Use of standard cost systems - Analysis of variation from standard cost expectations
Unit 4	**RESPONSIBILITYCENTERSANDREPORTINGSEGMENTS** Types of responsibility centers -Transfer pricing-Reporting of organizational segments
Unit 5	**PERFORMANCE MEASURES:** Product profitability analysis - Business unit profitability analysis - Customer profitability analysis - Return on investment - Residual income - Investment base issues - Key performance indicators (KPIs) - Balanced scorecard

Course Objectives	
Title	**1: BUSINESS COMMUNICATION**
Course Code	**CA31B**
CO-1	To facilitate the students to understand the concept of Communication.
CO-2	To know the basic techniques of the modern forms of communication
CO-3	To develop the communication skills among students.
CO-4	To learn how write different types of letter related to business.
CO-5	To provide an outline to effective organisational communication

Course Outcome	
Title	**1: BUSINESS COMMUNICATION**
Course Code	**CA31B**
CO-1	Applying business communication strategies and principles exchange information.
CO-2	Learn to write business letters.
CO-3	Attain oral communication skill for effective oral presentation.
CO-4	Acquire skills to prepare reports.
CO-5	Enrich written communication skill employability

Syllabus	
Title	**1: BUSINESS COMMUNICATION**
Course Code	**CA31B**
Unit 1	**COMMUNICATION:** Definition – Methods – Types – Principles of effective ɔmmunication – Barriers to Communication – Business Letters – Layout.
Unit 2	**BUSINESS LETTERS:** Kinds of Business Letters: Interview – Application for a situation – Interview -Appointment – Acknowledgement – Promotion – Enquiries – Reply letter – Orders – Sales letter – Circular letter – Complaint letter.
Unit 3	**CORRESPONDENCE:** Bank Correspondence – Insurance Correspondence – Agency Correspondence – Correspondence with Shareholders, Directors.
Unit 4	**REPORTS AND MEETINGS:** Report Writing – Meetings – Agenda - Minutes of Meeting – Memorandum – Office Order – Circular – Notes.
Unit 5	**FORMS OF COMMUNICATION:** Modern Forms of Communication: Fax – E-mail – Video Conferencing – Internet – Websites – uses of the various forms of communication.

Course Objectives	
Title	**III: ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
CO-1	To enable the students to understand the system of preparing financial statements for various types of organisation
CO-2	To familiarize the students with knowledge about financial reporting standards.
CO-3	To understand the preparation of financial statements for business units other than corporate undertaking and their utility.
CO-4	To foster analytical thinking and the uses of related discipline
CO-5	To analysis specific accounting standards and to execute the group project

Course Outcome	
Title	**III: ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
CO-1	Students would familiarize the concept branch account and its system.
CO-2	Students would understand the scope of departmental accounting.
CO-3	Enable the students to understand the scope of departmental accounting.
CO-4	Students would understand the dissolution partnership firm, dissolution accounts insolvency of partners.
CO-5	Students would prepare Indian accounting standard. IFRS- International financial reporting standards.

Syllabus	
Title	**III: ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
Unit 1	**BRANCH ACCOUNTS:** Dependent Branches - Stock and Debtors system – Distinction between Wholesale Profit and Retail Profit – Independent Branches (Foreign Branches excluded)
Unit 2	**DEPARTMENTAL ACCOUNTS:** Basis of Allocation of Expenses – Calculation of Profit - Inter-departmental Transfer at cost or Selling Price.
Unit 3	**PARTNERSHIP ACCOUNTS:** Admission of a Partner – Retirement of a Partner – Death of a Partner.
Unit 4	**PARTNERSHIP ACCOUNTS:** Dissolution of a Partnership Firm – Insolvency of a Partner – Insolvency of all Partners- Piecemeal Distribution of cash in case of Liquidation of Partnership Firm.
Unit 5	**ACCOUNTING STANDARDS FOR FINANCIAL REPORTING** Objectives and uses of financial statements for users-Role of accounting standards-Development of accounting standards in India- Requirements of international accounting standards - Role of developing IFRS- IFRS adoption or convergence in India-Implementation plan in India- Ind AS- Difference between Ind AS and IFRS.

Course Objectives	
Title	**IV - PRINCIPLES OF MANAGEMENT**
Course Code	**CZ22B**
CO-1	To make the students to understand the basic concepts of management.
CO-2	To prepare the students to know about the significance of the management in Business
CO-3	Learn to take decision making own.
CO-4	To make students to know how management will apply the planning and control concept in the process and projects.
CO-5	To provide scope for development of creative abilities of individual

Course Outcome	
Title	**IV - PRINCIPLES OF MANAGEMENT**
Course Code	**CZ22B**
CO-1	Students able to develop knowledge and evolution of management thoughts.
CO-2	Students would able to better understanding of planning and decision making.
CO-3	Students able to give an idea about organisation structure and different types of organisations.
CO-4	Students would able to provide idea about motivation, importance of communication and leadership.
CO-5	Students would able to understand the principles of co-ordination

Syllabus	
Title	**IV - PRINCIPLES OF MANAGEMENT**
Course Code	**CZ22B**
Unit 1	**INTRODUCTION** Definition – Importance – Nature and Scope of Management – Process of Management - Role and functions of Managers - Levels of Management Scientific Management Contributions to Management by different Schools of thought.
Unit 2	**PLANNING** Nature – Importance -Types of Planning - Steps in planning - Objectives of Planning – Policies - Decision making Process-Types of Decisions. HRM- Meaning, -Nature and scope of HRM.
Unit 3	**ORGANIZATION** Meaning and Types of organizations - Principle – Formal and Informal organization - Organisation Structure – Spa of Control – Departmentalization – Basis - Meaning and Importanc of Departmentalization. Policies - Meaning and Types – Procedures Forecasting.
Unit 4	**AUTHORITY AND RESPONSIBILITY** Authority – Definition – Sources – Limitations – Difference between Authority and Responsibility – Delegation of Authority – Meaning – Principles and importance – Centralization Vs Decentralization- Leadership & Communication.
Unit 5	**DIRECTION CO-ORDINATION & CONTROL** Direction Nature - Purpose. Co-ordination – Need – Types and Techniques Requisites for Excellent Co-ordination. Controlling – Meaning Importance – Control Process.

Course Objectives	
Title	**FINANCIAL ANALYSIS & CONTROL**
Course Code	**CA32B**
CO-1	To know and apply concept of financial Information Systems in present scenario
CO-2	To learn the process of Supply Chain ManagementandBusinessProcessImprovement
CO-3	Apply all types of security measure in the financial department and analysis the over all performance of the concern
CO-4	To assess the earning capacity or profitability of the firm
CO-5	To assess the operational efficiency and managerial effectiveness

Course Outcome	
Title	**FINANCIAL ANALYSIS & CONTROL**
Course Code	**CA32B**
CO-1	To understand information systems, data governance ,technology - enabled finance transformation and the application of data analytics and visualization.
CO-2	To be able to define cost behaviour and types of costs, classify costing systems and compare different types of costs.
CO-3	To understand supply chain management and business process improvement.
CO-4	To understand governance ,risk, compliance ,system controls and security measures for internal controls.
CO-5	To understand the concept of internal control system in finance department.

Syllabus	
Title	**FINANCIAL ANALYSIS & CONTROL**
Course Code	**CA32B**
Unit 1	**INFORMATION SYSTEMS AND DATA GOVERNANCE** Accounting information systems - Enterprise resource planning systems – Enterprise performance management systems - Data policies and procedures - Life cycle of data - Controls against security breaches
Unit 2	**TECHNOLOGY-ENABLED FINANCE TRANSFORMATION AND DATA ANALYTICS** Systems Development Life Cycle — Process automation - Innovative applications - Business intelligence - Data mining - Analytic tools - Data visualization
Unit 3	**COST MEASUREMENT CONCEPTS** Cost behavior and cost objects - Actual and normal costs - Standard costs - Absorption (full) costing - Variable (direct) costing - Joint and by-product costing- Job order costing - Process costing - Activity-based costing - Life-cycle costing - Fixed and variable overhead expenses -Plant-wide versus departmental overhead - Determination of allocation base - Allocation of service department costs
Unit 4	**SUPPLY CHAIN MANAGEMENT AND BUSINESS PROCESS IMPROVEMENT** Leanmanufacturing - Enterpriseresourceplanning(ERP) - Theoryofconstraintsandthroughput costing - Capacity management and analysis - Value chain analysis - Value-added concepts -process analysis - Activity-based management - Continuous improvement concepts - Best practice analysis - Cost of quality analysis - Efficient accounting processes
Unit 5	**INTERNAL CONTROLS** Internal control structure and management philosophy – Internal control policies for safe guarding and assurance - Internal control risk - Corporate governance - External audit requirements -Systems controls and security measures

Course Objectives	
Title	**NME–II(B): OFFICEMANAGEMENT**
Course Code	**AR52B**
CO-1	To enable the students to gain knowledge about structure and functioning of an office
CO-2	To Gain knowledge on Filing system, Records Management
CO-3	To learn Office Layout and Forms Control.
CO-4	It aims to achieve the objectives of office management
CO-5	To learn about the regular flow of communication between each department & level of people

Course Outcome	
Title	**NME–II(B): OFFICEMANAGEMENT**
Course Code	**AR52B**
CO-1	Planned Practice the functions of office and office manager
CO-2	Devise and practice there cord management system
CO-3	Analyse the cost control method sand prepare office budget
CO-4	Acquire the skill of effect form control and control over the office stationeries and supplies
CO-5	Practice the office layout principles and maintain office environment

Syllabus	
Title	**NME–II(B): OFFICEMANAGEMENT**
Course Code	**AR52B**
Unit 1	**Office Management**: Meaning, Definition of office, Functions of Office, Office management - Definition of Functions, Duties, and Qualities of Office Manager – Role of Manager in Office ,Planning and Scheduling of Office Work.
Unit 2	**Record Management**: Meaning, Needs, Principles, Filing Objectives, Characteristics of Good Filing System, Centralised and Decentralised Filing, Filing and Indexing, Office Correspondence Business Information System–Electronic Data Processing
Unit 3	**Office Maintenance Management**: Cost Control - Methods ofcost reduction and savings-, Organisation and methods (O&M),Need and objectives- Office Work- Work Simplification, Budgetary Control, organization for budgetary control – office budget-Store Management ,House keeping and Waste Management.
Unit 4	**Forms Control and Stationery**: Objectives of Form control, Steps in Form control, Types of Forms and Design, Principles and Control Office Stationary and Supplies ,Types of Stationary and Continuous Stationary Purchases
Unit 5	**Office Accommodation and Layouts**: Location of Office, steps in office layout ,principles of office layout ,Office Environment

Course Objectives	
Title	**CORPORATE ACCOUNTING – I**
Course Code	**CZ23A**
CO-1	To make the students familiarize with corporate accounting procedures
CO-2	To enable the students to acquire conceptual knowledge about the preparation of the company accounts.
CO-3	Learn the accounting procedures of corporate undertaking and their financial statement preparations
CO-4	To ascertain profit or loss of the business
CO-5	To maintain full & systematic records of business transaction

Course Outcome	
Title	**CORPORATE ACCOUNTING – I**
Course Code	**CZ23A**
CO-1	To provide the knowledge of issue of shares and debentures along with regulation of companies act.
CO-2	To give an exposure to the company final accounting.
CO-3	To understand the methods of valuation of goodwill in corporate sectors.
CO-4	Keep them aware about accounts of insurance company.
CO-5	To provide knowledge regarding how to underwrite shares and debenture along with redemption concept in corporate sector

Syllabus	
Title	**CORPORATE ACCOUNTING – I**
Course Code	**CZ23A**
Unit 1	**SHARE CAPITAL** Issue of Shares - Types of Shares – Forfeiture of Shares- Reissue of Shares- Redemption of Preference Shares.
Unit 2	**DEBENTURES & UNDERWRITING** Issue of Debentures – Redemption of Debentures- Profit prior to incorporation. Underwriting of Shares & Debentures
Unit 3	**FINAL ACCOUNTS** Final Accounts - Preparation of Profit & Loss account and Balance sheet- Managerial Remuneration.
Unit 4	**VALUATION OF GOODWILL & Shares** Valuation of Goodwill & Shares – Meaning – Methods of valuation.
Unit 5	**ACCOUNTING FOR INSURANCE COMPANIES** Insurance Accounts- Types- Final accounts of Life Insurance- Profit determination of Life Insurance

Course Objectives	
Title	**Financial Reporting**
Course Code	**CA23A**
CO-1	Achieve understanding of the financial accounting and reporting frameworks used by business enterprises globally (including US GAAP and IFRS).
CO-2	Achieve knowledge and skills required to apply the knowledge of accounting principles(per US GAAP and IFRS) in performing financial reporting
CO-3	To learn & apply terms used by corporate finance professionals.
CO-4	To provide information about financial position, performance & changes in financial position
CO-5	It is usefull in making economic decisions

Course Outcome	
Title	**Financial Reporting**
Course Code	**CA23A**
CO-1	Helps to understand the basic concept of managerial principle techniques.
CO-2	Help to analyse financial statement
CO-3	To evaluate financial position of company by using ratio analysis.
CO-4	Fund flow statement helps to schedule working capital changes in business concern.
CO-5	Evaluate cash inflow or outflow in business operations.

Syllabus	
Title	Financial Reporting
Course Code	CA23A
Unit 1	FINANCIAL STATEMENTS (PER USGAAP AND IFRS) Balance sheet - income statement - Statement of Comprehensive Income - Statement of changes in equity - Statement of cash flows - Integrated reporting
Unit 2	REVENUE RECOGNITION (PER USGAAP AND IFRS) 5-Step approach to Revenue Recognition - Certain Customer's Rights & Obligations - Specific Arrangements - Matching principle, Accruals & Deferrals, Adjusting Journal Entries
Unit 3	CURRENT ASSETS AND CURRENT LIABILITIES (PER USGAAP AND IFRS) Cash & Cash Equivalents - Accounts Receivable - Notes Receivable - Transfers & Servicing of Financial Assets - Accounts Payable - Employee-related Expenses Payable - Determining Inventory & Cost of Goods Sold - Inventory Valuation - Inventory Estimation Methods
Unit 4	ASSET VALUATION AND VALUATION OF LIABILITIES (PER US GAAP AND IFRS) Acquisition of Fixed Assets-Capitalization of Interest Costs Incurred After Acquisition-Depreciation - Impairment - Asset Retirement Obligation - Disposal & Involuntary Conversions - Knowledge-based intangibles (R&D, software) - Legal rights based intangibles (patent, copyright, trademark, franchise, license, leasehold improvements) - Goodwill -Leasehold Assets & Liabilities - Deferred Taxes
Unit 5	EQUITY TRANSACTIONS(PER USGAAP AND IFRS) Paid-in capital - Retained earnings - Accumulated other comprehensive income – Stock dividends and stock splits - Stock options - Business Combinations & Consolidations -Differences between US GAAP and IFRS

Course Objectives	
Title	**Banking Theory Law and Operations**
Course Code	**CZ23C**
CO-1	To facilitate the understanding of the origin and the growth of the Indian Banking System
CO-2	To understand the modern day Developments in Indian Banking Sector.
CO-3	Learn the concept of online transaction and E- banking concept in present scenario
CO-4	To acquire specialized knowledge of law & practice relating to banking theory
CO-5	To ensure the balanced development of banking companies

Course Outcome	
Title	**Banking Theory Law and Operations**
Course Code	**CZ23C**
CO-1	It helps students to know about the importance of saving liquidity and banking rules and it also helps to career in banking field.
CO-2	Helps to know about promoting price stability and also makes money at every cheaper rate.
CO-3	It gives a clear definition about online payment. it helps student to know about the advantages and disadvantages of online payment
CO-4	Its helps to know about the security which public get from bank and also the regulations of the banks
CO-5	Throughout the reading endorsement programme its provides all students with a broad scope of reading understanding the importance of it and it helps then to apply practically on their future.

Syllabus	
Title	**Banking Theory Law and Operations**
Course Code	**CZ23C**
Unit 1	**INTRODUCTION TO BANKING** - History of Banking- Components of Indian banking -Indian Banking System-Phases of development- Banking structure in India-Payment banks and small banks-Commercial Banking-Definition-Classification of banks. Banking System- Universal banking-Commercial Banking-functions-Role of Banks in Economic Development. Central Banking-Definition –Need-Principles- Central Banking Vs Commercial banking- Functions of Central bank.
Unit 2	**RBI** -Establishment-objective-Legal framework-Functions-SBI-Origin and History-Establishment-Indian subsidiaries-Foreign subsidiaries-Non-Banking-Subsidiaries-Personal banking-International banking- Trade Financing-Correspondent banking .Co-operative banks-Meaning and definition-Features- Co-operative banks vs Commercial banks-Structure.-**NBFC-Role of NBFC- RBI Regulations- Financial sector reforms-Sukhmoy committee 1985-Narasimham committee I and II-Prudential norms: capital adequacy norms-classification of assets and provisioning.**
Unit 3	**E-BANKING** - Meaning-Services-e-bankingandFinancialservices-Initiatives-Opportunities-Internetbanking-Meaning-Internet banking Vs Traditional banking -Services-Drawbacks-Frauds in Internet banking. Mobile banking– **Anywhere Banking-Any Time Banking**- Electronic Mobile Wallets. ATM-Evolution -Concept- Features - Types-. Electronicmoney-Meaning-Categories-Meritsofe-money-ElectronicFunds Transfer (EFT)system - Meaning- Steps–Benefits-Monetary policies- final sector reforms- sakmoy chakrevarthy commmittee 1985-Narasiman Committee I & II- prudential norms capital adequacy norms-classification of assets & provisionary meaning- Structure of Interest rates (short and long term)-impacts on saving and borrowings.
Unit 4	**BANK ACCOUNT** -Opening – Types of Accounts-FDR-Steps in opening Account-Saving vs Current Account- 'Donatio Mortis Causa' - Passbook-Bank Customer Relationship-Special Types of currents-KYC norms. Bank Lending – Lending Sources-Bank Lending Principles-Forms of lending-Loan evaluation process-securities of lending- Factors influencing bank lending – Negotiable

	Instruments –Meaning –Characteristics-Types. Crossing – Definition –Objectives-Crossing and negotiability-Consequences of Crossing.
Unit 5	**ENDORSEMENT** -Meaning-Components-Kinds of Endorsements-Cheques payable to fictitious person- Endorsement by legal representative –Negotiation bank-effect of endorsement-Rules regarding endorsement .Paying banker- Banker's duty-Dishonoring of Cheques-Discharge of paying banks-Payments of a crossed cheque payment. Collecting bankers-Statutory protection under section 85-Refusal of cheques Payment. Collecting Banker- Statutory protection under section 131-Collecting bankers' duty –RBI instruction –Paying Banker Vs Collecting Banker-Customer grievances-Grievance redressal –Banking Ombudsman.

Course Objectives	
Title	**VIII – MARKETING**
Course Code	**CZ23D**
CO-1	To facilitate the students to understand the importance and the relevance of marketing in to- day's Business world
CO-2	To enable the students to understand the features of the Indian Marketing
CO-3	To understand the basic concepts of Marketing, Market Segmentation, Marketing Mix and Recent trends in Marketing.
CO-4	It helps in achieving consumer satisfaction & maximizing profit
CO-5	To Improves awareness & demand around new product or services

Course Outcome	
Title	**VIII – MARKETING**
Course Code	**CZ23D**
CO-1	Student would able to understand marketing concept and environment.
CO-2	Students acquire knowledge about products and channels of distribution.
CO-3	Learn knowledge about promotion
CO-4	Learn how to fix the product pricing and product mix.
CO-5	Students would able to know CRM concept.

Syllabus	
Title	**VIII – MARKETING**
Course Code	**CZ23D**
Unit 1	Introduction to Marketing –Meaning – Definition and Functions of Marketing – Marketing Orientation – Role and Importance of Marketing – Classification of Markets
Unit 2	Market Segmentation – Concept – Benefits – Basis and Levels. Introduction to Consumer Behaviour – Need for study – Consumer buying decision process – Buying motives.
Unit 3	Marketing mix. Product – Meaning – Introduction to Stages of New Product Development – Types – Introduction to PLC – Product Mix – Price – Pricing Policies and Methods.
Unit 4	Channels of Distribution (Levels) – Channel Members – Promotion – Communication Mix – Basics of Advertising, Sales promotion and personal selling.
Unit 5	Recent Trends in Marketing. A Basic understanding of E – Marketing, Consumerism, Market Research, MIS and Marketing Regulations.

Course Objectives	
Title	**RURAL ECONOMICS**
Course Code	**CZ33B**
CO-1	To teach the rural economy and its development.
CO-2	To make the students to know about non-form sector in the rural economy.
CO-3	To bring the awareness of RBI and NABARD and unemployment problem in rural economy.
CO-4	To improve living standards of rural people by utilizing the easily available natural & human resources
CO-5	To develop agriculture & allied activities

Course Outcome	
Title	**RURAL ECONOMICS**
Course Code	**CZ33B**
CO-1	By learning this subject students will have thorough knowledge of rural economics.
CO-2	To understand the changes in rural economy
CO-3	Student will understand productivity & wages of rural people
CO-4	Student will understand the development of rural areas
CO-5	Student will understand the agriculture & its economic activities

Syllabus	
Title	**RURAL ECONOMICS**
Course Code	**CZ33B**
Unit 1	Structure of the Rural Economy of India- Predominance of the Rural Sector in the Indian Economy-Features of the Indian Rural Economy
Unit 2	RoleofAgricultureinRuralDevelopment-PatternofAgriculturalHolding-Strategy of Agricultural development and Green Revolution- Problems of Agricultural Labourers and Artisans in the Rural Economy-Measures to solve their problems.
Unit 3	Non-farm sector in the Rural Economy- Role of Small Scale Industries, Cottage Industries ,Khadi and Village Industries in the Rural Economy
Unit 4	Rural indebtedness- Causes and magnitude- Role of RBI, Commercial Banks, RRBs and NABARD in Rural Economy**.**
Unit 5	PovertyandunemploymentproblemintheRuralEconomy-Stepstakentosolvetheproblems- Rural Development- Strategy for Rural Development with special reference to PURA.

Course Objectives	
Title	**ADVANCED CORPORATE ACCOUNTING**
Course Code	**CZ24A**
CO-1	To provide the students with an understanding of accounting procedure for corporate restructuring
CO-2	TomakethestudentsunderstandtheapplicationsofAccountingTransactions in Corporate Sector.
CO-3	Apply the concept and legal rules of amalgamation, reconstruction and liquidation process of company.
CO-4	It helps to control money deflation & cost
CO-5	It helps to know the arithmatical accuracy of accounts

Course Outcome	
Title	**ADVANCED CORPORATE ACCOUNTING**
Course Code	**CZ24A**
CO-1	Student would able to understand amalgamation, absorption and External reconstruction.
CO-2	Student would aware about preparation of final accounts in banking sectors as per schedules
CO-3	Students would able to families with the liquidation process of company
CO-4	Students would able to introduce and develop the knowledge of holding company accounts as per schedule
CO-5	Students would compute the internal reconstruction

Syllabus	
Title	**ADVANCED CORPORATE ACCOUNTING**
Course Code	**CZ24A**
Unit 1	**INTERNAL RECONSTRUCTION** Meaning - Alteration of share capital – Accounting Procedures
Unit 2	**AMALGAMATION, ABSORPTION & EXTERNAL RECONSTRUCTION** Meaning- Amalgamation in the nature of Merger, Purchase - External Reconstruction – Applicability of AS 14- Calculation of Purchase consideration (all methods) – Journal Entries in the books of Transferor and Transferee Companies, Revised Balance Sheet (excluding inter - company holdings)
Unit 3	**LIQUIDATION** Meaning – Preparation of Liquidator's Final Statement of Accounts – Calculation of Liquidator Remuneration
Unit 4	**CONSOLIDATION** Holding Company –Subsidiary company - Meaning – Preparation of Consolidated Final Statement of Accounts
Unit 5	**ACCOUNTING FOR BANKING COMPANIES** Bank accounts - Concept of Non-Performing Assets (NPA)-Preparation of Profit and Loss Account - Asset classification - Preparation of Balance Sheet.

Course Objectives	
Title	**CORPORATE & BUSINESS LAW**
Course Code	**CA24A**
CO-1	To make the students aware on the recent amendments to companies Act.
CO-2	To enlighten the students on the provisions governing the company law.
CO-3	The students will gain knowledge on Company Law provisions and amendments.
CO-4	To understand the general legal frame work and of specific legal areas relating to business
CO-5	To study the fundamental principles of law of contract and allied laws.

Course Outcome	
Title	**CORPORATE & BUSINESS LAW**
Course Code	**CA24A**
CO-1	To enlighten the students on the provision governing the company law.
CO-2	To enable the students to learn the various kinds of securities
CO-3	Aim to understand how to increase in remuneration if KMP by a public company.
CO-4	Discuss the students to know about the meeting and resolution regarding special notice.
CO-5	To facilitate the understanding of various mode of liquidation process in concern.

Syllabus	
Title	**CORPORATE & BUSINESS LAW**
Course Code	**CA24A**
Unit 1	Indian Contract Act Formation-Nature and Elements of Contract-Classification of Contract -Contract Vs Agreement
Unit 2	Offer- Definition-Forms of offer- Requirements of Valid Offer. Acceptance - Meaning-Legal Rules as to a valid acceptance. Consideration - Definition-Essentials - Legal Rules relating to consideration - Contracts without consideration.
Unit 3	Capacityofparties.Definition-PersonsCompetenttocontract.Freeconsent -Coercion-Undue Influence - Fraud — Misrepresentation — Mistake. Legality of object — void agreement -Unlawful agreements - performance of contracts.
Unit 4	Company - Definition-Characteristics-Lifting of corporate veil-Advantages of Incorporation-Company Law Administration-NCLT&NCLAT- Classification of companies-Formation of a Company - Memorandum and Articles of Association.
Unit 5	Prospectus-Definition-Registration-Contents-ShelfProspectus-Misstatementandtheir consequences - Share capital - Meaning - kinds - alteration of share capital - Dividend -provisions for declaration of dividend - Meetings - Kinds of Company Meetings.

Course Objectives	
Title	**WORKING CAPITAL MANAGEMENT**
Course Code	**CAZ4B**
CO-1	To enable the Students to learn the Working Capital mechanism.
CO-2	To facilitate the understanding of there levance of the working capital
CO-3	To enable the Students to learn the cash mechanism
CO-4	It helps to ensure a smooth operating cycle of the business
CO-5	To optimize level of working capital and minimize the cost

Course Outcome	
Title	**WORKING CAPITAL MANAGEMENT**
Course Code	**CAZ4B**
CO-1	Students enable to under standard the concepts of working capital based on concept and time.
CO-2	Students enable to estimate the components of working capital.
CO-3	Students enables to under standard about how to make payments according to payment schedule.
CO-4	Students enable to maintain the receivables through various analysis.
CO-5	Students gain knowledge about which items to stock and which items to procure to demand.

Syllabus	
Title	**WORKING CAPITAL MANAGEMENT**
Course Code	**CAZ4B**
Unit 1	Working Capital Meaning-Importance of working capital management –components of working capital - Factors Influencing working capital requirements - Estimating working capital management-workingcapitallifecycle-Roleoffinancemanagerinworkingcapital
Unit 2	Different approaches to Financing Current Assets -Conservative, Aggressive and Matching approach –Sources of Finance Committees on Working Capital Finance..
Unit 3	Importance - Factors influencing Cash Balance - Determining Optimum Cash Balance - Cash Budgeting-Controlling and Monitoring Collection and disbursements.
Unit 4	CreditPolicyVariables-CreditStandards-Creditperiod-CashdiscountandCollection efforts-Credit evaluation- Controlof receivables.
Unit 5	Need for Inventories and Importance of its Management-Techniques for managing Inventory- Economic Order Quantity (EOQ) – Stock levels – Analysis of Investment in inventory-Selective Inventory Control-ABC,VED and FSN Analysis

Course Objectives	
Title	**XII - INDIRECT TAXATION**
Course Code	**CZ24D**
CO-1	To facilitate the students to gain knowledge of the principles of Indirect Taxation.
CO-2	To enable the students to gain knowledge of Goods and Services (GST)
CO-3	To highlight the students about customs duty
CO-4	The students will be able to understand the concepts of Indirect taxation, types and Assessment procedures
CO-5	It helps to minimize the inequalities in the standard of consumption in the community

Course Outcome	
Title	**XII - INDIRECT TAXATION**
Course Code	**CZ24D**
CO-1	A tax is a compulsory charge imposed by government.
CO-2	Goods to serve tax that are CGST,SGST,IGST, UGST
CO-3	GST Assessment procedure its self-assessment.
CO-4	GST Audit is enabling to turnover based audit.
CO-5	Custom duty is a tax imposed on import and export of goods.

Syllabus	
Title	**XII - INDIRECT TAXATION**
Course Code	**CZ24D**
Unit 1	**Introduction** History and Objectives of Taxation – Tax System in India- Direct & Indirect Taxes – Meaning and Types – Powers of Union and State to levy taxes. **Constitutional Amendments leading to introduction of GST and their importance**
Unit 2	**GST – Overview & Concepts** Background behind implementing GST- The need for GST- objectives of GST- Business impact- Benefits of GST-SGST- CGST and IGST- Taxes covered by GST- Definitions - Scope and Coverage Scope of supply- Levy of tax- Rate Structure- Taxable Events. Types of Supplies – Composite and Mixed Supplies –Composition Levy.
Unit 3	**GSTTaxation/Assessment proceedings** Return- Refunds- Input Tax Credit- Reverse charge Mechanism, Transitional Provisions composition under GST- Administrative structure of GST-Officers as per CGST Act- Officers as per SGST Act-Jurisdiction- Appointment Powers. **Relevance of Cross Empowerments**
Unit 4	**GST Audit** Assessment and Audit under GST- Demands and Recovery- Appeals and revision- Advance ruling Offences and Penalties. **National Anti-Profiteering Authority – GST Practitioners – eligibility and Practice and Career avenues**
Unit 5	**Customsduty** The custom duty- Levy and collection of customs duty- Organisations of custom departments- Officers of customs- powers- Appellate Machinery- Infringement of the Law-Offences and Penalties- Exemptions from duty customs duty draw back- duties free Zones. **Export incentive schemes**

Course Objectives	
Title	**IV INTERNATIONAL ECONOMICS**
Course Code	**CZ34B**
CO-1	To teach the International Economics
CO-2	To acquire the knowledge 0f Export Import.
CO-3	To know about International Economic Organizations and its Functions.
CO-4	It deals with issues arising from economic interactions among sovereign nation
CO-5	To end economic colonialism & dependency through a new interdependent economy

Course Outcome	
Title	**IV INTERNATIONAL ECONOMICS**
Course Code	**CZ34B**
CO-1	Equip the students to have the thorough knowledge of International Economics.
CO-2	To understand the effect of international trade on welfare & income distribution
CO-3	To analyse the role of heterogeneity in international trade
CO-4	It explains the pattern & consequences of transactions & interactions between different countries
CO-5	It deals with international trade theory , international trade policies ,balance of payment in foreign exchange market

Syllabus	
Title	**IV INTERNATIONAL ECONOMICS**
Course Code	**CZ34B**
Unit 1	International Trade – Importance of International Trade, Theories of Foreign Trade:- Theories of Adam Smith, Ricardo, Haberler‟sHechsher –Ohlin
Unit 2	Balance of Trade, Balance of Payment – Concepts – Causes of Disequilibrium, Methods to Correct Disequilibrium – Fixed and Floating Exchange Rates – Euro – Dollar Marketing (An Over View)
Unit 3	Export Management – Export Procedure and Documents – Export Finance – Export Promotion – Export Pricing
Unit 4	International Economic Organizations and its Functions IMF, IDA, IFA, IBRD, ADB, UNCTAD, UNIDO
Unit 5	WTO and Trade Liberalization – Liberalization of Trade in Manufacturing and in Agricultural Trade – TRIPS, TRIMS – Indian Patent Law

Course Objectives	
Title	**XIII - ELEMENTS OF COST ACCOUNTING**
Course Code	
CO-1	To make the students to know the Process of Accounting for Cost Elements.
CO-2	To understand the advantages of Costing to the Stakeholders, Workers, Creditors and the Public
CO-3	At the end of the course students will understand the basic elements of costing
CO-4	To correctly analyse the cost of both the process and operation
CO-5	To ascertain the cost of different product that business concern manufacturers

Course Outcome	
Title	**XIII - ELEMENTS OF COST ACCOUNTING**
Course Code	
CO-1	Aimed to familiarize the concept of cost accounting
CO-2	Helps together knowledge on preparation of cost sheet its practical point of view.
CO-3	Accrue basic knowledge on cost accounting concept, element of cost, classification of cost, labour, various system of remuneration and incentive
CO-4	Need for material control, valuation
CO-5	To understand the concept of overhead

Syllabus	
Title	**XIII - ELEMENTS OF COST ACCOUNTING**
Course Code	
Unit 1	**Introduction of Cost Accounting** Definition - Nature and Scope – Principles of Cost Accounting – Cost Accounting and Financial Accounting - Cost Accounting Vs Management Accounting – Installation of Costing System –Classification of Costs – Cost Centre – Profit Centre
Unit 2	**Cost sheet and methods of costing** Preparation of Cost Sheet. Reconciliation of Cost and Financial Accounts.- Unit Costing- Job Costing.
Unit 3	**Material Costing** Material Control – Meaning and Objectives – Purchase of Materials – Stock Levels of Materials – EOQ – Stores Records – ABC Analysis – Issue of Materials – Methods of Issue – FIFO – LIFO – HIFO – Base Stock Method – Specific Price Method – Simple and Weighted Average Method – Standard and Inflated Price Method.
Unit 4	**Labour Costing** Direct Labour and Indirect Labour – Time Keeping – Methods and Calculation of Wage Payments – Time Wages – Piece Wages – Incentives – Different Methods of Incentive Payments - Idletime – Overtime – Labour Turnover - Meaning, Causes and Measurement.
Unit 5	**Overheads Costing** Overheads – Definition – Classification – Allocation and Apportionment of Overheads – Basis of Allocation – Absorption of Overheads - Preparation of Overheads Distribution Statement – Machine Hour Rate – Computation of Machine Hour Rate.

Course Objectives	
Title	**XIV: PRACTICAL AUDITING**
Course Code	
CO-1	To make the students to understand the concept of present day Auditing Practices.
CO-2	To enable the students to gain knowledge of various techniques of Auditing.
CO-3	On the completion of syllabus students will gain in sight of the Auditing practices prevailing in the present scenario.
CO-4	Students will understand the general approach of audit in EDP environment.
CO-5	To find reliability of financial position & profit & loss statements

Course Outcome	
Title	**XIV: PRACTICAL AUDITING**
Course Code	
CO-1	Student would understand the basic concepts in auditing.
CO-2	Able to familiarizes the vouching terms in auditing
CO-3	Student able to identify the duties liabilities and role play by auditor in concern.
CO-4	Student would prepare the audit report.
CO-5	Student would again knowledge in auditing and non -profit organisation.

Syllabus	
Title	**XIV: PRACTICAL AUDITING**
Course Code	
Unit 1	**Introduction** Meaning and Definition of Auditing – Distinction between Auditing and Accounting - Objectives – Advantages and Limitations of Audit - Scope of Audit - Classifications of Audit – Audit Planning - Meaning. Audit programme – Meaning – Objectives and Contents. Audit Note Book, contents, Usefulness of Audit Note Book - Audit working NAMEs - meaning. Ownership and Custody – Test checking and Routine checking - Meaning. Internal control Meaning – Definition – Objectives – Technique for evaluation of Internal Control System. Internal check – Meaning - Objectives difference between Internal control, Internal check and Internal Audit.
Unit 2	**Vouching and Verification** Vouching – Meaning and Definitions - Objectives. Trading Transactions – Audit of Ledger - Scrutinizing of ledgers – Vouching of cash Receipts and Payments - Vouching of outstanding Assets and Liabilities – Verification – Meaning - Objectives and Process – Valuation of Assets and liabilities – Distinction between Verification and Valuation.
Unit 3	**Audit and Accounting Standards** Types of Audit – Statutory Audit – Concurrent Audit – Stock Audit – Cost Audit – Secretarial Audit – CAG Audit – Management Audit. Accounting Standards – Standards on Auditing Standards on Internal Audit – Penal Provisions – Role of National Financial Reporting Authority (NFRA)
Unit 4	**Auditors and Audit Report** Appointment – Procedures – Eligibility an Qualifications – Powers and Duties – Rotation and Removal of Auditors – Resignation of Auditors – Remuneration o Auditors - Audit report – Preparation and presentation. Auditor' Responsibilities and liabilities towards Shareholders, Board and Audi Committee. Restriction on other Services.
Unit 5	**Recent Trends in Auditing** EDP Audit – Meaning – Division of auditing in EDP environment. Impact of Computerization on Audit Approach – Online Computer System Audit – Types of Online Computer System Audit – Audit around with the Computers – Procedure of Audit under EDP system- Green Audit- Introduction

Course Objectives	
Title	**XV - INCOMETAX LAW AND PRACTICE**
Course Code	
CO-1	To provide a detailed understanding of the various provisions of I.T. Act.
CO-2	To enable the students to about the Assessment Procedures and Tax Planning.
CO-3	The students will understand the concepts of Income tax, Types of filing and computation of tax from various head.
CO-4	It provides for levying , administrating , collecting & recovering income tax for the indian government
CO-5	To raise revenue

Course Outcome	
Title	**XV - INCOMETAX LAW AND PRACTICE**
Course Code	
CO-1	Student would identify the technical terms related to income tax.
CO-2	Students would determine the residential status of an individual and scope of total income.
CO-3	Students would familiarize the different know- how and head of income with its components and would compute the income from salary.
CO-4	Students would build on idea about income from house property as a concept.
CO-5	Student would familiarize and get an idea about income from business or profession and also understand the concept about filing of returns, TDS and advance payments

Syllabus	
Title	**XV - INCOMETAX LAW AND PRACTICE**
Course Code	
Unit 1	**INTRODUCTION** Meaning of Income – Features of Income Tax – Types – Important Definitions Under the Income Tax Act – Assessee – Types – Rates of Tax – Residential Status – Scope of Total Income – Incomes Exempt from tax.
Unit 2	**Income from Salary** Definition – Allowances – Valuation of perquisites – Deductions from Salary – Gratuity – Pension – Commutation of Pension – Leave Salary – Profits in lieu of Salary - Provident Funds – Deductions under Sec. 80.
Unit 3	**Income from House Property** Annual Value – Meaning and Computation – Deductions from Annual Value – Legal Provisions.
Unit 4	**Profits and Gains from Business or Profession** Income from Business or Profession – Allowable expenses – Not allowable expenses - General deductions – Provisions relating to Depreciation – Deemed Business Profits - Undisclosed incomes – Investments – Compulsory maintenance of Books of accounts – Audit of Accounts of certain persons – Special provisions for Computing Incomes on estimated basis – Computation of Income from Business or Profession.
Unit 5	**E-filing & Submission of Returns** E-filing – Concept – Procedure - 26AS – TDS – Traces – Filing of Return – Various Returns – Permanent Account Number (PAN) – Usage of PAN – Concept of Transfer Pricing - Fundamentals.

Course Objectives	
Title	**XVI:FINANCIAL MANAGEMENT**
Course Code	
CO-1	To impart the basics of Financial Management for the benefit of Commerce students.
CO-2	To enable the students to know the concepts of the Investment, Financing and Working Capital.
CO-3	At the end of syllabus students will understand the basics of financial management, investing, financing and dividend decisions.
CO-4	To ensure regular & adequate supply of funds to the concern
CO-5	To know about the profit & wealth of the business concern

Course Outcome	
Title	**XVI:FINANCIAL MANAGEMENT**
Course Code	
CO-1	To learn theoretical foundation of financial management decisions.
CO-2	To families the theories of Capital structure and concept of cost of capital.
CO-3	To provide basic knowledge about working capital management.
CO-4	To evaluate feasibility of various investment options.
CO-5	Students will understand the proper utilization of financial resources

Syllabus	
Title	**XVI:FINANCIAL MANAGEMENT**
Course Code	
Unit 1	**Introduction** Meaning and Objectives of Financial Management Functions of Financial Management. Finance - Sources of Financing-Role of Financial Manager in Financial Management- Financial Goals- Profit maximization Vs. Wealth maximization – Concept of Time Value of Money- Risk and Return.
Unit 2	**Capital Structure and Cost of Capital** Capital Structure- Meaning- Capital Structure Theories-Definition - Cost of Equity Capital – Cost of Preference Capital – Cost of Debt – Cost of Retained Earnings – Weighted Average (or) Composite cost of capital (WACC) Capital Structure – Theories of Capital Structure - Leverage concept.
Unit 3	**Dividend** Meaning – Dividend Policies – Factors affecting Dividen Payment – Provisions on Dividend Payment in Company Law – Dividend Models - Walter's Model - Gordon's Model - M. M. Model – Hypothesis Model.
Unit 4	**Working Capital** Working Capital - Meaning and importance Factors Influencing Working Capital – Determining (or) Forecasting of Working Capital requirements – Working Capital Operating cycle-
Unit 5	**Capital Budgeting** Capital Budgeting Process – Cash flow estimation- Payback period _ Accounting Rate of Return – Net Present Value (NPV) – Net Terminal Value - Internal Rate of Return – Profitability Index – Capital Budgeting under Risk- Certainty Equivalent Approach and Risk – Adjusted Discount Rate – Decision Tree Analysis.

Course Objectives	
Title	**I: PORTFOLIO MANAGEMENT**
Course Code	
CO-1	To acclimate the students on the concept of Portfolio Management.
CO-2	To facilitate the students to know the techniques of Portfolio Management.
CO-3	To Apply concept of Risk & Return in the markets
CO-4	Learn to apply concept of Portfolio Analysis
CO-5	To acclimate the students on the concept of Portfolio Management.

Course Outcome	
Title	**I: PORTFOLIO MANAGEMENT**
Course Code	
CO-1	Students would enable to understand the concept of investment, different types of investments, views of investment and process of investment and apply the theoretical knowledge in investment for selecting the securities**.**
CO-2	Students would understand the types of risk in security market and applying various tools for the valuation of bonds as well as economic indicators to predict the market to some extent.
CO-3	Students would develop the knowledge about the provisions regarding registration and help in preparation of books of accounts and filing returns under the act.
CO-4	Students would understand about the powers of GST authorities regarding inspection search and seizure.
CO-5	Apply the basic understanding about the customs law in India.

Syllabus	
Title	**I: PORTFOLIO MANAGEMENT**
Course Code	
Unit 1	**Introduction** Portfolio - Meaning - Objectives - Terms relating to Portfolio - Securities - Risk – Return - Introduction to Portfolio Management – Role of Portfolio Managers.
Unit 2	**Value of Money** Timevalue- Computation of PresentValueInterest Factor (PVIF),Future Value InterestFactor(FVIF),Present Value Interest FactoratanAnnuity(PVIFA)-Future ValueInterestFactoratanAnnuity (FVIFA)SimpleProblemsrelatingtoit.
Unit 3	**Portfolio Analysis** Planning – Selection – Evaluation – Revision - Various Steps involved in Portfolio Development Theories relating to Portfolio Analysis.
Unit 4	**Risk & Return** Interpretation of Risk & Return – Mean – Variance Analysis - B(Beta) Measures. Portfolio Diversification – Bond Valuation.
Unit 5	**Need and Importance of Portfolio Management** Portfolio Management Vs Wealth Management – Introduction to Derivatives – Futures Options – Swaps – SEBI Regulations relating to Portfolio Operations.

Course Objectives	
Title	**ADVANCED COST ACCOUNTING**
Course Code	
CO-1	To make the students to understand the process of ascertainin classification and controlling costs.
CO-2	To enable the students to learn the various methods of cost elements.
CO-3	The students will understand the concepts of cost accounting, methods and its usage in decision making
CO-4	It helps to measure efficiency of cost data & cost control
CO-5	It helps to maintain balance between the management team & the wages of the company

Course Outcome	
Title	**ADVANCED COST ACCOUNTING**
Course Code	
CO-1	Students would analysis the job cost in production unit.
CO-2	Students able to understand the work certified &uncertified
CO-3	Students would evaluate the input and output of process manufacturing and understand the need for process costing.
CO-4	Students would able to relates the normal and abnormal loss.
CO-5	Students would able to evaluate no profit and no loss concept

Syllabus	
Title	**ADVANCED COST ACCOUNTING**
Course Code	
Unit 1	**Contract Costing** Definition - Features of Contract costing- Calculation of Profit on Contracts- Cost plus Contract-Contract Costing Vs job Costing- Preparation of Contract A/c
Unit 2	**Process Costing** Features of Process Costing - Process Loss - Norma and Abnormal Loss - Abnormal Gain - Joint Products - By Products Concept of Equivalent Production – Process Accounts - Proces Lossess and Gains.
Unit 3	**Operation Costing** Operating Costing – Meaning – Preparation of Operating cost Sheet – Transport costing – Power Supply Costing – Hospital Costing – Simple Problems.
Unit 4	Meaning – Features – Absorbtion Costing – Marginal Costing VsAbsorbtion Costing – Contribution – PV Ratio – Break Even point – Key Factor – Margin of Safety – Preparation of Marginal Cost Statement
Unit 5	Definition – Objectives – Advantages – Standard Cost and Estimated Cost – Installation of Standard Costing – Variance analysis – Material, Labour, Overhead, and Sales Variances – Calculation of Variances

Course Objectives	
Title	**MANAGEMENTACCOUNTING**
Course Code	
CO-1	To enable the students to get knowledge about the various techniqu of Management Principles.
CO-2	To make the students to get practical skill in solving management problems
CO-3	Understand the primary purpose of management accounting namely financial statement analysis and budgetary control
CO-4	Develop and apply budget for planning and controlling purpose.
CO-5	Better decision making

Course Outcome	
Title	**MANAGEMENTACCOUNTING**
Course Code	
CO-1	Helps to understand the basic concept of managerial principle techniques.
CO-2	Help to analyse financial statement.
CO-3	To evaluate financial position of company by using ratio analysis.
CO-4	Fund flow statement helps to schedule working capital changes in business concern
CO-5	Evaluate cash inflow or outflow in business operations

Syllabus	
Title	**MANAGEMENTACCOUNTING**
Course Code	
Unit 1	Management Accounting - Meaning- Scope- Importance- Limitations - Management Accounting Vs Cost Accounting – Management Accounting Vs Financial Accounting
Unit 2	**Financial Statement Analysis** Analysis and Interpretation of Financial Statements – Nature and Significance – Types of Financial Analysis – Tools of Analysis – Comparative Statements – Common size Statement – Trend Analysis
Unit 3	**Ratio Analysis** Meaning – Advantages – Limitations – Types of Ratios – Liquidity Ratios – Profitability Ratios Turnover Ratios – Capital Structure Ratios – Leverage Ratios – Calculation of Ratios.
Unit 4	**Fund Flow Analysis & Cash Flow Analysis** Introduction, Meanin of Funds Flow Statement-Ascertainment of flow of funds Technique of preparing funds flow statement- Schedule of Change in Working Capital- Adjusted Profit and Loss account-Funds Flow Statement Meaning of Cash Flow Statements – Advantages Limitations – Preparation of Cash Flow Statement – Types of Cas flows - Operating, Financing and Investing Cash flows.
Unit 5	**Budgetary Control & Marginal Costing** Budgetary Control – Meaning – Preparation of various Budgets – Cash Budget - Flexible Budget – Production Budget – Sales Budget. Capital Expenditure Control - Application of Marginal Costing in Decision Making – Make or Buy –Shut down or Continue – Exploring New Markets

Course Objectives	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	
CO-1	To enable the students to understand the concept of Entrepreneurship and to learn the professional behavior expected of an entrepreneur.
CO-2	To identify significant changes and trends which create business opportunities and to analyze the environment for potential business opportunities
CO-3	To provide conceptual exposure on converting idea to a successful entrepreneurial firm
CO-4	On completion of syllabus student will understand on the basic concepts of entrepreneurship and business opportunities to familiars with knowledge about business and project reports for starting a new ventures on team based.
CO-5	To motivate or needs for acievements

Course Outcome	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	
CO-1	Students could able to understand the concept of entrepreneur. Help to identity project and feasible analysis..
CO-2	Help to identity project and feasible analysis
CO-3	Gain knowledge on financial literacy toward entrepreneur.
CO-4	Help to identify the different types of entrepreneur
CO-5	To help in rapid growth of the economy by supplying skilled entrepreneurs

Syllabus	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	
Unit 1	**Entrepreneurship -**Entrepreneur : Meaning of entrepreneurship – Types of Entrepreneurship – Traits of entrepreneurship – Factors promoting entrepreneurship- Barriers to entrepreneurship- the entrepreneurial culture- Stages in entrepreneurial process – Women entrepreneurship and economic development- SHG.
Unit 2	**Developing Successful Business Ideas -**Recognizing opportunities – trend analysis – generating ideas – Brainstorming, Focus Groups, Surveys, Customer advisory boards, Day in the life research – Encouraging focal point for ideas and creativity at a firm level-Protecting ideas from being lost or stolen – Patents and IPR.
Unit 3	**Opportunity Identification and Evaluation -**Opportunity identification and product/service selection – Generation and screening the project ideas – Market analysis, Technical analysis, Cost benefit analysis and network analysis- Project formulation – Assessment of project feasibility- Dealing with basic and initial problems of setting up of Enterprises
Unit 4	**: Business Planning Process -**Meaning of business plan- Business plan process- Advantages of business planning- preparing a model project report for starting a new venture (Team-based project work).
Unit 5	**Funding** -Sources of Finance- Venture capital- Venture capital process- Business angles- Commercial banks- Government Grants and Schemes.

Course Objectives	
Title	**INCOMETAX LAW AND PRACTICE-II**
Course Code	
CO-1	To help the students to understand the relevance and significance of Tax.
CO-2	To facilitate the students in understanding the various Provisions I.T. Act.
CO-3	The students will understand the procedure for computing taxable income from different heads, clubbing of income, Setoff and carry forward of losses and Deductions applicable to an individual
CO-4	To amend & consolidate rules of taxation in the country
CO-5	To bring cultural operational & structural changes in the taxation system

Course Outcome	
Title	**INCOMETAX LAW AND PRACTICE-II**
Course Code	
CO-1	Student would identify the technical terms related to income tax.
CO-2	Students would determine the residential status of an individual and scope of total income
CO-3	Students would familiarize the different know- how and head of income with its components and would compute the income from salary.
CO-4	Students would build on idea about income from house property as a concept.
CO-5	Student would familiarize and get an idea about income from business

Syllabus	
Title	**INCOMETAX LAW AND PRACTICE-II**
Course Code	
Unit 1	**INTRODUCTION** Meaning of Income – Features of Income Tax – Types – Important Definitions Under the Income Tax Act – Assessee – Types – Rates of Tax – Residential Status – Scope of Total Income – Incomes Exempt from tax
Unit 2	**Income from Salary** Definition – Allowances – Valuation of perquisites – Deductions from Salary – Gratuity – Pension – Commutation of Pension – Leave Salary – Profits in lieu of Salary - Provident Funds – Deductions under Sec. 80
Unit 3	**Income from House Property** Annual Value – Meaning and Computation – Deductions from Annual Value – Legal Provisions.
Unit 4	**Profits and Gains from Business or Profession** Income from Business or Profession – Allowable expenses – Not allowable expenses - General deductions – Provisions relating to Depreciation – Deemed Business Profits - Undisclosed incomes – Investments – Compulsory maintenance of Books of accounts – Audit of Accounts of certain persons – Special provisions for Computing Incomes on estimated basis – Computation of Income from Business or Profession
Unit 5	**: E-filing & Submission of Returns** E-filing – Concept – Procedure - 26AS – TDS – Traces – Filing of Return – Various Returns – Permanent Account Number (PAN) – Usage of PAN – Concept of Transfer Pricing - Fundamentals

Course Objectives	
Title	**FINANCIAL SERVICE**
Course Code	
CO-1	To enable the students to understand the worldof financial services.
CO-2	To facilitate the understanding of the various Financial Services
CO-3	On the completion of modules, the students will understand the various financial services.
CO-4	It helps in economic development
CO-5	It provides various financial instrument to individuals,investors,corporations and institutions

Course Outcome	
Title	**FINANCIAL SERVICE**
Course Code	
CO-1	To understand the operation and structure of different financial institutions.
CO-2	Describe various types of insurance contracts and their user in financial services in merchant banking
CO-3	describe the factors clients dispositions towards risk and identify appropriate strategies' to pursue money market and stock exchange.
CO-4	Identify the factors that affect interest rates mechanics of consumer finance.
CO-5	Identify the factors that affect interest rates mechanics of consumer finance.

Syllabus	
Title	**FINANCIAL SERVICE**
Course Code	
Unit 1	**: Introduction** Financial Services - Concept - Objectives - Functions - Characteristics - Financial Services Market - Concept - Constituents - Growth of Financial Services in India - Financial Services Sector Problems - Financial Services Environment - The Forces - Players in Financial Markets
Unit 2	**: Merchant Banking and Public Issue Management** Definition - Functions - Merchant Bankers Code of Conduct - Public Issue Management - Concept - Functions - Categories of Securities Issue - Mechanics of Public Issue Management - Issue Manager - Role of issue Manager - Marketing of Issue - New Issues Market Vs Secondary Market.
Unit 3	**Money Market and Stock Exchange** Characteristics - Functions - Indian Capital Market - Constituents of Indian Capital Market - New Financial Institutions and Instruments - Investor Protection - Stock Exchange - Functions - Services - Features - Role - Stock Exchange Traders -Regulations of Stock Exchanges - Depository - SEBI - Functions and Working.
Unit 4	**: Leasing and Factoring and Securitisation** Characteristics - Types - Participants - Myths about Leasing - Hire Purchase – Lease Financing Vs Hire Purchase Financing - Factoring - Mechanism - Functions of a Factor - Factoring - Players- Types - Operational Profile of Indian Factoring - Operational Problems in Indian Factoring - Factoring Vs bills Discounting - Securitisation of Debt- Parties involved- Steps of securitisation - Types of securitisation- Advantages- Limitations – SARFAESI Act 2002- Background- Purpose of the Act- Main provisions
Unit 5	**Venture Capital, credit rating and pension Fund** Origin and Growth of Venture Capital - Investment Nurturing Methods - Mutual Funds - Portfolio Management Process in Mutual Funds - Credit Rating System - Growth Factors - Credit Rating Process - Global and Domestic Credit Rating agencies - Pension Fund - Objectives - Functions - Features - Types - Chilean Model - Pension Investment Policy - Pension Financing

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF CHEMISTRY

Program : B.Sc. CHEMISTRY

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	Become knowledgeable in the subject of Chemistry and apply the principles of the same to the needs of the Employer / Institution / own Business or Enterprise
PO-2	Gain Analytical skills in the field/area of Chemistry
PO-3	Identify and solve chemical problems and explore recent trends in research
PO-4	Able to function on different areas in Chemistry
PO-5	Analyze the environmental problems and issues related to Chemists

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Apply the knowledge of chemistry to appreciate, apply, develop and test the theoretical aspects for applications in various domains viz., energy, environment, materials, medicines, etc.,
PSO-2	Solve the complex problems in the various fields of chemistry using latest techniques, tools and methodologies to get appropriate solution
PSO-3	Apply the contextual knowledge of chemistry to multidisciplinary environments
PSO-4	Form a part of member in a team with right attitudes

Course Objectives	
Title	**GENERAL CHEMISTRY-I**
Course Code	**SD21A**
CO-1	To understand the nature electromagnetic radiation and quantum theory.
CO-2	To understand the periodic law and significance of atomic no and electronic configuration as the basic for periodic classification
CO-3	To classify elements into a s,p,d and f blocks and learn their main characteristics.
CO-4	To understand the concept of organic reactions mechanism and type of organic reactions.
CO-5	To describe the term – paramagnetic, diamagnetic and ferromagnetic substances. **CO6**: To calculate the percentage of ionic character of molecules

Course Outcome	
Title	**GENERAL CHEMISTRY-I**
Course Code	**SD21A**
CO-1	To know the fundamental concepts of atomic structure and basics of quantum mechanics
CO-2	To know the periodicity of properties of elements
CO-3	To understand the various types of chemical bonding and basics of solid state
CO-4	To learn the principles of inorganic qualitative and quantitative analysis.
CO-5	To understand the basic concepts of organic chemistry.

Syllabus	
Title	GENERAL CHEMISTRY-I
Course Code	SD21A
Unit 1	Atomic Structure and Introduction to Quantum Mechanics Rutherford's atomic model, Planck's quantum theory of radiation, Photoelectric effect, Bohr's theory of hydrogen atom - postulates, Bohr's radius, energy of electron, origin of hydrogen spectrum. Particle and wave nature of electron - de Broglie's equation, Heisenberg's uncertainty principle and Compton effect - Schrodinger wave equation (no derivation) - Significance of Ψ and Ψ2- Wave mechanical concept of atomic orbitals, - Shapes of orbitals - Quantum numbers - Zeeman effect, Pauli`s exclusion principle, Aufbau principle - Effective nuclear charge, screening effect, Slater's rules -applications and limitations. Electronic configuration of first 30 elements - extra stability of half-filled and completely filled orbitals. Hund's rule - its basis and applications
Unit 2	Classification of Elements and Periodicity of Properties Classification of elements - noble gases and s, p, d and f - block elements. Modern periodic table. Position of hydrogen in the periodic table-Variation of atomic volume, atomic and ionic radii, ionization potential, electron affinity, electronegativity along periods and groups-variation of metallic characters-factors influencing the above periodic properties.
Unit 3	Chemical Bonding andSolid State Ionic bond - factors influencing the formation of ionic compounds - ionisation energy, electron affinity and lattice energy; inert pair effect, Fajan's rules. Covalent bond - polarity of covalent bond, percentage ionic character of covalent bond, dipole moment and molecular structures of CO_2, H_2O, NH_3 and CH_4, bond characteristics - bond length, bond angle and bond energy. Classification of solids, isotropic and anisotropic crystals, representation of planes, Miller indices, space lattice, unit cell, crystal systems. X-ray diffraction-derivation of Bragg's equation, discussion of structures of NaCl, CsCl and ZnS, determination of Avogadro's number.
Unit 4	Common ion effect, solubility product, applications of the solubility product principle in qualitative analysis. Principle of elimination of interfering anions. Complexation reactions in qualitative analysis. Spot test reagents and tests with them - Cupferon, DMG, thiourea, magneson, alizarin and Nessler reagent. Volumetric analysis - Definitions - normality, molarity, molality and molefraction, primary and secondary standards, theories of acid - base, redox, complexometric, iodometric and iodimetric titrations, calculations of equivalent weights, theories of acid - base, redox, metal ion and adsorption indicators and choice of indicators.Introduction to nano science and nanotechnology – Types of nanoparticles, Techniques to synthesize nanoparticles, Physical methods – Physical vapour deposition (evaporation and sputtering) – chemical methods–reduction methods – sol–gel methods

Unit 5	Hybridization and shapes of molecules - methane, ethane, ethylene, acetylene and benzene. Electron displacement effects - inductive, electrometric, mesomeric (resonance) and hyperconjugation. Steric effect. Cleavage of bonds - homolytic and heterolytic fissions. Reactive intermediates - carbocations, carbanions and free radicals - their formation and stability.Nomenclature of organic compounds: IUPAC system of nomenclature of compounds containing upto 8 carbon atoms - mono and bifunctional compounds.

Course Objectives	
Title	**GENERAL CHEMISTRY-II**
Course Code	**SD22A**
CO-1	To obtain the knowledge of the and p-block elements .
CO-2	To understand the chemistry of cycloalkanes with their preparation, properties and conformational analysis
CO-3	To apply gas laws in various real life situations and to explain the behavior of real and ideal gas,
CO-4	To differentiate between gaseous state and vapour and to explain the kinetic theory of gases.
CO-5	To Explain the properties of liquids.

Course Outcome	
Title	**GENERAL CHEMISTRY-II**
Course Code	**SD22A**
CO-1	To equip the learners with concepts of s block elements through comparative study.
CO-2	To equip the learners with concepts of p block elements through comparative study
CO-3	To understand the aspects of gaseous state
CO-4	To understand the aspects of liquid state, colloids and carbon nanotubes, fullerenes.
CO-5	Chemistry of Alkanes and Cycloalkanes : General methods of preparation and properties of alkanes and cycloalkanes ,Conformational analysis of ethane and n-butane. Baeyer's straintheory. Alkenes, Alkynes and Dienes: Preparation of alkenes (dehydrogenation, dehydrohalogenation and dehydration), preparation of alkynes (dehydrohalogenation, dehalogenation).Addition (with mechanisms) of H2, X2, HX, HOX, B2H6 and O3 to alkenes and alkynes. Addition of HBr (peroxide effect; free radical reaction mechanism) to alkenes and alkynes. . Allylic substitution of alkenes by NBS. Dienes types, stability; preparation of- 1,3butadiene,isoprene, and chloroprene. Reactivity: 1,2- and 1,4- additions to butadiene. Diels-Alder reaction.

Syllabus	
Title	**GENERAL CHEMISTRY-II**
Course Code	**SD22A**
Unit 1	Hydrogen: Position of hydrogen in the periodic table. Alkali metals: Comparative study of the elements with respect to oxides, hydroxides, halides, carbonates and bicarbonates. Diagonal relationship of Li with Mg. Extraction of Li from its silicate-ores. Preparation, properties and uses of NaOH,Na2CO3, KBr KClO3 alkaline earth metals: Comparative study of the elements with respect to oxides, hydroxides, sulphates, halides and carbonates. Extraction and anomalous behaviour of Be.
Unit 2	Boron Family[Group-IIIA]: preparation and structure of diborane and borazine. Chemistry of borax. Extraction of Al and its uses. Alloys of Al. 2.2 Carbon Family (Group IV A) : comparison of carbon with silicon. Carbon-di-sulphide – Preparation , properties , structure and uses. Percarbonates , per noncarbonates and per dicarbonates. Tin- Allotropic forms of Tin, alloys of tin, tinning, tin plating. Lead-lead accumulator (discharging and recharging), lead pigments.
Unit 3	Postulates of kinetic theory of gases, derivation of gas laws from the kinetic gas equation. Kinetic energy and temperature-average translational kinetic energy and its calculation. Maxwell's distribution of molecular velocities(no derivation)-mean, root mean square and most probable velocity. Collision diameter, collision number, collision frequency, mean free path. Principle of equipartition of energy. Real gases- van der Waals equation of state-derivation. Boyle temperature. Significance of critical constants.
Unit 4	Some Properties of Liquids(molecular basis)-Equilibrium vapour pressure of a liquid, boiling point, heat of evaporation, heat of condensation, freezing point. Surface tensiondefinition, measurement of surface tension, effect of temperature on surface tension. Parachor-definition, calculation and applications. Viscosity or fluidity-definition, measurement and calculation, factors affecting viscosity.Nanoparticles of Au, Ag and TiO2 – preparation, properties and uses. Carbon nanotubes-Types-preparation, properties and usesFullerene – Introduction only

Course Objectives	
Title	**VOLUMETRIC ANALYSIS PRACTICAL COURSE**
Course Code	**SD221**
CO-1	To know the principles of the volumetry.
CO-2	To have a knowledge on various types of titrations.
CO-3	To know the Preparation of standard solutions
CO-4	To have Knowledge about normality, equivalent weight of compounds
CO-5	To know the principles of the volumetry.

Course Outcome	
Title	**VOLUMETRIC ANALYSIS PRACTICAL COURSE**
Course Code	**SD221**
CO-1	To understand the aspects of Volumetric analysis and inorganic preparation of salt
CO-2	Prepare standard solutions.
CO-3	Know knowledge about normality, equivalent weight of compounds.
CO-4	To know the knowledge of normality of the unknown solution corresponding weight can be calculated in the bulk solution.
CO-5	Volumetric analysis basic formula can be operated V1N1=V2N2 in various titrations.

Syllabus	
Title	**VOLUMETRIC ANALYSIS PRACTICAL COURSE**
Course Code	**SD221**
Unit 1	Estimation of HCl by NaOH using a standard oxalic acidsolution Estimation of Na2CO3by HCl using a standard Na2CO3solution
Unit 2	Estimation of oxalic acid by KMnO4 using a standard oxalic acid. Estimation of Ferrous sulphate by KMnO4 using a standard Mohr's salt solution.
Unit 3	Estimation of KMnO4 by sodium thiosulphate using a standard K2Cr2O7solution. Estimation of iron by K2Cr2O7 solution using a standard Ferrous sulphate solution Estimation of Copper sulphate using a standardK2Cr2O7solution
Unit 4	Estimation of Copper sulphate using a standardK2Cr2O7solution. Estimation of Mg(II) by EDTA solution using standard Zinc sulphate solution.
Unit 5	Estimation of Zn(II) by EDTA solution using standard Magnesium sulphate solution. Estimation of total hardness of water.

Course Objectives	
Title	**GENERAL CHEMISTRY-III**
Course Code	**SD23A**
CO-1	To obtain the knowledge of the nitrogen and oxygen family
CO-2	To learn the chemistry of halogen and zero group elements
CO-3	To understand the chemistry of substitution, nucleophilic and elimination reactions
CO-4	To understand the concepts in aromaticity and mechanism of electrophilic substitution reactions.
CO-5	To acquire the knowledge about thermodynamics

Course Outcome	
Title	**GENERAL CHEMISTRY-III**
Course Code	**SD23A**
CO-1	To understand the general characteristics of Nitrogen and Oxygen families.
CO-2	To know about the chemistry of Halogens and noble gases
CO-3	To learn the mechanism of Nucleophillic substitution and Elimination reactions.
CO-4	To know about the reaction mechanisms of aromatic and heterocycliccompounds
CO-5	To understand the basic concepts of Thermodynamics and Thermochemistry.

Syllabus	
Title	GENERAL CHEMISTRY-III
Course Code	SD23A
Unit 1	CHEMISTRY OF NITROGEN AND OXYGEN FAMILIES Group VA elements: General characteristics of Group VA elements; chemistry of H2N-NH2, NH_2OH, HN_3 and HNO_3. Chemistry of PH_3, PCl_3, PCl_5, $POCl_3$,P_2O_5 and oxyacids of phosphorous (H_3PO_3 and H3PO4).Group VIA elements: General properties of group VIA elements - Structure and allotropy of elements-chemistry of ozone - Classification and properties of oxides - oxides of sulphur and selenium - Oxyacid's of sulphur (Caro's and Marshall's acids).
Unit 2	CHEMITRY OF HALOGENS AND NOBLE GASESChemistry of Halogens: General characteristics of halogen with reference to electronegativity, electron affinity, oxidation states and oxidizing power. Peculiarities of fluorine. Halogen acids (HF, HCl, HBr and HI), oxides and oxyacid's (HClO4). Inter-halogen compounds (ICl, ClF_3, BrF_5 and IF_7), pseudo halogens [$(CN)_2$ and $(SCN)_2$] and basic nature of Iodine. Noble gases: Position in the periodic table. Preparation, properties and
Unit 3	NUCLEOPHILIC SUBSTITUTION AND ELIMINATIONREACTIONS Nucleophilic substitution : SN1, SN2 and SNi reactions-mechanisms-stereochemistry - effect of solvent, structure of substrate, nucleophilicity of the reagent [nucleophile] and nature of the leaving group. Elimination reactions: E1, E2 and E1CB reactions and mechanisms: Hofmann and Saytzeff rules. Elimination vs Substitution.

Unit 4	BENZENE AND POLYNUCLEAR AROMATIC HYDROCARBONS Aromaticity - conditions for aromaticity - resonance stabilization energy - Hückel rule with respect to benzene, naphthalene, anthracene and phenanthrene; Electrophilic substitution in benzene-general mechanism; nitration, sulphonation, halogenations, Friedel-Crafts alkylation and acylation. Orientation [directive influence] and reactivity in mono substituted benzenes. Polynuclear hydrocarbons-naphthalene, anthracene and phenanthrene-preparation, properties and uses.
Unit 5	THERMODYNAMICS-I Terminology of thermodynamics-Thermodynamic equilibrium-nature of work and heat-First law of Thermodynamics-statement-definition of Internal Energy (E), Enthalpy (H) and Heat capacity. Relation between Cp and Cv. Calculation of W, q, dE and dH for expansion of ideal and real gases under isothermal and adiabatic condition of reversible and irreversible processes. Joule- Thompson effect and Coefficient (μJT)-Calculation of μJT for ideal and real gases - Inversion temperature. Thermochemistry - Relation between enthalpy of reaction at constant volume (qv) and at constant pressure (qp) - Temperature dependence of heat of reaction - Kirchoffequation-Derivation and application-Enthalpy of formation and combustion - Bond energy and its calculation from thermochemical data.

Course Objectives	
Title	**GENERAL CHEMISTRY-IV**
Course Code	**SD24A**
CO-1	To obtain the knowledge about heterocyclic compounds and Dyes
CO-2	To learn the chemistry of d block elements
CO-3	To understand the chemistry of redox recations
CO-4	To understand the chemistry of alcohols, ethers, thiols and thioethers.
CO-5	To acquire the knowledge about concepts and law of thermodynamics-II

Course Outcome	
Title	**GENERAL CHEMISTRY-IV**
Course Code	**SD24A**
CO-1	To understand the chemistry of Redox reactions
CO-2	To understand the General characteristics of d-Block elements
CO-3	To learn about the preparation and properties of Heterocyclic compounds and dyes.
CO-4	To know about the nomenclature, preparation and properties of alcohols, thiols, ethers and thioethers.
CO-5	To understand the chemistry of redox recations

Syllabus	
Title	**GENERAL CHEMISTRY-IV**
Course Code	**SD24A**
Unit 1	**CHEMISTRY OF REDOX REACTIONS** Covalency- oxidation number- oxidation state - difference between oxidation number and valency- rules for calculating oxidation number - definition of oxidation and reduction - redox reactions and half reactions - oxidising agents and reducing agents - equivalent weights of oxidising and reducing agents - auto oxidation and induced oxidation - balancing of redox equations by oxidation number method and ion-electron method
Unit 2	**CHEMISTRY OF d-BLOCK ELEMENTS** Transition Elements - Electronic configuration - General periodic trend –Atomic and ionic radii, metallic character, melting and boiling points, ionisation energy, oxidation state, reactivity, colour and tendency to form complexes- Group study of Titanium, Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel and Zinc groups - galvanization, Evidences for the existence of mercurous ion as Hg_2^{2+}.
Unit 3	**HETEROCYCLIC COMPOUNDS AND DYES** Nomenclature, Preparation, properties and reactions of Furan, Pyrrole, Thiophene and Pyridine. Comparative study of basicity of pyrrole and pyridine with aliphatic amines. Synthesis and reactions of Indole, Quinoline and Isoquinoline Theory of colour and constitution. Preparation and uses of: Azo dye - Bismarck brown, Triphenyl methane dye - malachite green, phthalein dye -

	fluorescein,anthrquinone dye- alizarin and vat dye- indigo.
Unit 4	**: ALCOHOLS AND THIOLS ,ETHERS AND THIOETHERS** Monohydric, dihydric (Ethyleneglycol) and trihydric (Glycerol) alcohols: Nomenclature, preparation of alcohols from alkenes, alkyl halides, Grignard reagent and carbonyl compounds. Reactions of alcohols-Dehydration, oxidation, action of Grignard reagent, dehydrogenation using copper and esterification. Thiols: Nomenclature, structure, preparation and properties
Unit 5	**THERMODYNAMICS-II** Second Law of Thermodynamics - Limitations of first law & Need for the second law - Different statements of the law - Carnot's cycle and efficiency of heat engine-Carnot's theorem- Concept of Entropy - Definition and physical significance of entropy - Entropy as a function of P, V and T- Entropy changes during phase changes - Entropy of mixing- Gibb's free energy (G) and Helmholtz free energy (A) - Variation of A and G with P, V and T - Gibb's Helmholtz equation and its applications - Thermodynamic equation of state - Maxwell's relations

Course Objectives	
Title	**SEMI MICRO QUALITATIVE ANALYSIS PRACTICAL**
Course Code	**SD241**
CO-1	To identify the anions and cations
CO-2	To know the tests and spot tests for cations
CO-3	Various preliminary test can be performed by the predicition of acid radicals.
CO-4	Confirmation test can be performed by sodium carbonate extraction methods.
CO-5	Elimination of interfere radicals such as phosphate, arsenate, etc. in the salt mixture followed by intergroup separation performed to find basic radicals present in specific groups could be identified.

Course Outcome	
Title	**SEMI MICRO QUALITATIVE ANALYSIS PRACTICAL**
Course Code	**SD241**
CO-1	To understand the aspects of Semi micro qualitative analysis for inorganic salt components
CO-2	Simple radicals such as acetate, chloride, iodide, nitrate, carbonate simply detected in a preliminary test.
CO-3	Interfere radicals such as oxalate, phosphate, arsenate, arsenite, simply detected in sodium carbonate extractions.
CO-4	Inter group separation for various group metal ions can be performed by using selective precipitant such as hydrochloric acid, hydrogen sulphide, ammonium chloride, ammonium carbonate.
CO-5	Basic radicals from group 1 to group6 can be completely detected by complexing ligands.

Syllabus	
Title	**SEMI MICRO QUALITATIVE ANALYSIS PRACTICAL**
Course Code	**SD241**
Unit 1	Analysis of simple acid radicals: carbonate, sulphate, chloride, bromide, iodide, nitrate
Unit 2	Analysis of interfering acid radicals: Fluoride, oxalate, borate, phosphate
Unit 3	Elimination of interfering acid radicals and Identifying the groups of basic radicals
Unit 4	Analysis of basic radicals (group-wise): Lead, copper, bismuth, cadmium, iron, aluminium, zinc, manganese, nickel, cobalt, calcium, strontium, barium, magnesium, ammonium
Unit 5	Analysis of a mixture containing two cations and two anions (of which one is interfering type)

Course Objectives	
Title	**INORGANIC CHEMISTRY – I**
Course Code	**BCY-DSC07**
CO-1	To learn the group study and the metallurgy of f- block elements.
CO-2	To study the basic concepts and application of coordination compounds
CO-3	To understand the chemistry of biological, binary and carbonyl compounds
CO-4	To study the different concepts of acid-bases and non-aqueous solvents
CO-5	To study magnetic behavior and color of various transition complexes using magnetic susceptibility methods.

Course Outcome	
Title	**INORGANIC CHEMISTRY – I**
Course Code	**BCY-DSC07**
CO-1	Learning the unique characteristics of lanthanide and actinide series
CO-2	Learning the fundamentals of coordination chemistry and its applications in analytical chemistry
CO-3	Understanding the biological importance of complexes
CO-4	Learning the theories of acids and bases
CO-5	Learning fundamentals of metal carbonyls.

Syllabus	
Title	**INORGANIC CHEMISTRY – I**
Course Code	**BCY-DSC07**
Unit 1	**CHEMISTRY OF f-BLOCKELEMENTS** General characteristics of f-block elements - Comparative account of lanthanides and actinides - Occurrence, Oxidation states, Magnetic properties, Colour and spectra - Lanthanides and Actinides Separation by ion-Exchange and Solvent extraction methods - Lanthanide contraction Chemistry of thorium and Uranium-Occurrence, Ores, Extraction, properties and uses - Preparation, Properties and uses of ceric ammonium sulphate, thorium dioxide and uranyl acetate.
Unit 2	**COORDINATION CHEMISTRY** Types of ligands, IUPAC Nomenclature, Isomerism - Ionisation, hydrate, linkage, ligand and coordination isomerism. Stereoisomerism-geometrical and optical isomerism in 4 & 6 coordinated complexes. Theories of coordination compounds - Werner and Sidgewick EAN concept , Valence Bond theory - hybridisation, geometry and magnetic properties of [Ni(CN)4]2-, [NiCl4]2-, [Fe(CN)6]4- , [Co(NH3)6]3+ and [CoF6]3-. Crystal field theory – spectrochemical series, splitting of d- orbitals in octahedral and tetrahedral complexes, low spin & high spin complexes. Explanation of colour and magnetic properties using CFT, comparison of VBT and CFT.
Unit 3	**APPLICATION OF COORDINATIONCOMPOUNDS** Application of coordination compounds - Estimation of nickel using DMG and aluminium using oxine. Estimation of hardness of water using EDTA . Biologically important coordination compounds - Chlorophyll, haemoglobin, vitamin - B12 . (their structure and applications). Metal Carbonyls : Mono and Poly nuclear Carbonyls of Ni, Fe, Cr, Co and Mn- Synthesis, structures and bonding.
Unit 4	**CHEMISTRY OF BINARYCOMPOUNDS** Classification, preparation, properties and uses of hydrides, borides, carbides and nitrides
Unit 5	**CONCEPTS OF ACIDS AND BASES** Theories of acids and bases - Arrhenius theory, Bronsted- Lowry theory - basicity of an acid and acidity of a base - relative strengths of acids and bases, Cady - Esley concept - general theory of solvent system, Lux - Flood concept - Lewis acids - bases concept in coordination chemistry - classification of Lewis acids, Usanovich concept. Concept of Hard and Soft Acids and Bases (HSAB). Types of solvents: Protic and aprotic solvents-aqueous and nonaqueous solvents-liquid ammonia and liquid HF as solvents.

Course Objectives	
Title	ORGANIC CHEMISTRY – I
Course Code	**BCY-DSC08**
CO-1	To learn the chemistry of phenola and aromatic compounds
CO-2	To learn and understand the chemistry of carbonyl compounds.
CO-3	To know the chemistry of carboxylic acids
CO-4	To study the chemistry of nitrogen compounds
CO-5	To acquire about the concepts and reactions of green chemistry

Course Outcome	
Title	ORGANIC CHEMISTRY
Course Code	**BCY-DSC08**
CO-1	Understanding acidic nature of phenol and its properties
CO-2	Learning the reactions of aldehydes and ketones
CO-3	Learning the chemistry of carboxylic acids and their derivatives
CO-4	Learning the chemistry of nitro compounds and amines
CO-5	Learning the basics of green chemistry

Syllabus	
Title	ORGANIC CHEMISTRY – I
Course Code	**BCY-DSC08**
Unit 1	**CHEMISTRY OF PHENOLS AND AROMATIC ALCOHOLS** Phenols: Nomenclature, synthesis of phenol from benzene sulphonic acid, chlorobenzene and cumene - Properties - Acidity of phenols and substituted phenols (explanation on the basis of resonance stabilization). Reactions similar to those of alcohols, ring substitution in phenol- orientation of phenolic group towards electrophiles, halogenation, nitration and sulphonation, Liebermann nitroso reaction, mechanism of Riemer-Tiemann reaction, Kolbe-Schmidt reaction and coupling with diazonium salts and condensation reactions. Alkylation and acylation of phenols. Dihydric phenols and benzyl alcohols-preparation, properties and uses.

Unit 2	**CHEMISTRY OFCARBONYL COMPOUNDS.** Nomenclature, structure of carbonyl compounds, acidity of alpha-hydrogen atom, keto- enol Tautomerism (proof for the two forms). Mechanism of nucleophilic addition with HCN, ROH, $NaHSO_3$, ammonia (NH_2OH, $NH_2NH_2$and $C_6H_5NHNH_2$).Mechanism of MeerweinPondorf-Verley reduction, Clemmenson reduction, Wolf-Kishner reduction, aldol condensation, Claisen-Schmidt reaction, Cannizaro reaction, haloform reaction, Perkin and Benzoin condensation reaction - Diekmann condensation.
Unit 3	**CHEMISTRY OF CARBOXYLIC ACIDS AND THEIR DERIVATIVES** Acidity of carboxylic acids, Effect of substituents on acidity, comparison of acid strengths of halogen substituted acetic acid and substituted benzoic acid. Dicarboxylic acids: General methods of preparation - from alkyl cyanides, cyclic ketones and halo esters. Reactions - action of heat, action of PCl_5 and NH_3. Acid derivatives (Aliphatic): Synthesis and important properties of acid derivatives (acid chlorides, acid anhydrides, esters and amides). Acetoacetic and malonic esters-Preparation and synthetic applications.
Unit 4	**CHEMISTRY OF NITROGEN COMPOUNDS** Nitrobenzene- preparation, reduction in different media, conversion of nitrobenzene to m- dinitrobenzene and TNT. Amines: Nomenclature, Basicity of amines, effect of substituents on basicity of aliphatic and aromatic amines. Preparation of primary amines by Gabriel synthesis and reduction of nitriles, secondary and tertiary amines-by the reduction of N-alkyl substituted amides. Reactions of amines-primary aliphatic and aromatic amines with nitrous acid, diazotization, coupling and carbylamine reactions
Unit 5	**GREEN CHEMISTRY** Concept and principles of green chemistry – need of green chemistry –Atom economy reactions (substitution, elimination, hydrogenation, addition and rearrangement reaction – basic concepts only)-green solvents-types and simple applications. Green Catalysis – Heterogeneous – use of zeolites, silica, alumina, supported catalysis –bio catalysis: Enzymes, microbes, phase transfer catalysis (miscellar / surfactant). Microwave, ultrasound and light promoted reactions (few examples for each type).

Course Objectives	
Title	**PHYSICAL CHEMISTRY – I**
Course Code	**BCY-DSC09**
CO-1	To learn the concepts of thermodynamics III
CO-2	To learn and understand the basics of solution and separation techniques
CO-3	To know the chemistry of Phase rule and its application to component systems
CO-4	To study the Colligative properties of dilute solutions
CO-5	To acquire about the concepts of electrochemistry

Course Outcome	
Title	**PHYSICAL CHEMISTRY – I**
Course Code	**BCY-DSC09**
CO-1	Introduced to concepts of thermodynamics such as equilibrium constant and entropy
CO-2	Learning fundamental concepts about solutions and the basis of separation techniques such as steam distillation and solvent extraction
CO-3	Introduced to phase rule and its application to one component and two component systems
CO-4	Introduced to colligative properties and methods of their determination
CO-5	Introduced to the concept of conductance in electrochemistry

Syllabus	
Title	**PHYSICAL CHEMISTRY – I**
Course Code	**BCY-DSC09**
Unit 1	**THERMODYNAMICS III** Equilibrium constant and free energy change - Thermodynamic derivation of law of mass action - Equilibrium constants in terms of pressure and concentration (Kp and Kc) and their relation - Thermodynamic interpretation of Lechatelier principle (Concentration, temperature, pressure and addition of inert gases). Systems of variable composition - Partial molar quantities - Chemical potential - Variation of chemical potential with T, P and X (mole fraction) - Gibbs-Duhem equation- Duhem-Margulesequation.van't Hoff reaction isotherm - van't Hoff's isochore- Clapeyron equation and Clausius- Clapeyron equation - Applications- Nernst heat theorem - Third Law of Thermodynamics - Statement of third law and concept of residual entropy - Evaluation of absolute entropy from heat capacity

	data- exception to third law (CO, ortho and para hydrogen).
Unit 2	**SOLUTIONS** Ideal and Non-ideal solutions. Concept of activity and activity coefficients - Completely miscible liquid systems - benzene and toluene.Raoult's law and Henry's law. Deviation from Raoult's law and Henry's law. Azeotropes- HCl-water and Ethanol-water system - Partially miscible liquid systems (Upper and lower CST) - phenol-water, triethylamine-water and Nicotine-water systems. Completely immiscible liquids –principle and applications of steam distillation - Nernst Distribution Law-thermodynamic derivation, application to solvent extraction, limitations of distribution law
Unit 3	**THERMODYNAMICS OF PHASE TRANSITIONS** Definition of terms in the phase rule - Derivation and application to one component system water and sulphur - super cooling, sublimation. Two component systems - reduced phase rule - solid- liquid equilibria, simple eutectic (lead-silver), desilverisation of lead –Compound formation with congruent melting point. (Mg-Zn) and incongruent melting point (NaK).Solid solutions - (Ag- Au) - freezing mixtures - KI-H2O system.
Unit 4	**DILUTE SOLUTIONS AND COLLIGATIVE PROPERTIES** Colligative properties - relative lowering of vapour pressure, osmosis - Law of osmotic pressure- isotonic solutions, effect of concentration and temperature on osmotic pressure - thermodynamic derivation of elevation of boiling point and depression in freezing point - determination of molecular masses using the above properties [experimental details not required]- abnormal molecular masses and van't Hoff factor - degree of association and degree of dissociation.
Unit 5	**ELECTRO CHEMICAL CONDUCTANCE** Electrical transport and conductance in metal and in electrolytic solution. Specific conductance and equivalent conductance. Measurement of equivalent conductance. Using Kohlrausch'sbridge. Arrhenius theory of electrolytic dissociation and its limitations. Weak and strong electrolyte according to Arrhenius theory Ostwald's dilution laws- applications and limitation. Variation of equivalent conductance with concentration. Migration of ionionic mobility. Kohlrausch's law and its applications. The elementary treatment of the Debye- Hückel Onsager equation for strong electrolytes. Evidence for ionic atmosphere. Wein effect and Debye-Falkenhagen effect. Transport number - Determination by Hittorf method and moving boundary method. Application of conductance measurements- Determination of $\Lambda_0$of strong electrolytes. Determination of Ka of weak acids. Determination of solubility product of a sparingly soluble salt. Conductometric titrations.

Course Objectives	
Title	**ELECTIVE-I: PHARMACEUTICAL CHEMISTRY**
Course Code	**BCY-DSE1A**
CO-1	To know the complete fundamentals and terminology of pharmaceutical chemistry
CO-2	To know about antibiotics anasthetics, antibacterials as well as various hormones and their functions in human systems
CO-3	To understand the function and uses of narcotic and non narcotics analgesics
CO-4	To summarize about the micronutrients and their biological role in human systems
CO-5	To clearly learn about the classification and uses of sulpha drugs, anti-inflammatory and antihypertensive agents

Course Outcome	
Title	**ELECTIVE-I: PHARMACEUTICAL CHEMISTRY**
Course Code	**BCY-DSE1A**
CO-1	Learning various terminologies in pharmacology, Types of drugs and their action
CO-2	Introduction to the concepts of Absorption of drugs, Various routes of administration and about Indian medicinal plants
CO-3	Introduced to Concepts of Anesthetics, Antipyretics, analgesics, Antibiotics and anti-inflammatory agents
CO-4	Concepts on Composition of blood, Cardiovascular drugs, vasodialators and antipsychedelic drugs
CO-5	Understanding the biological importance of vitamins, inorganic compounds and Lipid profile

Syllabus	
Title	**ELECTIVE-I: PHARMACEUTICAL CHEMISTRY**
Course Code	**BCY-DSE1A**
Unit 1	Important terminologies used in pharmaceutical chemistry - drug pharmacology, pharmacognosy, pharmacodynamics, pharmacokinetics, antimetabolites, pharmacopeia (BP,IP,USP), National formulary, chemotherapy, vaccines, primary immunization, synergism, antagonist LD50, ED50, therapeutic index and drug dosage. Various sources of drugs, pharmacologically active constituents in plants. Classification of drugs, chemical – biological - mechanism of drug action - action at cellular sites. Drug receptors and biological responses. Mechanism of different types of drug action.
Unit 2	Absorption of drugs - factors affecting absorption of drugs, routes of administration - local, enema, oral and external, parental routes - advantages and disadvantages – Common diseases - infective diseases insect borne - air borne and water borne. Common diseases of the respiratory system and nervous system. Indian medicinal plants - tulsi, neem, keezhanelli. AIDS - symptoms and prevention.
Unit 3	Anaesthetics - general - ether, chloroform, ethyl chloride, halothane, nitrous oxide, local - esters - cocaine, benzo cocaine, procaine, amides - lignocaine, cinchocaine. Analgesics - Narcotic and synthetic Antipyretics and anti-inflammatory agents, Antibiotics - penicillin, streptomycin, chloramphenicol, tetracycline. Antiseptics and disinfectants - phenol and its derivatives, nitrofuran derivatives.
Unit 4	Composition of blood - blood grouping and matching. Blood pressure - systolic and diastolic - hypertensive drugs. Diabetes - causes - hyperglycaemic drugs. Cardiovascular drugs - cardiac glycosides – anti arrhythmic drugs, antianginal drugs, vasodilators, antipsychedelic drugs - antidepressants - sedatives and hypnotics.
Unit 5	Anticonvulsant agents - Barbiturates– oxazolone diones- acetyl urea derivatives - succinimides. Diagnostic agents for kidney function (aminohippuric acid) –for liver function (sulfobromophthalein).Lipid profile - HDL, LDL, cholesterol and lipid lowering drugs. Vitamins - fat soluble and water soluble - sources, biological role and deficiency conditions. Medicinal importance of inorganic compounds - compounds of aluminium - phosphorus - arsenic - mercury and Iron. Biological importance of inorganic compounds - sodium and its compounds - potassium and its compounds - copper and its compounds.

Course Objectives	
Title	**POLYMER CHEMISTRY**
Course Code	**BCY-DSE2B**
CO-1	The subject provides an introduction to polymer science with respect to synthesis, polymerization kinetics and network formation/gelation by step-growth and chain-growth polymerization.
CO-2	To learn the chemistry of polymer processing
CO-3	To learn about the industrially important polymers
CO-4	To study the Molecular weight determination of polymers
CO-5	To understand the concept of polymer reactions

Course Outcome	
Title	**POLYMER CHEMISTRY**
Course Code	**BCY-DSE2B**
CO-1	Introduction to types of polymers and their properties.
CO-2	Learning the mechanism of polymerization and polymerization Techniques
CO-3	Introduction to Chemistry of Polymer processing
CO-4	Introduced to chemistry of industrially important polymers
CO-5	Introduced to the concept of Polymer reactions. Properties and applications of natural polymers and supramolecular polymes

Syllabus	
Title	**POLYMER CHEMISTRY**
Course Code	**BCY-DSE2B**
Unit 1	Introduction to polymers –general characteristics of polymers in comparison with common organic compounds. Basic concept of monomers and polymers. Classification of polymers - natural and synthetic polymers. Distinction between plastics, elastomers and fibres. Types of polymers thermoplastics and thermosetting plastics. Geometrical structures of polymer molecules - microstructures - chemical structures - geometrical structures - Crosslinked polymers - stereoregular polymers. Mechanism of polymerization: chain polymerization, free radical polymerization, ionic and coordination polymerization. Polyaddition and polycondensation polymerization, ring opening and group transfer polymerization.

Unit 2	Molecular weight of polymers - number average, weight average and viscosity average. Determination of polymer molecular weights - Osmometry (membrane, vapour phase),Viscometry methods. Light scattering and ultra-centrifugation methods. Molecular weight and degree of polymerization - practical significance of polymer molecular weight. Glass transition temperature - transition and associated properties - factors affecting Glass transition temperature- importance - glass transition temperature of copolymers. Polymer crystallinity - crystallisability- effect of crystallinity on properties.
Unit 3	Industrially important polymers - preparation, properties and applications. Polyethylene, polypropylene, polyamides, polyvinylchloride, polymethylmethacrylate, polyesters, polycarbonates, polyurethanes, phenol - formaldehyde, melamine - formaldehyde, polysilanes, polyaniline.
Unit 4	Degradation of polymers by thermal - oxidative, mechanical and photodegradation methods. Polymerisation techniques - bulk, solution, suspension, emulsion, polycondensation and interfacial polycondensation. Polymer processing - compression moulding, casting, extrusion, fibre spinning, injection moulding, thermoforming, vulcanization of elastomers.
Unit 5	Polymer reactions - hydrolysis, Acidolysis, Aminolysis, hydrogenation, addition and substitution - cyclisation reactions - crosslinking reactions. Natural polymers - Rubber, Silk, Cellulose - structure and applications Supramolecular polymers - introduction - properties - applications.

Course Objectives	
Title	**INORGANIC CHEMISTRY – II**
Course Code	**BCY-DSC10**
CO-1	To learn the metallic bonding theories
CO-2	To learn and understand the chemistry of organic metallic compounds
CO-3	To know the chemistry of carboxylic acids
CO-4	To study the chemistry of radioactivity
CO-5	To acquire about the chemistry of some useful inorganic compounds

Course Outcome	
Title	**INORGANIC CHEMISTRY – II**
Course Code	**BCY-DSC10**
CO-1	Learning the theories of metallic bonding
CO-2	Introduced to organometallic compounds
CO-3	Introduced to fundamental concepts of nuclear chemistry and radioactivity
CO-4	Learning the chemistry of clathrates, phosphazenes, silicates
CO-5	To learn the radioactive disintegration provide various nucleus and its off life time completely studied.

Syllabus	
Title	**INORGANIC CHEMISTRY – II**
Course Code	**BCY-DSC10**
Unit 1	**METALLIC BONDING** Metallic state - Packing of atoms in metal (BCC , FCC , HCP and simple cube) - Theories of metallic bonding - Electron gas , Pauling and band theories - Semiconductors- n- type and p- type, transistors - Uses - superconductors - examples, types - structures of alloys - substitutional and interstitial solid solutions- Hume-Rotheryratio.
Unit 2	**CHEMISTRY OF ORGANOMETALLIC COMPOUNDS** Introduction - Preparation, properties uses of Organomagnesium,Organozinc, Organolithium,Organocopper, Organolead, Organophosphorus and Organoboroncompounds. Preparation, properties, uses and structure of ferrocene-Preparation and uses of Ziegler-Natta catalyst.
Unit 3	**NUCLEAR CHEMISTRY** Introduction - composition of nucleus - nuclear binding energies –structure of nucleus- nuclear shell model and liquid drop model - magic numbers – nuclear stability - theories of nuclear stability - nuclear binding energy theory – meson theory of nuclear forces - nuclear fluid theory - isotopes, isobars, isotones, nuclear isomers and mirror nuclei - detection of isotopes

	–Aston's mass spectrograph separation of isotopes - electromagnetic method - the whole number rule and packing fraction.
Unit 4	**RADIOACTIVITY** Radioactive Emanations, Alpha rays, Beta rays and Gamma rays. The Disintegration theory- Group Displacement Law. Rate of disintegration and Half-life period. Radioactive disintegration series. The Gieger- Nuttal rule - Artificial radioactivity. Induced radioactivity. Nuclear fission-Atom bomb, Nuclear fusion-hydrogen bomb- Stellar energy - Hazards of radiation. Applications of Radioisotopes. Radiocarbon dating
Unit 5	**SOME SPECIAL TYPE OF COMPOUNDS** Clathrates - examples and structures, interstitial and non-stoichiometric compounds – composition, manufacture, structure, properties and uses ofphospazenes –composition and uses of beryl, asbestos, talc, mica, zeolites and ultramarines

Course Objectives	
Title	**ORGANIC CHEMISTRY – II**
Course Code	**BCY-DSC11**
CO-1	To enable the students to understand and appreciate the concepts of stereochemistry.
CO-2	To study about the chemistry of carbohydrates.
CO-3	To learn and understand the chemistry of vitamins and proteins
CO-4	To know the mechanism of rearrangement reactions
CO-5	To know the stereochemistry of various organic compound provide best structural identity.

Course Outcome	
Title	**ORGANIC CHEMISTRY – II**
Course Code	**BCY-DSC11**
CO-1	Learning the chemistry of biopolymers – carbohydrates and proteins
CO-2	Understanding vitamins
CO-3	Learning the chemistry of natural products – alkaloids and terpenoids
CO-4	Learning the mechanism of various types of molecular rearrangement
CO-5	Introduced to the concepts of stereochemistry

Syllabus	
Title	**ORGANIC CHEMISTRY – II**
Course Code	**BCY-DSC11**
Unit 1	**CHEMISTRY OF CARBOHYDRATES** Carbohydrates –Definition and Classification of carbohydrates with examples. Mono saccharides- glucose and fructose - epimers and anomers with examples.Mechanism mutarotation, osazoneformation.Absolute configurations of glucose and fructose.Structural elucidation of glucose and fructose (including cyclic and Haworth structure).Interconversions, ascending and descending the sugar series.Disaccharide - Sucrose, Maltose - Structural elucidation. Polysaccharide - Starch and Cellulose (Elementary treatment
Unit 2	**CHEMISTRY OF PROTEINS AND VITAMINS** Amino acids - Classification, General methods of preparation and reactions, zwitter ion, isoelectric point.Peptides and proteins - Peptide linkage- Preparation of dipeptides by Bergmann's method Classification of proteins, primary structure (End group analysis - Sanger's method and Edman method) - secondary structure, tertiary structure, denaturation. Vitamins - Classification, biological importance of Vitamins. Structure of vitamin C.
Unit 3	**CHEMISTRY OF ALKALOIDS AND TERPENOIDS** Chemistry of natural products - Alkaloids - Isolation,

	classification, general methods of elucidating structure.Structural elucidation of nicotine and piperine.Terpenes- classification , isoprene rule, special isoprene rule - isolation and structural elucidation of citral, α- terpeniol and menthol
Unit 4	**MOLECULAR REARRANGEMENTS** Molecular rearrangements - Types of rearrangements, Mechanisms for the following rearrangements :pinacol-pinacolone, benzil- benzilic acid, benzidine, Favorskii, Claisen, Fries, Hofmann, Curtius, Schmidt and Beckmann
Unit 5	**STEREOCHEMISTRY OF ORGANIC COMPOUNDS** Stereoisomerism - definition, classification into geometric and optical isomerism. Optical isomerism - Optical activity, asymmetric centre(chirality), symmetry elements (σn, Sn and i), relative and absolute configurations, concept of enantiomerism and diastereoisomerism; Racemisation - methods of Racemisation (by substitution and tautomerism), Resolution - methods of resolution (by mechanical, seeding and biochemical),Walden inversion. Projection formulae- Fischer, flying wedge, Sawhorse and Newmann projections, notation of optical isomerism: Cahn- Ingold and Prelog rules, R and S notations for one and two chirality (stereogenic) centres, erythro and threo representations. Geometrical isomerism: cis - trans; syn- anti; E - Zdescriptors

Course Objectives	
Title	PHYSICAL CHEMISTRY- II
Course Code	**BCY-DSC12**
CO-1	To acquire the knowledge about rate of chemical reactions
CO-2	To learn in detail about reactions taking place in electrolytic cells.
CO-3	To learn in detail about reactions taking place in electrochemical cells.
CO-4	To study the thermal and spectral techniques.
CO-5	To analyse the concepts of group and computational theory.

Course Outcome	
Title	PHYSICAL CHEMISTRY- II
Course Code	**BCY-DSC12**
CO-1	Learning the basics of chemical kinetics
CO-2	Understanding the basics of catalysis and adsorption
CO-3	Introduced to the fundamentals of photochemistry
CO-4	Learning the basics of computational chemistry
CO-5	Learning the fundamentals of electrochemical cells

Syllabus	
Title	PHYSICAL CHEMISTRY- II
Course Code	**BCY-DSC12**
Unit 1	**CHEMICAL KINETICS** Rate of reaction- Average and instantaneous rates, factors influencing rate of reaction - molecularity of a reaction - rate equation - order and molecularity, Rate laws - Rate constants - derivation of rate constants and characteristics for zero, first, second and third order (equal initial concentration) - Derivation of time for half change. Methods of determination of order of reactions - Experimental methods of determination of rate constant of a reaction - Volumetry, manometry and polarimetry. Effect of temperature on reaction rate - temperature coefficient - concept of activation energy - energy barrier - Arrhenius equation. Theories of reaction rates - Collision theory - derivation of rate constant of bimolecular gaseous reaction - Failure of collision theory. Theory of absolute reaction rates - Derivation of rate constant for a bimolecular reaction - significance of entropy and free energy of activation. Comparison of collision theory and ARRT
Unit 2	**CATALYSIS AND ADSORPTION** Catalysis - general characteristics of catalytic reactions, auto catalysis, promoters, negative catalysis, poisoning of a catalyst - theories of homogenous and heterogenous catalysis - Kinetics of Acid - base and enzyme catalysis- Mechanism (lock and key, induced fit), Michaelis-Menton equation (no derivation) - Heterogenous catalysis Adsorption - Difference between absorption and adsorption - Chemical and physical adsorption and their general characteristics- distinction between them

	Different types of isotherms - Freundlich and Langmuir. Adsorption isotherms and their limitations - BET theory (no derivation)
Unit 3	**PHOTOCHEMISTRY** Photo physical processes - Jablonski diagram - Laws of photo chemistry - Lambert - Beer, Grotthus- Draper and Stark – Einstein. Quantum efficiency. Fluorescence and Phosphorescence. Photo chemical reactions - rate law - Kinetics of H_2-Cl_2 and H_2-I_2 reactions, comparison between thermal and photochemical reactions
Unit 4	**PHOTOCHEMISTRY** Photo physical processes - Jablonski diagram - Laws of photo chemistry - Lambert - Beer, Grotthus- Draper and Stark – Einstein. Quantum efficiency. Fluorescence and Phosphorescence. Photo chemical reactions - rate law - Kinetics of H_2-Cl_2 and H_2-I_2 reactions, comparison between thermal and photochemical reactions
Unit 5	**ELECTROCHEMICAL CELLS** Electrolytic & Galvanic cells - Reversible and irreversible cells. Conventional representation of electrochemical cells. Electromotive force of a cell and its measurement computation of E.M.F. calculation of thermodynamic quantities of cell reactions (ΔG,ΔH, ΔS and Keq).Application of Gibbs Helmholtz equation. Calculation of E.M.F. Types of reversible electrodes - Gas/metal ion- metal/metal ion; metal/insoluble salt/anion and Redox electrodes. Electrode reactions - Nernst equation - Derivation of cell E.M.F. and single electrode potential - standard hydrogen electrode - reference electrodes (Calomel electrode)- standard electrodes reduction potentials – sign convention - Electrochemical series and its significance. Concentration cell with and without transport. Liquid junction potential. Application of EMF concentration cells. Valency of ion, solubility product and activity coefficient. Potentiometric titrations. Determination of pH using Hydrogen, quinhydrone and glass electrodes. Determination of pKa of acids by potentiometric method. Fuel cells - Corrosion - general and electrochemical theory - passivity - prevention of corrosion

Course Objectives	
Title	**ANALYTICAL CHEMISTRY**
Course Code	**BCY-DSE3A**
CO-1	To acquire the knowledge of the analytical chemistry
CO-2	To Know some important theory about data analysis and types of errors
CO-3	To understand the quantitative and Gravimetric analysis
CO-4	To study the thermal and spectral techniques.
CO-5	To analyse the concepts and applications of polarographic methods.

Course Outcome	
Title	**ANALYTICAL CHEMISTRY**
Course Code	**BCY-DSE3A**
CO-1	Learning terminology of data analysis
CO-2	Understanding the basics of Separation techniques
CO-3	Principles and instrumentation ofchromatographic
CO-4	Principles and instrumentation of gravimetric, Thermal techniques computational chemistry
CO-5	Principles and instrumentation of spectroscopic and electroanalytical techniques

Syllabus	
Title	**ANALYTICAL CHEMISTRY**
Course Code	**BCY-DSE3A**
Unit 1	Data Analysis - Theory of errors - idea of significant figures and its importance with examples - Precision - accuracy - methods of expressing accuracy - error analysis - minimizing errors methods of expressing precision - average deviation - standard deviation and confidence limit. Purification of solid compounds - extraction - use of immiscible solvents - Soxhlet extraction Purification of liquids - experimental techniques distillation - fractional distillation - vacuum distillation - steam distillation –tests for purity).
Unit 2	Principles of gravimetric analysis - characteristics of precipitating agents- choice of precipitants and conditions of precipitation –specific and selective precipitants - DMG, cupferron, salicylaldehyde, ethylene

	diamine- use of sequestering agents - co-precipitation - post precipitation - peptization- differences- reduction of error - precipitation from homogeneous solutions - calculations in gravimetric methods - use of gravimetricfactor.Thermal analytical methods - Principle involved in thermogravimetric analysis and differential gravimetric analysis - discussion of various components with Block diagram - characteristics of TGA and DTA - factors affecting TGA and DTA curves- thermometric titrations. Chromatography Techniques - Principles - adsorption, partition and ion exchange chromatography , column chromatography - adsorbents - preparation of column - elution, recovery of substance and applications. TLC - choice of adsorbent and solvent - preparation of chromatogram (Rf value) and applications - Paper chromatography - Solvents used - factors affecting Rfvalue- separation of amino acidmixtures.
Unit 3	Definition of spectrum - electromagnetic radiation - quantisation of different forms of energies of molecules - translational, vibrational, rotational, vibrational and electronic energies. UV - Visible spectroscopy - absorption laws –theory- electronic spectra - types of electronic transitions - chromophores and auxochromes –absorption bands and intensity - factors governing absorption maxima and intensity – instrumentation. IR spectroscopy - vibrations of diatomicmolecules- harmonic and anharmonic oscillators, zero point energy, force constant, condition for a molecule to be IR active, selection rules - instrumentation
Unit 4	NMR spectroscopy - principle - equivalent and non-equivalent protons - shielded and deshielded protons, chemical shift - TMS, delta tau scales, spin-spin coupling- analysis of spectrum of ethanol - instrumentation Mass spectrometry: Basic principles of mass spectrum Instrumentation and Block diagram molecular ion peak, base peak, isotopic peak, fragmentation - Nitrogen rule - determination of molecular formulae - fragmentation and mass spectrum of simple organic compounds - alcohols and carbonyl compounds- McLafferty rearrangement.
Unit 5	Polarography - principle - concentration polarization - dropping mercury electrode - advantages and disadvantages - migration and diffusion currents - Ilkovic equation (derivation not required) and significance - experimental assembly –electrodes - capillary - current voltage curve - oxygen wave - influence of temperature and agitation on diffusion layer - polarography as an analytical tool in quantitative and qualitative analysis . Amperometry- basic principles and uses.

Course Objectives	
Title	**GRAVIMETRIC ANALYSIS PRACTICAL**
Course Code	**BCY-DSC13**
CO-1	To know about estimation of compounds
CO-2	Understand by the principles of gravimetric estimation and develop practical skill in it.
CO-3	Estimation of cations present in the bulk solution can be performed
CO-4	Estimation of anions present in the bulk solution can be performed
CO-5	To estimate various complex ion also performed example Nickel – DMG

Course Outcome	
Title	**GRAVIMETRIC ANALYSIS PRACTICAL**
Course Code	**BCY-DSC13**
CO-1	Learning the gravimetric estimation of some anions and cations
CO-2	Learning the exact concentration of an unknown chloride solution or the percentage by mass of an unknown chloride salt.
CO-3	Learning the amount of a substance by selective precipitation of the substance from an aqueous solution
CO-4	Completely focused on Chemical analysis of ores, industrial materials, equipment calibration and elemental analysis of inorganic compound.
CO-5	Chemical composition of rocks, minerals and alloys can be completely determined by the knowledge of gravimetric analysis.

Syllabus	
Title	**GRAVIMETRIC ANALYSIS PRACTICAL**
Course Code	**BCY-DSC13**
Unit 1	1. Estimation of Lead as Leadchromate 2. Estimation of Barium as Barium chromate
Unit 2	3. Estimation of Nickel as Nickel - DMG complex. 4. Estimation of Calcium as Calciumoxalate
Unit 3	5. Estimation of Barium as Barium sulphate 6.Estimation of Sulphate as Bariumsulphate
Unit 4	7.Estimation of Aluminium as Aluminium oxinate (for demonstration)
Unit 5	8.Estimation of Silver as Silver chloride (for demonstration)

Course Objectives	
Title	**ORGANIC ANALYSIS PRACTICAL**
Course Code	**BCY-DSC14**
CO-1	To have a knowledge about analyzing organic compounds
CO-2	To Know some important organic reactions
CO-3	To know about preparation of compounds
CO-4	To know the condition for organic compound preparation.
CO-5	To know the temperature stability of the crystalline organic compounds.

Course Outcome	
Title	**ORGANIC ANALYSIS PRACTICAL**
Course Code	**BCY-DSC14**
CO-1	Learning to identify functional groups and elements present in organiccompounds; Preparation of some simple organic compounds
CO-2	Learning to identify the organic compound becomes aromatic or aliphatic in nature.
CO-3	Learning to identify the organic compound becomes saturated or unsaturated in nature.
CO-4	Learning to identify the organic compound containing one or more number of functional groups in a single spot test using sodium fusion method.
CO-5	Learning the preparation of various dervitatives of the corresponding organic compounds.

Syllabus	
Title	**ORGANIC ANALYSIS PRACTICAL**
Course Code	**BCY-DSC14**
Unit 1	Mono - functional compounds are given for analysis. In case of bi-functional compounds, students are required to report any one of the functional groups.
Unit 2	Each student is expected to do the analysis of at least 10 different organic substances. Recommended to adopt micro scale technique of organic analysis
Unit 3	Oxidation of benzaldehyde Reduction of nitrobenzene Esterification of salicylic acid
Unit 4	Acetylation of aniline Hydrolysis of methyl salicylate
Unit 5	Nitration of phenol Bromination of acetanilide

Course Objectives	
Title	**PHYSICAL PRACTICAL**
Course Code	**BCY-DSC15**
CO-1	To improve the knowledge of the rate of chemical reactions.
CO-2	To acquire the knowledge of electro chemical aspects like conductometric and potentiometric titrations
CO-3	To create knowledge about colligative properties and binary mixtures of the system
CO-4	To corrlete the theoretical principles with practical experiments of physical chemistry
CO-5	: Perform conductometric and potentiometric titrations for calculating concentration and the amount present in the given solution.

Course Outcome	
Title	**PHYSICAL PRACTICAL**
Course Code	**BCY-DSC15**
CO-1	Learning determination of order of chemical reactions; potentiometric andconductometric titrations
CO-2	Learning the determination of Transition temperature of various hydrated salt
CO-3	To learn complete miscibility of the binary liquid system.
CO-4	To learn neutralization of various acid base titrations conducted by conductometric titrations.
CO-5	To study the kinetics of various chemical reactions.

Syllabus	
Title	**PHYSICAL PRACTICAL**
Course Code	**BCY-DSC15**
Unit 1	1. Critical Solution Temperature 2. Effect of impurity on critical solution temperature of phenol-water system[NaCl] 3. Ras method
Unit 2	4. Transition temperature 5. Heat of neutralization 6. Phase diagram (Simple Eutectic)
Unit 3	7. Kinetics of saponification 8.Kinetics of acid catalysed ester hydrolysis 9.Kinetics of Persulphate- Iodide reaction
Unit 4	8. Partition coefficient and Equilibrium constant of KI + I2 →KI3 9. Determination of cell constant, specific conductance and equivalent conductance of strong electrolyte. 10. Estimation of HCl by conductometric titration .
Unit 5	11. Estimation of acetic acid conductometric titration. 12. Estimation of BaCl2 by conductometric titration. 13. Estimation of HCl by potentiometric titration .

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF COMPUTER SCIENCE

Program : **B.Sc. (COMPUTER SCIENCE)** **Program Code: SE1**

Program Outcomes	
	On Completion of Program Student will able to
PO-1	Understand the basic principles and concepts of Computer Science and integrate the knowledge gained in Computer Science domain with practical needs of the society and be an ethically and socially responsible Computer Science Professional.
PO-2	Explore emerging technologies in diverse areas of Computer Science and inculcate skills for successful career, entrepreneurship and higher studies.
PO-3	Apply the concepts of Computer and practices via emerging technologies and Software development tools
PO-4	To apply knowledge of computing, mathematics, and basic sciences.
PO-5	To Build up programming, analytical and logical thinking abilities.
PO-6	To analyze a problem, and identify and define the computing requirements appropriate to its solution.
PO-7	To understanding professional, ethical, legal, security and social issues and responsibilities.
PO-8	To use current techniques, skills, and tools necessary for computing practice.
PO-9	To identify and analyze user needs and take them into account in the selection, creation, evaluation, and administration of computer-based systems.
PO-10	To understanding of best practices and standards and their application.

Program Specific Outcomes	
	On Completion of Program Student will able to
PSO-1	To apply basic knowledge of computing, mathematics, and basic sciences
PSO-2	To Build up programming, analytical and logical thinking abilities.
PSO-3	To adapt to current frameworks and programming trends in the industry
PSO-4	To understanding professional, ethical, legal, security and social issues and responsibilities
PSO-5	To be equipped with the knowledge of the internals of the computer as a hardware to adopt to the innovations in the industry.
PSO-6	To be equipped with the accommodative knowledge of research areas and future trends.
PSO-7	To use current techniques, skills, and tools necessary for computing practice.

Course Objectives	
Title	**PROBLEM SOLVING USING PYTHON**
Course Code:	SE21A
CO-1	To Understand the principles of Python and acquire skills in programming in Python.
CO-2	To develop the emerging applications of relevant field using Python.
CO-3	To implement Object Oriented Skills in Python.
CO-4	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
CO-5	To acquire skills in developing small size programs using Python features.

Course Outcome	
Title	**PROBLEM SOLVING USING PYTHON**
Course Code:	SE21A
CO-1	To Understand the principles of Python and acquire skills in programming in python.
CO-2	To develop the emerging applications of relevant field using Python .
CO-3	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
CO-4	Able to develop turtle graphics programs in Python.
CO-5	Ability To use Python files and data structures.

Syllabus	
Title	**PROBLEM SOLVING USING PYTHON**
Course Code:	SE21A
Unit 1	**INTRODUCTION** Introduction: The essence of computational problem solving – Limits of computational problem solving-Computer algorithms-Computer Hardware-Computer Software-The process of computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types.
Unit 2	**CONTROL STRUCTURES** Control Structures: Boolean Expressions - Selection Control - If Statement-Indentation in Python- Multi-Way Selection -- Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flags and Indefinite Loops. Lists: List Structures - Lists in Python - Iterating over lists in Python.
Unit 3	**FUNCTIONS** Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope.
Unit 4	**OBJECTS AND THEIR USE** Objects and their use: Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - Top Down Design - Python Modules - Text Files: Opening, reading and writing text files - String Processing - Exception Handling.
Unit 5	**DICTIONARIES AND SETS** Dictionaries and Sets: Dictionary type in Python - Set Data type. Object Oriented Programming using Python: Encapsulation - Inheritance – Polymorphism. Recursion: Recursive Functions.

Course Objectives	
Title	**PYTHON PROGRAMMING LAB**
Course Code:	SE211
CO-1	To implement the python programming features in practical applications.
CO-2	To write, test, and debug simple Python programs.
CO-3	To implement Python programs with conditionals and loops.
CO-4	Use functions for structuring Python programs.
CO-5	Represent compound data using Python lists, tuples, dictionaries , turtles, Files and modules.

Course Outcome	
Title	**PYTHON PROGRAMMING LAB**
Course Code:	SE211
CO-1	Understand the numeric or real life application problems and solve them.
CO-2	Apply a solution clearly and accurately in a program using Python.
CO-3	Apply the best features available in Python to solve the situational Problems.
CO-4	Apply data structures in Python to real life applications
CO-5	Apply Object concept in Python to real life applications

Syllabus	
Title	**PYTHON PROGRAMMING LAB**
Course Code:	SE211
Unit 1	. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
Unit 2	Program to calculate total marks, percentage and grade of astudent.Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria: Grade A: Percentage >=80 Grade B: Percentage >=70 and <80 Grade C: Percentage >=60 and <70 Grade D: Percentage >=40 and <60 Grade E: Percentage <40
Unit 3	Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user
Unit 4	Program to display the first n terms of Fibonacci series
Unit 5	Program to find factorial of the given number using recursive function
Unit 6	Program to find factorial of the given number using recursive function
Unit 7	Python function that accepts a string and calculate the number of upper case letters and lower case letters.
Unit 8	Python program to reverse a given string and check whether the give string is palindrome or not.
Unit 9	Write a program to find sum of all items in a dictionary.
Unit 10	Write a Python program to construct the following pattern, using a nested loop 1 22 333 4444 55555 666666 7777777 88888888 999999999
Unit 11	Read a file content and copy only the contents at odd lines into a new file
Unit 12	Create a Turtle graphics window with specific size
Unit 13	Write a Python program for Towers of Hanoi using recursion
Unit 14	Create a menu driven Python program with a dictionary for words and their meanings
Unit15	Devise a Python program to implement the Hangman Game.

Course Objectives	
Title	**COMPUTER ORGANIZATION**
Course Code:	SE22A
CO-1	To understand the basic organization of computers and the working of each component and CPU
CO-2	To bring the programming features of 8085 Microprocessor and know the features of latest microprocessors.
CO-3	To understand the principles of Interfacing I/O devices and Direct Memory access
CO-4	To understand communication between processor and I/O devices
CO-5	To understand communication between processor and Memory

Course Outcome	
Title	**COMPUTER ORGANIZATION**
Course Code:	SE22A
CO-1	Describe the major components of a computer system and state their function and purpose
CO-2	Describe the microstructure of a processor
CO-3	Demonstrate the ability to program a microprocessor in assembly language.
CO-4	Classify and describe the operation DMA and peripheral Interfaces.
CO-5	Ability to write device related assmebly programs

Syllabus	
Title	**COMPUTER ORGANIZATION**
Course Code:	SE22A
Unit 1	Data representation: Data types – Complements- fixed point and floating point representation other binary codes. Register Transfer and Microoperations: Register transfer language- Register transfer- Bus and Memory transfers – Arithmetic, logic and shift micro operations
Unit 2	Central processing unit: General register and stack organizations- instruction formats - Addressing modes- Data transfer and manipulation - program control- RISC - Pipelining - Arithmetic and instruction- RISC pipeline - Vector processing and Array processors
Unit 3	Microprocessor Architecture and its Operations - 8085 MPU - 8085 Instruction Set and Classifications. Programming in 8085: Code conversion - BCD to Binary and Binary to BCD conversions - ASCII to BCD and BCD to ASCII conversions - Binary to ASCII and ASCII to Binary conversions.
Unit 4	Programming in 8085:BCD Arithmetic - BCD addition and Subtraction - Multibyte Addition and Subtraction - Multiplication and Division. Interrupts: The 8085 Interrupt – 8085 Vectored Interrupts
Unit 5	Direct Memory Access(DMA)and 8257 DMA controller - 8255A Programmable Peripheral Interface. Basic features of Advanced Microprocessors - Pentium - I3 , I5 and I7

Course Objectives	
Title	**JAVA AND DATA STRUCTURES**
Course Code:	SE23A
CO-1	To enable the students to learn the basic concepts of Java programming
CO-2	To use class and objects to create applications
CO-3	To have an overview of interfaces, packages, multithreading and exceptions.
CO-4	To familiarize students with basic data structures and their use in algorithms.
CO-5	To implement Object Oriented Skills in Java

Course Outcome	
Title	**JAVA AND DATA STRUCTURES**
Course Code:	SE23A
CO-1	Students will be able to develop Java Standalone applications and Applets.
CO-2	Choose the appropriate data structure for modeling a given problem
CO-3	Implement java programs for Threads
CO-4	Implement Java programs for specfic data structures
CO-5	Implement linear and non linear data structures

Syllabus	
Title	**JAVA AND DATA STRUCTURES**
Course Code:	SE23A
Unit 1	History and Evolution of Java - Features of Java - Object Oriented Concepts – Bytecode - Lexical Issues - Data Types – Variables- Type Conversion and Casting- Operators - Arithmetic Operators - Bitwise - Relational Operators - Assignment Operator - The conditional Operator - Operator Precedence- Control Statements – Arrays.
Unit 2	Classes - Objects - Constructors - Overloading method - Static and fixed methods - Inner Classes - String Class- Overriding methods - Using super- Abstract class - this keyword – finalize() method – Garbage Collection.
Unit 3	Packages - Access Protection - Importing Packages - Interfaces - Exception Handling - Throw and Throws-The Java Thread Model- Creating a Thread and Multiple Threads - Thread Priorities Synchronization-Inter thread Communication - Deadlock - Suspending, Resuming and stopping threads – Multithreading-I/O Streams - File Streams - Applets .
Unit 4	Abstract Data Types(ADTs)-List ADT-Array based implementation-linked list implementation-singly linked list-doubly linked list-circular linked list-Stack ADT operations-Applications-Evaluating arithmetic expressions-Conversion of infix to postfix expression-Queue ADT-operations-Applications of Queues
Unit 5	Trees-Binary Trees- representation - Operations on Binary Trees- Traversal of a Binary Tree -Binary Search Trees, Graphs Representation of Graphs - Traversal in Graph -Dijkstra’s Algorithm, Depth-First vs Breadth-First Search

Course Objectives	
Title	**PRACTICAL - III DATA STRUCTURES USING JAVA LAB**
Course Code:	SE231
CO-1	To implement linear and non-linear data structures
CO-2	To understand the different operations of search trees
CO-3	To implement graph traversal algorithms
CO-4	To understand the time and space complexities of data structures
CO-5	To understand evaluation of expressions

Course Outcome	
Title	**PRACTICAL - III DATA STRUCTURES USING JAVA LAB**
Course Code:	SE231
CO-1	Write functions to implement linear and non-linear data structure operations.
CO-2	Suggest appropriate linear and non-linear data structure operations for solving a given problem
CO-3	To implement evaluation of expressions
CO-4	To implement and test time and space complexities of data structures
CO-5	To implement Tree and Graph

Syllabus	
Title	**PRACTICAL - III DATA STRUCTURES USING JAVA LAB**
Course Code:	SE231
Unit 1	Write a Java program to implement the Stack ADT using a singly linked list.
Unit 2	Write a Java program to implement the Queue ADT using a singly linked list.
Unit 3	Write a Java program for the implementation of circular Queue.
Unit 4	Write a Java program that reads an infix expression, converts into postfix form
Unit 5	Write a Java program to evaluate the postfix expression (use stack ADT).

Course Objectives	
Title	**WEB TECHNOLOGY**
Course Code:	SE24A
CO-1	To use PHP and MySQL to develop dynamic web sites for user on the Internet
CO-2	To develop web sites ranging from simple online information forms
CO-3	To develop complex e-commerce sites with MySQL database, building, connectivity, and maintenance
CO-4	To Understand Client Server Concept
CO-5	To Understand Three Tier architecture

Course Outcome	
Title	**WEB TECHNOLOGY**
Course Code:	SE24A
CO-1	Understand the general concepts of PHP scripting language for the development of Internet websites.
CO-2	Understand working with Arrays
CO-3	Understand working with Functions
CO-4	Understand the basic functions of MySQL database program and XML concepts
CO-5	Learn the relationship between the client side and the server side scripts

Syllabus	
Title	**WEB TECHNOLOGY**
Course Code:	SE24A
Unit 1	Introducing PHP – Basic development Concepts – Creating first PHP Scripts – Using Variable and Operators – Storing Data in variable – Understanding Data types – Setting and Checking variables Data types – Using Constants – Manipulating Variables with Operators.
Unit 2	Controlling Program Flow: Writing Simple Conditional Statements - Writing More Complex Conditional Statements – Repeating Action with Loops – Working with String and Numeric Functions
Unit 3	Working with Arrays: Storing Data in Arrays – Processing Arrays with Loops and Iterations – Using Arrays with Forms - Working with Array Functions – Working with Dates and Times
Unit 4	Using Functions and Classes: Creating User-Defined Functions - Creating Classes – Using Advanced OOP Concepts. Working with Files and Directories: Reading Files-Writing Files- Processing Directories.
Unit 5	Working with Database and SQL : Introducing Database and SQL- Using MySQL-Adding and modifying Data Handling Errors – Using SQLite Extension and PDO Extension. Introduction XML - Simple XML and DOM Extension.

Course Objectives	
Title	**PRACTICAL IV WEB TECHNOLOGY LAB**
Course Code:	SE241
CO-1	The objectives of this course are to have a practical understanding about how to write PHP code to solve problems.
CO-2	Display and insert data using PHP and MySQL.
CO-3	Test, debug, and deploy web pages containing PHP and MySQL.
CO-4	It also aims to introduce practical session to develop simple applications using PHP and MySQL
CO-5	To introduce working with XML

Course Outcome	
Title	**PRACTICAL IV WEB TECHNOLOGY LAB**
Course Code:	SE24A
CO-1	On the completion of this laboratory course the students ought to
CO-2	Obtain knowledge and develop application programs using Python.
CO-3	Create dynamic Web applications such as content management, user registration, and e-commerce using PHP and to understand the ability to post and publish a PHP website.
CO-4	Develop a MySQL database and establish connectivity using MySQL.
CO-5	Develop programs using XML

Syllabus	
Title	**PRACTICAL IV WEB TECHNOLOGY LAB**
Course Code:	SE24A
Unit 1	Write a PHP program which adds up columns and rows of given table
Unit 2	Write a PHP program to compute the sum of first n given prime numbers
Unit 3	Write a PHP program to find valid an email address
Unit 4	Write a PHP program to convert a number written in words to digit.
Unit 5	Write a PHP script to delay the program execution for the given number of seconds

Course Objectives	
Title	**COMPUTER NETWORK**
Course Code:	SA15A
CO-1	To understand the concept of Computer network
CO-2	To impart knowledge about networking and inter networking devices
CO-3	To impart knowledge on data link layer
CO-4	To impart knowledge on Transport and Network layer
CO-5	To impart knowledge on Network security

Course Outcome	
Title	**COMPUTER NETWORK**
Course Code:	SA15A
CO-1	Analyze different network models
CO-2	Describe, analyze and compare a number of data link, network and transport layer
CO-3	Analysing key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI
CO-4	Understand IP addressing
CO-5	Understand Client Server model

Syllabus	
Title	**COMPUTER NETWORK**
Course Code:	SA15A
Unit 1	Introduction – Network Hardware - Software - Reference Models - OSI and TCP/IP Models - Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer - Theoretical Basis for Data Communication - Guided Transmission Media.
Unit 2	Wireless Transmission - Communication Satellites - Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues - Error Detection and Correction
Unit 3	Wireless Transmission - Communication Satellites - Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues - Error Detection and Correction
Unit 4	Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms - IP Protocol - IP Addresses - Internet Control Protocols
Unit 5	Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection - Simple Transport Protocol - Internet Transport Protocols (ITP) - Network Security: Cryptography

Course Objectives	
Title	**OPERATING SYSTEM**
Course Code:	SA15B
CO-1	To understand the fundamental concepts and role of Operating System.
CO-2	To learn the Process Management and Scheduling Algorithms
CO-3	To understand the Memory Management policies
CO-4	To gain insight on I/O and File management techniques
CO-5	To understand Protection and Security

Course Outcome	
Title	**OPERATING SYSTEM**
Course Code:	SA15B
CO-1	Understand the structure and functions of Operating System
CO-2	Compare the performance of Scheduling Algorithms
CO-3	Analyze resource management techniques
CO-4	To develop to skill to write program
CO-5	To test and understand Process management

Syllabus	
Title	**OPERATING SYSTEM**
Course Code:	SA15B
Unit 1	Introduction: Views - Types of System - OS Structure – Operations - Services – Interface- System Calls- System Structure - System Design and Implementation. Process Management: Process - Process Scheduling - Inter-process Communication. CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms
Unit 2	Process Synchronization: Critical- Section Problem - Synchronization Hardware Semaphores - Classical Problems of Synchronization - Monitors. Deadlocks: Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery
Unit 3	Memory Management: Hardware - Address Binding – Address Space - Dynamic Loading and Linking – Swapping – Contiguous Allocation - Segmentation - Paging – Structure of the Page Table.
Unit 4	Virtual Memory Management: Demand Paging - Page Replacement Algorithms - Thrashing. File System: File Concept -. Access Methods - Directory and Disk Structure - Protection - File System Structures - Allocation Methods - Free Space Management
Unit 5	/O Systems: Overview - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Transforming 1/0 Requests to Hardware Operations - Performance. System Protection: Goals - Domain - Access matrix. System Security: The Security Problem - Threats – Encryption- User Authentication

Course Objectives	
Title	**RELATIONAL DATABASE MANAGEMENT SYSTEM III YEAR / V SEM**
Course Code:	SA15C
CO-1	Gain a good understanding of the architecture and functioning of Database Management Systems
CO-2	Understand the use of Structured Query Language (SQL) and its syntax.
CO-3	Apply Normalization techniques to normalize a database.
CO-4	Understand the need of transaction processing and learn techniques for controlling the consequences of concurrent data access.
CO-5	Understand PL/SQL

Course Outcome	
Title	**RELATIONAL DATABASE MANAGEMENT SYSTEM III YEAR / V SEM**
Course Code:	SA15C
CO-1	Describe basic concepts of database system
CO-2	Design a Data model and Schemas in RDBMS
CO-3	Competent in use of SQL
CO-4	Analyze functional dependencies for designing robust Database
CO-5	Develop programs using PL/SQL

Syllabus	
Title	**RELATIONAL DATABASE MANAGEMENT SYSTEM III YEAR / V SEM**
Course Code:	SA15C
Unit 1	Introduction to DBMS– Data and Information - Database – Database Management System – Objectives - Advantages – Components - Architecture. ER Model: Building blocks of ER Diagram – Relationship Degree – Classification – ER diagram to Tables – ISA relationship – Constraints – Aggregation and Composition – Advantages
Unit 2	Relational Model: CODD's Rule- Relational Data Model - Key - Integrity – Relational Algebra Operations – Advantages and limitations – Relational Calculus – Domain Relational Calculus - QBE.
Unit 3	Structure of Relational Database. Introduction to Relational Database Design - Objectives – Tools – Redundancy and Data Anomaly – Functional Dependency - Normalization – 1NF – 2NF – 3NF – BCNF. Transaction Processing – Database Security.
Unit 4	SQL: Commands – Data types – DDL - Selection, Projection, Join and Set Operations – Aggregate Functions – DML – Modification - Truncation - Constraints – Subquery.
Unit 5	SQL: Commands – Data types – DDL - Selection, Projection, Join and Set Operations – Aggregate Functions – DML – Modification - Truncation - Constraints – Subquery.

Course Objectives	
Title	**PRACTICAL V OPERATING SYSTEM LAB**
Course Code:	SA151
CO-1	To learn Process management and scheduling.
CO-2	To understand the concepts and implementation of memory management policies.
CO-3	To understand the various issues in Inter Process Communication
CO-4	To understand Deadlocks
CO-5	To understand Basic I/O programming

Course Outcome	
Title	**PRACTICAL V OPERATING SYSTEM LAB**
Course Code:	SA151
CO-1	Understand the process management policies and scheduling process by CPU.
CO-2	Analyze the memory management and its allocation policies.
CO-3	To evaluate the requirement for process synchronization
CO-4	Implement deadlocks
CO-5	Implement Page replacement algorithms

Syllabus	
Title	**PRACTICAL V OPERATING SYSTEM LAB**
Course Code:	SA151
Unit 1	Basic I/O programming. To implement CPU Scheduling Algorithms
Unit 2	Shortest Job First Algorithm
Unit 3	First Come First Served Algorithm
Unit 4	Round Robin and Priority Scheduling Algorithms.
Unit 5	To implement reader/writer problem using semaphore

Course Objectives	
Title	**PRACTICAL - VI PL/SQL LAB**
Course Code:	SA152
CO-1	Learn the various DDL and DML commands
CO-2	Understand queries in SQL to retrieve information from data base
CO-3	Understand PL/SQL statements: Exception Handling, Cursors, and Triggers.
CO-4	Develop database applications using front-end and back-end tools.
CO-5	Understand Curosrs, Triggers

Course Outcome	
Title	**PRACTICAL - VI PL/SQL LAB**
Course Code:	SA152
CO-1	Implement the DDL , DML Commands and Constraints
CO-2	Create, Update and query on the database.
CO-3	Design and Implement simple project with Front End and Back End.
CO-4	Implement Exception Handling
CO-5	Implement SQL queries

Syllabus	
Title	**PRACTICAL - VI PL/SQL LAB**
Course Code:	SA152
Unit 1	DDL commands with constraints
Unit 2	DML Commands with constraints
Unit 3	SQL Queries: Queries, sub queries, Aggregate function
Unit 4	PL/SQL : Exceptional Handling
Unit 5	PL/SQL : Cursor

Course Objectives	
Title	**SOFTWARE ENGINEERING**
Course Code:	SA16A
CO-1	To introduce the software development life cycles
CO-2	To introduce concepts related to structured and objected oriented analysis & design co
CO-3	To provide an insight into UML
CO-4	To introduce different testing tools
CO-5	To understand different requirement analysis

Course Outcome	
Title	**SOFTWARE ENGINEERING**
Course Code:	SA16A
CO-1	The students should be able to specify software requirements,
CO-2	To the students should be able to design the software using tools
CO-3	To write test cases using different testing techniques
CO-4	To test testing tools
CO-5	Analyze different software models

Syllabus	
Title	**SOFTWARE ENGINEERING**
Course Code:	SA16A
Unit 1	Introduction – Evolution – Software Development projects – Emergence of Software Engineering. Software Life cycle models – Waterfall model – Rapid Application Development – Agile Model – Spiral Model
Unit 2	Requirement Analysis and Specification – Gathering and Analysis – SRS – Formal System
Unit 3	Software Design – Overview – Characteristics – Cohesion & Coupling – Layered design – Approaches Function Oriented Design – Structured Analysis – DFD – Structured Design – Detailed design
Unit 4	Object Modeling using UML – OO concepts – UML – Diagrams – Use case, Class, Interaction, Activity, State Chart – Postscript
Unit 5	Coding & Testing – coding – Review – Documentation – Testing – Black-box, White-box, Integration, OO Testing, Smoke testing

Course Objectives	
Title	**INTRODUCTION TO DATA SCIENCE**
Course Code:	SA16B
CO-1	To introduce the concepts, techniques and tools with respect to data science practice, including data collection and integration
CO-2	To explore data analysis
CO-3	To understand predictive modeling and descriptive modeling
CO-4	To understand effective communication.
CO-5	To understand Machine learning

Course Outcome	
Title	**INTRODUCTION TO DATA SCIENCE**
Course Code:	SA16B
CO-1	To describe what Data Science is
CO-2	To describe what Statistical Inference means
CO-3	Identify probability distributions
CO-4	Understand to fit a model to data and use tools
CO-5	To understand basic analysis and communication

Syllabus	
Title	**INTRODUCTION TO DATA SCIENCE**
Course Code:	SA16B
Unit 1	Introduction to Data Science – Benefits and uses – Facets of data – Data science process – Big data ecosystem and data science
Unit 2	The Data science process – Overview – research goals - retrieving data - transformation – Exploratory Data Analysis – Model building
Unit 3	Algorithms - Machine learning algorithms – Modeling process – Types – Supervised – Unsupervised - Semi-supervised
Unit 4	Introduction to Hadoop – framework – Spark – replacing MapReduce– NoSQL – ACID – CAP – BASE – types
Unit 5	Case Study – Prediction of Disease - Setting research goals - Data retrieval – preparation - exploration - Disease profiling - presentation and automation

Course Objectives	
Title	**INTRODUCTION TO CLOUD COMPUTING III YEAR /V I SEM**
Course Code:	SA16C
CO-1	To understand the concepts in Cloud Computing
CO-2	To understand Security in cloud computing
CO-3	To understand the evolving computer model caned cloud computing.
CO-4	To introduce the various levels of services that can be achieved by cloud.
CO-5	To understand Cloud services

Course Outcome	
Title	**INTRODUCTION TO CLOUD COMPUTING III YEAR /V I SEM**
Course Code:	SA16C
CO-1	To explain and apply levels of services of Cloud
CO-2	To describe the security aspects in cloud.
CO-3	To understand Data storage in Cloud
CO-4	To understand Cloud computing tools
CO-5	To understand Cloud Applications

Syllabus	
Title	**INTRODUCTION TO CLOUD COMPUTING III YEAR /V I SEM**
Course Code:	SA16C
Unit 1	Cloud Computing Foundation: Introduction to Cloud Computing – Move to Cloud Computing – Types of Cloud – Working of Cloud Computing
Unit 2	Cloud Computing Architecture : Cloud Computing Technology – Cloud Architecture – Cloud Modeling and Design - Virtualization : Foundation – Grid, Cloud and Virtualization – Virtualization and Cloud Computing
Unit 3	Data Storage and Cloud Computing : Data Storage – Cloud Storage – Cloud Storage from LANs to WANs – Cloud Computing Services : Cloud Services – Cloud Computing at Work
Unit 4	Cloud Computing and Security : Risks in Cloud Computing – Data Security in Cloud – Cloud Security Services – Cloud Computing Tools : Tools and Technologies for Cloud – Cloud Mashaps – Apache Hadoop – Cloud Tools
Unit 5	Cloud Applications – Moving Applications to the Cloud – Microsoft Cloud Services – Google Cloud Applications – Amazon Cloud Services – Cloud Applications

Course Objectives	
Title	**CASE TOOLS AND TESTING**
Course Code:	SA161
CO-1	To get familiarized to the usage of UML tool kit.
CO-2	To understand the requirements of the software
CO-3	To map them appropriately to subsequent phases of the software development
CO-4	To develop the ability to verify
CO-5	To validate their designs

Course Outcome	
Title	**CASE TOOLS AND TESTING**
Course Code:	SA161
CO-1	Students must be able to analyze the problem
CO-2	Students must design the problem at hand.
CO-3	Students solve different problems
CO-4	Students should be able to use UML tools for the designing the software
CO-5	Students be able to test the correctness and soundness of their software through testing tools

Course Objectives	
Title	**ELECTIVE I ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM III YEAR / V SEM**
Course Code:	SEE5A
CO-1	To Acquire Knowledge on various AI Techniques
CO-2	To acquire Knowledge on Expert Systems
CO-3	To have enriched knowledge regarding heuristic search
CO-4	To understand Predicate Logic
CO-5	To understand Knowledge representation and Expert systems

Course Outcome	
Title	**ELECTIVE I ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM III YEAR / V SEM**
Course Code:	SEE5A
CO-1	Gain a working knowledge of the foundations of and modern applications in, artificial intelligence
CO-2	Understand heuristic search, knowledge representation and logic
CO-3	To solve AI problems
CO-4	Ability to understand Reasoning
CO-5	Ability to understand issues in Knowledge representation

Syllabus	
Title	**ELECTIVE I ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM III YEAR / V SEM**
Course Code:	SEE5A
Unit 1	Introduction: AI Problems – AI techniques – Criteria for success. Problems, Problem Spaces, Search: State space search – Production Systems – Problem Characteristics – Issues in design of Search
Unit 2	Heuristic Search techniques: Generate and Test – Hill Climbing – Best-Fist, Problem Reduction, Constraint Satisfaction, Means-end analysis
Unit 3	Knowledge representation issues: Representations and mappings – Approaches to Knowledge representations – Issues in Knowledge representations – Frame Problem
Unit 4	Using Predicate Logic: Representing simple facts in logic – Representing Instance and Isa relationships – Computable functions and predicates – Resolution – Natural deduction
Unit 5	Representing knowledge using rules: Procedural Vs Declarative knowledge – Logic programming – Forward Vs Backward reasoning – Matching – Control knowledge Brief explanation of Expert Systems-Definition- Characteristics-architecture Knowledge Engineering- Expert System Life Cycle-Knowledge Acquisition Strategies- Expert System Tools

Course Objectives	
Title	**GRAPHICS AND VISUALIZATION**
Course Code:	SEE5B
CO-1	To introduce theoretical concepts behind computer graphics
CO-2	Overview of interactive computer Graphics
CO-3	Learn about two and three dimensional graphics
CO-4	Understand the concept of clipping and windowing
CO-5	To introduce the algorithms, tools and techniques for implementing the same

Course Outcome	
Title	**GRAPHICS AND VISUALIZATION**
Course Code:	SEE5B
CO-1	Know the principles of Display devices
CO-2	Understand various algorithms to scan, convert and basic geometrical primitives, transformations
CO-3	Understand Area filling and clipping.
CO-4	Capture the significances of viewing and projections.
CO-5	Define the fundamentals of 2D, 3D and color models

Syllabus	
Title	**GRAPHICS AND VISUALIZATION**
Course Code:	SEE5B
Unit 1	Introduction – Display devices – Hard copy devices – Interactive input devices – display processors -graphics software – O/P primitives – line drawing algorithm – DDA- Bresenham's – anti aliasing of lines – line command – circle drawing algorithm
Unit 2	Attributes of output primitives – line style – color and intensity- Character attributes – Two dimensional transformations - basic and composite transformation – matrix representation – other transformation
Unit 3	Windowing and Clipping: windowing concepts – window to view port transformation – Clipping – line – polygon clipping
Unit 4	Interactive Input methods - Physical input devices – Logical classification of input devices – Interactive picture construction techniques – Input functions
Unit 5	Three dimensional concepts – Display methods – Three dimensional Geometric and Modeling transformations – Other transformations – 3D viewing – Projections – animation-Visible surface detection methods-classification of visible-surface detection Algorithms-Blackface detection-Depth buffer method-Scan line method-Color models and Color Applications

Course Objectives	
Title	**ELECTIVE - I NETWORK SECURITY III YEAR / V SEM**
Course Code:	SEE5C
CO-1	To Understand OSI security architecture
CO-2	To acquire fundamental knowledge on the concepts of finite fields and number theory
CO-3	To Understand various block cipher and stream cipher models
CO-4	To understand the principles of symmetric &public key cryptosystems
CO-5	To learn the system security practices.

Course Outcome	
Title	**ELECTIVE - I NETWORK SECURITY III YEAR / V SEM**
Course Code:	SEE5C
CO-1	Compare various Cryptographic Techniques
CO-2	To implement RSA
CO-3	To implement Hash functions
CO-4	Design simple applications
CO-5	Design Secure applications

Syllabus	
Title	**ELECTIVE - I NETWORK SECURITY III YEAR / V SEM**
Course Code:	SEE5C
Unit 1	OSI Security Architecture – Security attacks, services and mechanisms – Network security Model – Classical encryption techniques: Symmetric cipher model, Substitution techniques – Transposition techniques – Rotor machines – Steganography
Unit 2	Number theory and finite fields: The Euclidean algorithm – Modular arithmetic - Groups, Rings and Fields – Finite fields of the Form GF (p) – Polynomial arithmetic – prime numbers – Fermat's and eulers theorems
Unit 3	Block Ciphers and Data Encryption Standard: Traditional block cipher structure – Data Encryption – Strengths of DES – Block Cipher Design Principles – Advanced Encryption Standard – AES structure – AES transformation functions – AES Key expansion – implementation
Unit 4	Public Key Cryptography and RSA – Principles of Public-key Crypto systems – RSA algorithm - Diffie – Hellman Key exchange - Elgamal Cryptographic System
Unit 5	Hash functions – Applications – two simple hash functions – Hash functions based on Cipher block chaining - Secure Hash Algorithm (SHA)

Course Objectives	
Title	**ELECTIVE - II MOBILE COMPUTING III YEAR / VI SEM**
Course Code:	SEE6A
CO-1	To make the student understand the concepts of mobile computing
CO-2	To be familiar with the network protocol stack
CO-3	To be exposed to Ad-Hoc networks Gain knowledge about different mobile platforms
CO-4	To be exposed to application development
CO-5	To understand Mobile OS

Course Outcome	
Title	**ELECTIVE - II MOBILE COMPUTING III YEAR / VI SEM**
Course Code:	SEE6A
CO-1	Explain the basics of mobile telecommunication system.
CO-2	Choose the required functionality at each layer for given application.
CO-3	Use simulator tools and design Ad hoc networks and develop a mobile application.
CO-4	Ability to understand security issues
CO-5	Ability to understand Routing protocols

Syllabus	
Title	**ELECTIVE - II MOBILE COMPUTING III YEAR / VI SEM**
Course Code:	SEE6A
Unit 1	Introduction-Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.
Unit 2	Mobile Internet Protocol and Transport Layer-Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance.
Unit 3	Mobile Telecommunication System-Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Tele communication System (UMTS).
Unit 4	Mobile Ad-Hoc Networks-Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols –Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET Vs VANET –Security.
Unit 5	Mobile Platforms and Applications-Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – M-Commerce – Structure– Pros & Cons – Mobile Payment System – Security Issues.

Course Objectives	
Title	**ELECTIVE - II IOT AND ITS APPLICATIONS III YEAR / VI SEM**
Course Code:	SEE6B
CO-1	To understand the concepts of Internet of Things
CO-2	To understand the application of IoT.
CO-3	To Determine the Market perspective of IoT.
CO-4	To Understand the vision of IoT from a global context
CO-5	To understand security and governance

Course Outcome	
Title	**ELECTIVE - II IOT AND ITS APPLICATIONS III YEAR / VI SEM**
Course Code:	SEE6B
CO-1	Use of Devices, Gateways and Data Management in IoT.
CO-2	Design IoT applications in different domain
CO-3	Design to analyze the performance of IoT application
CO-4	Implement basic IoT applications on embedded platform.
CO-5	Implement to understand the basic architecture

Syllabus	
Title	**ELECTIVE - II IOT AND ITS APPLICATIONS III YEAR / VI SEM**
Course Code:	SEE6B
Unit 1	IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.
Unit 2	M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.
Unit 3	IoT Architecture -State of the Art – Introduction, State of the art, Architecture. Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.
Unit 4	IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and GasIndustry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.
Unit 5	Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security

Course Objectives	
Title	**ELECTIVE - II BLOCK CHAIN TECHNOLOGY III YEAR / VI SEM**
Course Code:	SEE6C
CO-1	To understand the concepts of block chain technology
CO-2	To understand the consensus and hyper ledger fabric in block chain technology.
CO-3	To understand Block chain in Finance
CO-4	To understand Block chain in Government
CO-5	To understand Block chain security

Course Outcome	
Title	**ELECTIVE - II BLOCK CHAIN TECHNOLOGY III YEAR / VI SEM**
Course Code:	SEE6C
CO-1	State the basic concepts of block chain
CO-2	Paraphrase the list of consensus
CO-3	Demonstrate and Interpret working of Hyper ledger Fabric
CO-4	Implement SDK composer tool
CO-5	Explain the Digital identity for government

Syllabus	
Title	**ELECTIVE - II BLOCK CHAIN TECHNOLOGY III YEAR / VI SEM**
Course Code:	SEE6C
Unit 1	History: Digital Money to Distributed Ledgers -Design Primitives: Protocols, Security, Consensus, Permissions, Privacy- : Block chain Architecture and Design-Basic crypto primitives: Hash, Signature-Hash chain to Block chain-Basic consensus mechanisms.
Unit 2	Requirements for the consensus protocols-Proof of Work (PoW)-Scalability aspects of Block chain consensus protocols**:** Permissioned Block chains-Design goals-Consensus protocols for Permissioned Block chains.
Unit 3	Decomposing the consensus process-Hyper ledger fabric components-Chain code Design and Implementation: Hyper ledger Fabric II:-Beyond Chain code: fabric SDK and Front End-Hyper ledger composer tool.
Unit 4	Block chain in Financial Software and Systems (FSS): -Settlements, -KYC, -Capital markets-Insurance- Block chain in trade/supply chain: Provenance of goods, visibility, trade/supply chain finance, invoice management/discounting.
Unit 5	Block chain for Government: Digital identity, land records and other kinds of record keeping between government entities, public distribution system / social welfare systems: Block chain Cryptography: Privacy and Security on Block chain.

JAYA COLLEGE OF ARTS AND SCIENCE
(AFFILIATED TO UNIVERSITY OF MADRAS)
THIRUNINRAVUR – 602024
DEPARTMENT OF MATHEMATICS

Program : B.ScMathematics

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	To acquire the basic mathematical knowledge which will provide the students with a strong foundation for further study in Mathematics
PO-2	To develop fundamental mathematical skills and ability for independent mathematical learning and reasoning.
PO-3	Acquire knowledge in functional areas of mathematics and apply in all the fields of learning.
PO-4	Develop critical thinking, creative thinking, and self-confidence for eventual success in carrier.
PO-5	To meet the current problems in various areas of mathematics.

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Ability to acquire knowledge of algebra, calculus, Differential Equations, Analysis (Real and Complex) and several other branches of Mathematics. Also it leads to study of related areas like computer science and physical sciences
PSO-2	Enabling students to develop a positive attitude towards Mathematics as an interesting and valuable subject of study.
PSO-3	Acquire good knowledge and understanding in advance areas of mathematics and its application.
PSO-4	Ability to pursue advanced studies and Research in pure and applied mathematical sciences.
PSO-5	Acquire basic practical skills and technical knowledge along with domain knowledge different subject in science stream.

Course Objectives	
Title	**ALGEBRA**
Course Code	**SM21A**
CO-1	The aim of teaching algebra in to help in expression of abstruct ideals.
CO-2	Teaching of Algebra should enable the students to use in the solution of some of the stiff problems in arithmetric.
CO-3	Graph linear, power root, reciprocal, absolute value, polynomial rational, exponential logarithmic functions using basic transformations.
CO-4	Use mathematical vocabulary and symbols in order to understand, interpret and represent mathematical informations.
CO-5	Gain knowledge on reciprocal equation

Course Outcome	
Title	**ALGEBRA**
Course Code	**SM21A**
CO-1	Students will acquire basic ideas in theory of equations, Matrices and theory of Numbers.
CO-2	Knowledge to solve theoretical and applied problems
CO-3	Use algebra methods to solve a variety of problems involving exponential, logarithmic, polynomial and rational functions.
CO-4	Graph solutions sets of systems of inequalities.
CO-5	Use numeric or variable substitution while working with expressions.

Syllabus	
Title	**ALGEBRA**
Course Code	**SM21A**
Unit 1	TheoryofEquations: PolynomialequationswithImaginaryandirrationalroots-Relationbetweenrootsandcoefficients-Symmetricfunctionsofrootsintermsofcoefficients. Chapter6:Section9to12.
Unit 2	Reciprocal equations-Standardform-IncreaseorDecreasethe roots of the givenequation-RemovaloftermsApproximatesolutionsofrootsofpolynomialsbyHorner'smethod. Chapter6:section16,16.1,16.2,17,and 30.
Unit 3	SummationofSeries:Binomial-Exponential-Logarithmicseries(Theoremswithoutproof):Chapter3:Section10, Chapter4:Section3,3.1,3.5,3.6,3.7(omit3.4)
Unit 4	Symmetric-SkewSymmetric-Hermit Ian-SkewHermit Ian-OrthogonalMatrices-Eigenvalues&EigenVectors-Similarmatrices-Clayey-HamiltonTheorem. Chapter 2:Section6.1to6.3,9.1,9.2,16,16.1,16.2,16.3.
Unit 5	PrimenumberandCompositenumber-DivisorsofagivennumberN-Euler'sfunction(withoutproof)-Integralpartofa realnumber-congruences.Chapter5:Section1to13.

Course Objectives	
Title	**DIFFERENTIAL CALCULUS**
Course Code	**SM21B**
CO-1	Differential calculus then enables us to find the limit of elasticity in the interval of rapid changes of deformation
CO-2	To provide students with an introduction to the theory of ordinary differential equations through applications, methods of solution.
CO-3	Compute limits, derivatives and integrals.
CO-4	Recognize the appropriate tools of calculus to solve applied problems.
CO-5	By using a derivative equation that describes the rate of change of a function.

Course Outcome	
Title	**DIFFERENTIAL CALCULUS**
Course Code	**SM21B**
CO-1	Gain knowledge of fundamental concepts of real numbers.
CO-2	Introduction to sequences and series.
CO-3	Learn about check function is continuous the consequences of the intermediate value theorem for continuous functions.
CO-4	Introduction to Ordinary Differential Equations.
CO-5	Introduction to partial differential equations

Syllabus	
Title	**DIFFERENTIAL CALCULUS**
Course Code	**SM21B**
Unit 1	Successive differentiation - n^{th} derivative- standard results – Trigonometrically transformation – formationofequationsusingderivatives- Leibnitz'stheoremanditsapplications Chapter3section1.1to1.6,2.1and2.2
Unit 2	Total differential of a function – special cases – implicit functions - partial derivatives of afunction of two functions - Maxima and Minima of functions of two variables- Lagrange'smethodofundeterminedmultipliers. Chapter8:Section1.3to1.5and1.7,Section4,4.1and5.
Unit 3	Envelopes – method of finding envelopes – Curvature- circle, radius and centre of curvature-Cartesian formula for radius of curvature – coordinates of the centre of curvature – evaluate-andinvoluteradiusofcurvatureandcentreofcurvatureinpolarcoordinates –p-requation
Unit 4	Polar coordinates - angle between the radius vector and the tangent – slope of the tangent in thepolar coordinates – the angle of intersection of two curves in polar coordinates- polar subtangentandpolarsubnormalthelengthofarcinpolarcoordinates.
Unit 5	Definition-Asymptotesparalleltotheaxes–specialcases– anothermethodforfindingasymptotes -asymptotesbyinspection – intersectionofa curvewithanasymptote.

Course Objectives	
Title	**CALCULUS OF FINITE DIFFIERENCE AND NUMERCIAL ANALYSIS-I**
Course Code	**SM3AB**
CO-1	Understand the finite differences.
CO-2	Illustrate the operators “E” and relation between them.
CO-3	Describe the solutions of simultaneous linear equations.
CO-4	Helps in learning interpolation techniques

Course Outcome	
Title	**CALCULUS OF FINITE DIFFIERENCE AND NUMERCIAL ANALYSIS-I**
Course Code	**SM3AB**
CO-1	To acquire knowledge about Numerical techniques.
CO-2	To acquire knowledge about Numerical techniques.
CO-3	To understand the transcendental equations.
CO-4	To analyze knowledge about interpolation using difference formula.
CO-5	Able to know the important of “E” operators.

Syllabus	
Title	**CALCULUS OF FINITE DIFFIERENCE AND NUMERCIAL ANALYSIS-I**
Course Code	**SM3AB**
Unit 1	Solutionsofalgebraicandtranscendentalequations:Bisectionmethod-Iterationmethod-Regula-falsimethod-Newton-Rap sonmethod.-Chapter 1:Section1.1-1.4
Unit 2	Solutions of Simultaneous Linear Equations: Gauss-Elimination method, Gauss-Jordan method,Croute'smethod,Gauss-Seidel method.-Chapter2:Section2.1-2.4,2.6
Unit 3	Finite Differences: E operators and relation between them-Differences of a polynomial-Factorialpolynomials-inverseoperator□$^{-1}$-SummationSeries.-Chapter3: Section3.1to3.4,3.6,3.7.
Unit 4	InterpolationwithEqualIntervals: Newton'sForwardandBackwardInterpolationformulae- Central Differences Formulae: Gauss-Forward and Backward Formulae- Stirling's Formula andBessel'sFormula-Equidistanttermswithoneor moremissingvalues. Chapter4: Section4.1-4.3(omit4.1a,4.4),4.7. -Chapter5: Section5.1-5.6.
Unit 5	InterpolationwithUnequalIntervals:DividedDifferencesNewton'sDividedDifferencesFormulaforInterpolationLagrange'sFormulaforInterpolation-InverseInterpolation-Lagrange'smethod-ReversionofSeriesmethod.- Chapter 6: Section6.1,6.2,6.5,6.7.

Course Objectives	
Title	**TRIGONOMETRY**
Course Code	**SM22A**
CO-1	Discover the need for working with triangles.
CO-2	Understand the angles, slopes.
CO-3	Evaluate the sin trigonometric functions for a given angle.
CO-4	Evaluate the sin trigonometric functions for a given angle.
CO-5	Students will be recognize and use the angle.

Course Outcome	
Title	**TRIGONOMETRY**
Course Code	**SM22A**
CO-1	About the expansion of Trigonometric functions, Hyperbolic functions and sum of Trigonometric series.
CO-2	Convert between decimal degree, minute-seconds and radian measures of an angle.
CO-3	Evaluate the 6 trigonometric functions using a calculators as well as determining exact values for some special angles without a calculator.
CO-4	Solve triangle (right, acute, obtuse) given various angles and sides.
CO-5	Demonstrate knowledge of several trigonometric Identities and use them to verify other Identities.

Syllabus	
Title	**TRIGONOMETRY**
Course Code	**SM22A**
Unit 1	Expansionsofpowersofsin,cost - Expansionsofcon^{s},sin,cos$^{m}\theta$sin$^{n}\theta$Chapter2,Section2 .1,2.1.1,2.1.2,2.1.3
Unit 2	Expansionsofsin,cons,tanno-Expansions oftan($\theta_1+\theta_2+$ .....+i_n)-Expansionsofsincost,taxintermsofx-Sumofrootsoftrigonometricequations–Formationofequationwithtrigonometric roots.Chapter3,Section3.1to3.6
Unit 3	Hyperbolicfunctions-Relationbetweencircularandhyperbolicfunctions-Formulasinhyperbolicfunctions–InversehyperbolicfunctionsChapter4,Section4.1to 4.7.
Unit 4	Inversefunctionofexponentialfunctions–ValuesofLog(unit)-Complexindex. Chapter5,Section5.1to5.3
Unit 5	SumsofTrigonometric series–Applicationsofbinomial, exponential,,logarithmicandGregory'sseries-Differencemethod.Chapter6,Section6.1to6.6.3

Course Objectives	
Title	**INTERGAL CALCULUS AND VECTOR ANALYSIS**
Course Code	**SM22B**
CO-1	Students will acquire knowledge about integration and its geometrical application
CO-2	Double, triple integral and improper integral.
CO-3	Vector differentiation and vector integration.
CO-4	Graphically obtain the surface of revolution of curves.
CO-5	Problem in a variety of ways ranging complies and limits, derivatives and integrals.

Course Outcome	
Title	**INTERGAL CALCULUS AND VECTOR ANALYSIS**
Course Code	**SM22B**
CO-1	In calculus we use three main tools for analyzing and describing the behavior of functions limits derivation integrals.
CO-2	Students solve the applications problem in a variety of ways ranging complies and limits, derivatives and integrals.
CO-3	Understand the nature of hyperbolic functions.
CO-4	Solve various limit problems using Hospital rule.
CO-5	Helps in learning multiple integrals

Syllabus	
Title	**INTERGAL CALCULUS AND VECTOR ANALYSIS**
Course Code	**SM22B**
Unit 1	Reductionformulae–Types,$\int x^n e^{ax} dx$, $\int x^n cosaxdx$, $\int x^n sinaxdx$,$\int cos^n xdx$,$\int sIn^n xdx$, $\int sIn^m x cos^n xdx$, $\int tan^n xdx$, $\int cot^n xdx$,$\int sec^n xdx$,$\int cosec^n xdx$, Chapter 1 Section13,13.1to13.10, 14, 15.1.
Unit 2	Chapter5Section1,2.1,2.2,3.1,4,6.1,6.2,6.3,7 Chapter6Section1.1,1.2,2.1to2.4. MultipleIntegrals-definitionofthedoubleintegrals-evaluationofthedoubleintegrals-doubleintegralsinpolarcoordinates–tripleintegrals–applicationsofmultipleintegrals –Volumesofsolidsofrevolution–areasofcurvedsurfaces–changeofvariables–Jacobins.
Unit 3	BetaandGammafunctions-infiniteintegral–definitions–recurrenceformulaof□functions-propertiesof□-functions -relationbetween □and□ functions. Chapter7Sections1.1to1.4,2.1,2.3,3,4,5
Unit 4	Introduction - directional derivative- Gradient- divergence-curl- Palladian Differential Operator.Chapter2Sections 2.1-2.13.
Unit 5	Line,surfaceandvolumeintegrals-IntegralTheorems-Gauss,GreensandStokes(Withoutproof)–Problems. Chapter 3Sections3.1to3.6 andChapter4Sections4.1 to4.5.

Course Objectives	
Title	**CALCULUS OF FINITE DIFFIERENCE AND NUMERCIAL ANALYSIS-2**
Course Code	**SM3AF**
CO-1	To make students aware of the concepts of numerical methods necessary for solving complicated mathematical problems numerically
CO-2	Interpolation and approximation
CO-3	Numerical differentiation, Numerical Integration, Gauss quadrature
CO-4	Initial and boundary value problem in ODE,
CO-5	Numerical solution of PDE by Finite difference method**.**

Course Outcome	
Title	**CALCULUS OF FINITE DIFFIERENCE AND NUMERCIAL ANALYSIS-2**
Course Code	**SM3AF**
CO-1	Understand the concepts of finite difference, interpolation, extrapolation and approximation
CO-2	Learn various techniques of getting numerical solution of system of linear equation and check the accuracy of the solution.
CO-3	Obtain numerical solution of algebraic and transcendental equations.
CO-4	Apply numerical methods to diverse situations in physics, engineering and in the other mathematical contexts.
CO-5	Helps to learn numerical differentiation and integration

Syllabus	
Title	**CALCULUS OF FINITE DIFFIERENCE AND NUMERCIAL ANALYSIS-2**
Course Code	**SM3AF**
Unit 1	NumericalDifferentiation:DerivativesusingNewton'sforwardandbackwarddifferenceformulae-DerivativesusingStirling'sformula-Derivativesusingdivideddifferenceformula-Maxima andMinimausingtheaboveformulae. Chapter7: Section7.1-7.4,7.6.
Unit 2	Numerical Integration: General Quadrature formula- Trapezoidal rule-Simpson's one-third rule-Simpson'sthree-eighthrule-Weddle'srule-Euler-McLaurinSummationformula-Stirling'sformulaforn!.-Chapter7: Section7.7-7.9,7.13-7.15.
Unit 3	Difference equations: Linear homogenous and nonhomogeneous difference equation with constantcoefficients-particularintegralsfor$a^{u}x^{m}$,x^{m},$sinkx$,$coskx$.Chapter8:Section8.1-8.4,8.6
Unit 4	NumericalsolutionofOrdinaryDifferentialEquations(Iorderonly): Taylor'sseriesmethod-Picard'smethod-Euler'smethod-ModifiedEuler'smethod.Chapter9:Section 9.5-9.7,9.9.
Unit 5	NumericalsolutionofOrdinaryDifferentialEquations(Iorderonly): Range – kuttamethod (fourthorderonly)-Predictor-Correctormethod-Milne'smethod-Adams-Bash forthmethod. Chapter9:Section9.10-9.14.

Course Objectives	
Title	**ANALYTICAL GEOMETRY**
Course Code	SM3AG
CO-1	Describe the two dimensional shapes.
CO-2	Describe the three dimensional shapes.
CO-3	Illustrate the system of planes.
CO-4	Understand the representation of a line.
CO-5	Understand the develop mathematical arguments

Course Outcome	
Title	**ANALYTICAL GEOMETRY**
Course Code	SM3AG
CO-1	Able to analyse characteristic and properties of two dimensional geometric shapes.
CO-2	To analyse characteristics and properties of three dimensional geometric shapes.
CO-3	To develop mathematical arguments.
CO-4	To understand about geometric relationships.
CO-5	Understand the geometry and its applications in real world.

Syllabus	
Title	**ANALYTICAL GEOMETRY**
Course Code	SM3AG
Unit 1	Chord of contact – polar and pole,- conjugate points and conjugate lines –chord with(x_1,y_1) asits midpoint–diameters conjugate diameters of an ellipse.-semidiameters-conjugate diameters of hyperbola Chapter7:Sections7.1to7.3,Chapter–8Section8.1to8.5.
Unit 2	Polar coordinates: General polar equation of straight line– Polar equation of a circle on A_1A_2 as diameter, Equation of a straight line, circle, conic– Equation of chord, tangent, normal. Equations of the a symptotes of a hyperbola. Chapter10:Sec10.1to10.8.
Unit 3	Introduction–System of Planes-Length of the perpendicular– Orthogonalprojection.Chapter2Sec2.1to2.10.
Unit 4	Representationofline–anglebetweenalineandaplane-co-planarlines-shortestdistance2skewlines-Lengthoftheperpendicular-intersectionofthreeplanes Chapter3: Sec3.1to3.8.
Unit 5	zEquation of a sphere-general equation -section of a sphereby a plane-equation of thecircle - tangent plane - angle of intersection of two spheres- condition for the orthogonally -radicalplane. Chapter6:Sec6.1to6.8.

Course Objectives	
Title	**DIFFERENTIAL EQUATIONS**
Course Code	**SM23B**
CO-1	To provide the students with an introduction to the theory of ODE through applications
CO-2	Methods of solutions and Numerical approximation
CO-3	Describe the solutions and Numerical approximation
CO-4	Goal is to solve an ODE problems.
CO-5	To determine what function or functions satisfy the equations'

Course Outcome	
Title	**DIFFERENTIAL EQUATIONS**
Course Code	**SM23B**
CO-1	Understand the mathematical principles on ordinary differential equations would provide then the ability of formulate.
CO-2	Understand how to solve the given standard partial differential equations.
CO-3	Solve differential equations, Using Lagrange's analysis which plays a viral solve mathematical applications.
CO-4	Appreciate the physical significance of differential equations one and two dimensional equations
CO-5	Solve the given exact equation on a successful different ion with such conditions

Syllabus	
Title	**DIFFERENTIAL EQUATIONS**
Course Code	**SM23B**
Unit 1	Ordinary Differential Equations: Variable separable-Homogeneous Equation-Non-HomogeneousEquations of first degree in x and y-Linear Equation-Bernoulli's Equation-Exact differentialequations. Chapter2:Section1to6.
Unit 2	Equation of first order but not of higher degree: Equation solvable for dye/dx- Equation solvablefory-Equationsolvableforx-Claimantsform-LinearEquationswithconstantcoefficients-Particularintegralse^{Fax},syntax,coax,a^{m},Ve^{x}whereVissyntaxorcoaxorh^{am}.Chapter4:Section1,2.1,2.2,3.1.Chapter5:Section4.
Unit 3	Simultaneous linear differential equations- Linear Equations of the Second Order -Completesolutionintermsofaknownintegrals-ReductiontotheNormalform-ChangeoftheIndependentVariable-MethodofVariationofParameters.Chapter6:Section-6Chapter8: Section-1,2,3,4.
Unit 4	Partial differential equation: Formation of PDE by Eliminating arbitrary constants and arbitraryfunctions-completeintegral-singularintegral-Generalintegral-Lagrange'sLinearEquationsPp+Qq=Chapter12:Section-1,2,3.1,3.2,4.
Unit 5	Specialmethods-Standardforms-Chariot'sMethods- RelatedproblemsChapter12:Section-5.1,5.2,5.3,5.4,6.

Course Objectives	
Title	**MATHEMATICAL STATSITICS-1**
Course Code	**SM3AC**
CO-1	Understand the survey concepts and planning of a survey.
CO-2	Students should be familiar with terminology and special notations.
CO-3	Demonstrate completion of this course students will be able to properties of statistical models in common use.
CO-4	Sample, population
CO-5	Ratio discrete variable continuous correlation methods variable.

Course Outcome	
Title	**MATHEMATICAL STATSITICS-1**
Course Code	**SM3AC**
CO-1	Demonstrate completion of this course students will be able to properties of statistical models in common use.
CO-2	Understanding the survey concepts and planning of a survey.
CO-3	Understanding knowledge of applicable large sample theory of estimators and tests.
CO-4	Understand to construct tests and estimators, and derive their properties.
CO-5	Understand the interpret the sign test and sum rank test.

Syllabus	
Title	**MATHEMATICAL STATSITICS-1**
Course Code	**SM3AC**
Unit 1	Concept of sample space- Events- Definition of Probability (Classical, Statistical& Axiomatic)-Addition and Multiplication laws of Probability- Independence- Conditional Probability-Bayer'stheorem– SimpleProblems.
Unit 2	RandomVariables(DiscreteandContinuous)Distributionfunction-ExpectedvaluesandMoments-Momentgenerating function–Probabilitygeneratingfunction-Examples.
Unit 3	Characteristic function- Uniqueness and Inversion theorems (Statements and applications only)-Cumulates-Chebychev'sInequality–SimpleProblems.
Unit 4	Conceptsofbivariatedistributions-CorrelationandRegression-LinearPrediction-RankCorrelationcoefficient-Conceptsofpartialandmultiplecorrelationcoefficients-Simpleproblems.
Unit 5	StandardDistributions–Binomial-Poisson-Normal-Uniformdistributions-Geometric-Exponential-Gamma-Betadistributions-Interrelationshipbetweendistributions.

Course Objectives	
Title	**TRANSFORMS TECHNIQUES**
Course Code	**SM24A**
CO-1	Express non periodic function to periodic functions using Fourier series and Fourier transforms.
CO-2	Apply Laplace Transforms and Z-transforms
CO-3	To solve partial differential equations.
CO-4	Helps to learn infinite Fourier transforms
CO-5	To solve differential equations. Formulate

Course Outcome	
Title	**TRANSFORMS TECHNIQUES**
Course Code	**SM24A**
CO-1	Learn how to use Laplace Transforms methods to solve differential equations such as ode and pie
CO-2	Learn the required conditions for transforming variable or variables in functions by the Laplace transforms
CO-3	To reduce a linear Differential equation to an algebraic equations which can then be solved by the formal rules of algebra.
CO-4	To understand Fourier series representation of periodic singles.
CO-5	Helps to learn about signals and system analysis

Syllabus	
Title	**TRANSFORMS TECHNIQUES**
Course Code	**SM24A**
Unit 1	TheLaplaceTransforms-Definitions-SufficientconditionsfortheexistenceoftheLaplacetransform (withoutproof)-Laplacetransformofperiodicfunctions-somegeneraltheorems-evaluationofintegralsusingLaplace transform-Problems **Chapter5:Section-1to5.**
Unit 2	The inverse Laplace Transforms-Applications of Laplace Transforms to ordinarydifferentialequationswithconstantco-efficientandvariableco-efficient,simultaneousequationsandequationsinvolvingintegrals-Problems. Chapter5:Section-6to12.
Unit 3	Fourier series- Expansion ofperiodic functions of period 2π-Expansion of even andoddfunctions,Halfrange Fourierseries-Change ofintervals–Problems.
Unit 4	Fourier Transform- Infinite Fourier Transform(Complex form) – Properties of FourierTransform –Fourier cosine andFourier sine Transform – Properties – Perceval's identity –Convolutiontheorem-Problems.
Unit 5	Z Transforms: Definition of Z-Transform and its properties - Z-Transforms of somebasicfunctions-Examplesandsimple problems

Course Objectives	
Title	**STATICS**
Course Code	**SM24B**
CO-1	The forces which acts on a body.
CO-2	Resultant of forces on a particle.
CO-3	An overview statics and an introduction to units and problem solving.
CO-4	An overview statics and an introduction to units and problem solving.
CO-5	An important geometry property of shapes and rigid bodies.

Course Outcome	
Title	**STATICS**
Course Code	**SM24B**
Co-1	Can illustrate the sectorial and scalar representation of forces and moments
CO-2	Able to analysis the rigid body in equilibrium
CO-3	Can evaluate the properties of surface and solids.
CO-4	Able to calculate the static forces exerted in rigid body.
CO-5	Able to determine the friction and the effects by the laws of friction.

Syllabus	
Title	**STATICS**
Course Code	**SM24B**
Unit 1	Force-Newton'slawsofmotion-resultantoftwoforcesona particle-EquilibriumofaparticleChapter2-Section2.1,2.2,Chapter3-Section3.1
Unit 2	Forces onarigidbody–momentofaforce–generalmotionofarigidbody-equivalentsystemsofforces –parallelforces–forcesalongthe sidesofa triangle–couples Chapter4-Section4.1to4.6.
Unit 3	Resultantof several coplanarforces- equation of theline of action of the resultant- Equilibriumof a rigid body under three coplanar forces – Reduction of coplanar forces into a force and a couple.-problemsinvolvingfrictionalforces Chapter4-Section4.7to4.9, Chapter5-Section5.1,5.
Unit 4	Centreofmass–findingmasscentre – ahangingbodyinequilibriumChapter6-Section6.1to6.3.
Unit 5	Hangingstrings- equilibriumofauniformhomogeneousstring–suspensionbridgeChapter9-Section9.1,9.2.

Course Objectives	
Title	**MATHEMATICAL STATISTICS-II**
Course Code	**SM3AG**
CO-1	Students should be familiar with terminology and special notations.
CO-2	Sample, population, ratio discrete variable continuous correlation methods variable.
CO-3	Demonstrate completion of this course students will be able to properties of statistical models in common use
CO-4	Understand the basic principles underlying statistical inference.
CO-5	Understand the survey concepts and planning of a survey

Course Outcome	
Title	**MATHEMATICAL STATISTICS-II**
Course Code	**SM3AG**
CO-1	Calculate covariance and correlation and determine independence of random variables, obtain expectations and variances of linear combinations of random variable.
CO-2	Construct point and interval estimators evaluate their goodness.
CO-3	Summarize distribution of univariate data and compare multiple distributions.
CO-4	Estimate population parameters using confidence intervals when appropriate.
CO-5	Conduct tests of significance when appropriate.

Syllabus	
Title	**MATHEMATICAL STATISTICS-II**
Course Code	**SM3AG**
Unit 1	Sampling theory – Sampling Distributions – Concept of Standard error – Sampling distributionbasedonnormaldistribution-t,Chi SquareandF distributions.
Unit 2	Pointestimation – Concepts of unbiasedness – consistency – efficiency and sufficiency- CramerRao inequality – Methods of estimation- Maximum likelihood- moments - minimum square andtheirproperties (Statementonly).
Unit 3	Test of significance – Standard error- Large sample test, Exact test based on normal, t, chi-squareandFdistribution with respect to populationmean/means, proportion/proportions, variance andcorrelation coefficient. Test of independence of attributes based on contingency tables-Goodnessof fit based onchi-square.
Unit 4	AnalysisofVariance:Oneway,twowayclassificationconcepts&Problems.Interval estimationConfidenceintervalsforpopulationmean/means-Proportion/proportionsandvariancesbasedon t,Chi-SquareandF.
Unit 5	TestofhypothesisTypeIandIIerrors-PoweroftestNeymannPearsonlemma-Likelihoodratiotest-conceptsofmostpowerfultest-statementsandresultsonly simpleproblems.

Course Objectives	
Title	**ALGEBRAIC STRUCTURES-I**
Course Code	
CO-1	The objective of this course is introduce the fundamental theory of rings, integral domain and field, and their corresponding homomorphism.
CO-2	The focus of the course will be the study certain basic structures called groups.
CO-3	It helps to learn about related structures in ring theory and field theory.
CO-4	Abstract algebra gives to student good mathematical maturity and enable to build mathematical thinking and skill.
CO-5	Known the fundamental concepts in ring theory such as the concepts of ideas, quotient ring, integral domain.

Course Outcome	
Title	**ALGEBRAIC STRUCTURES-I**
Course Code	
CO-1	Understand new concept kike group, cyclic group, lagrange theorem.
CO-2	Get an idea of normal subgroup quotient group homomorphism and isomorphism of group.
CO-3	Discuss sets, subsets, and partition and equivalence relations,
CO-4	Known the fundamental concepts in ring theory such as the concepts of ideas, quotient ring, integral domain.
CO-5	Learn in detail about field of quotient of an integral domain and Euclidean rings.

Syllabus	
Title	**ALGEBRAIC STRUCTURES-I**
Course Code	
Unit 1	Introduction to groups- Subgroups- cyclic groups and properties of cyclic groups- Lagrange's Theorem- A counting principle. Chapter 2 Section 2.4 and 2.5.
Unit 2	Normal subgroups and Quotient group- Homomorphism- Automorphism. Chapter 2 Section 2.6 to 2.8.
Unit 3	Cayley'sTheore e Permutation groups Chapter 2 Section 2.9 and 2.10
Unit 4	Definition and examples of ring- Some special classes of rings- homomorphism of rings- Ideals and quotient rings- More ideals and quotient rings. Chapter 3 Section 3.1 to 3.5.
Unit 5	The field of quotients of an integral domain- Euclidean Rings- The particular Euclidean ring. Section 3.6to 3.8.

Course Objectives	
Title	**REAL ANALYSIS-I**
Course Code	
CO-1	Have the knowledge of basic properties of the field of real numbers
CO-2	Studying Bolzano-Weierstrass theorem and Cauchy criteria.
CO-3	Studying the basic topological properties of the real numbers.
CO-4	Have the knowledge of real functions-limits of functions and their properties.
CO-5	Explain the concepts of serious and the knowledge of their convergence and divergence

Course Outcome	
Title	**REAL ANALYSIS-I**
Course Code	
CO-1	Apply mathematical concepts and principles to perform numerical and symbolic computations.
CO-2	Describe the fundamental properties of real numbers.
CO-3	Understand about sequences and limit of sequences.
CO-4	Understand about convergences and divergence sequences and their operations.
CO-5	Explain the concepts of serious and the knowledge of their convergence and divergence.

Syllabus	
Title	**REAL ANALYSIS-I**
Course Code	
Unit 1	Sets and Functions: Sets and elements- Operations on sets- functions- real valued functions-equivalence-countability-realnumbers-leastupperbounds. Chapter1Section1.1to1.7
Unit 2	SEQUENCES OF REAL NUMBERS: Definition of a sequence and subsequence- limit of a sequence-convergentsequences-divergentsequences-boundedsequences-monotonesequences-Chapter2Section2.1to2.6
Unit 3	Operations on convergent sequences- operations on divergent sequences- limit superior and limitinferior-Cauchysequences. Chapter2Section2.7to2.10
Unit 4	SERIESOFREALNUMBERS:Convergenceanddivergence-serieswithnon-negativeterms-alternatingseries-conditionalconvergenceandabsoluteconvergence-

	testsforabsoluteconvergence-serieswhose termsforma non-increasingsequence-the classl^2 Chapter3Section3.1to 3.4,3.6,3.7and3.10
Unit 5	LIMITS ANDMETRICSPACES:Limitof afunction on a real line-. Metricspaces - Limitsinmetricspaces. ContinuousFunctionsonMetricSpaces:Functioncontinuousatapointontherealline-Reformulation-Functioncontinuous onametricspace. Chapter4Section4.1to4.3Chapter5Section5.1-5.3

Course Objectives	
Title	**DYNAMICS**
Course Code	
CO-1	Understand the fundamentals of the theory of kinematics and dynamics of machines.
CO-2	Understand techniques for studying motion of machines and their components.
CO-3	Use computer software packages in modern design of machines.
CO-4	To understand the basic terms for the description of motion of particals, vector functions and the fundamental laws of Newtonian mechanics.
CO-5	Create a schematic drawing of a real-world mechanism.

Course Outcome	
Title	**DYNAMICS**
Course Code	
CO-1	Distinguish kinematic and kinetic motion.
CO-2	Determine the degress –of-freedom of a mechanism.
CO-3	Apply vector mechanics as a tool for solving kinematic problems.
CO-4	Create a schematic drawing of a real-world mechanism.
CO-5	Design basic gear trains.

Syllabus	
Title	**DYNAMICS**
Course Code	
Unit 1	Kinematics-Basicunits–velocity–acceleration-coplanarmotion.Chapter1. Section1.1to1.4.
Unit 2	Work, Energy and power – work – conservative field of force – power – Rectilinearmotion under varying Force: Simple harmonic motion (S.H.M.)– S.H.M. along a horizontalline-S.H.M.alongaverticalline Chapter11-Section11.1to11.3,Chapter12-Section12.1to12.3
Unit 3	Projectiles-Forcesonaprojectile- projectileprojectedonaninclinedplane. Impact:Impulsiveforce-impactofsphere-impactoftwosmooth spheres–impactofasmoothsphere onaplane–obliqueimpactoftwo smoothspheres Chapter13-Section13.1,13.2,Chapter14-Section14.1,14.5
Unit 4	Projectiles-Forcesonaprojectile- projectileprojectedonaninclinedplane. Impact:Impulsiveforce-impactofsphere-impactoftwosmooth spheres–impactofasmoothsphere onaplane–obliqueimpactoftwo smoothspheres Chapter13-Section13.1,13.2,Chapter14-Section14.1,14.5
Unit 5	Momentofinertia,Perpendicularandparallelaxestheorem.Chapter17–Section17.1,17.1.1

Course Objectives	
Title	**DISCRETE MATHEMATICS**
Course Code	
CO-1	Introduce concepts of mathematical logic for analyzing propositions and proving theorms.
CO-2	Work with relations and investigate their properties.
CO-3	Investigate functions as relations and their properties.
CO-4	Introduce basic concepts of graphs, digraphs and trees.
CO-5	Learn about the applications of graph theory in the study of shortest path algorithms.

Course Outcome	
Title	**DISCRETE MATHEMATICS**
Course Code	
CO-1	Understand the notion of ordered sets and maps between ordered sets.
CO-2	Learn about lattices, modular and distributive lattices, sublattices and homomorphism between lattices.
CO-3	Learn about basics of graph theory, including Eulerian graphs, Hamitonian graphs.
CO-4	Become familiar with Boolean algebra, Boolean homomorphism, Karnaugh diagrams, switch circuits and their applications.
CO-5	Learn about the applications of graph theory in the study of shortest path algorithms.

Syllabus	
Title	**DISCRETE MATHEMATICS**
Course Code	
Unit 1	INTEGERS: Set, some basic properties of integers, Mathematical induction, divisibility of integers,representationofpositiveintegers Chapter1-Sections1.1to1.5
Unit 2	BOOLEAN ALGEBRA &APPLICATIONS:Boolean algebra, two element Boolean algebra, Disjunctivenormalform,Conjunctivenormalform Chapter5-Sections 5.1to5.4
Unit 3	Application,Simplicationofcircuits,Designingofswitchingcircuits,LogicalGatesandCombinatorialcircuits. Chapter5-Section5.5,5.6
Unit 4	RECURRENCERELATIONSANDGENERATINGFUNCTIONS:Sequenceandrecurrencerelation,Solvingrecurrence relations by iteration method, Modeling of counting problems by recurrence relations,Linear(differenceequations)recurrencerelationswithconstantcoefficients,Generatingfunctions,Sumandproductoftwogeneratingfunctions,Usefulgeneratingfunctions,Combinatorialprobl

	ems. Chapter6-Section6.1to6.6
Unit 5	PROPORTIONAL LOGIC AND PREDICATE LOGIC: Proportional logic, Adequate system of connectivies,Translation of sentences in a Natural Language into Statement Formula, Logical validity ofarguments, Predicate Logic, Negation of a statement obtained by qualification of a predicate,Logical operations on predicates or quantified predicates, Symbolization of sentences by usingpredicates,Quantifiersandconnectives,Logicalvalidityofarguments. Chapter8-Sections8.1,8.5to 8.8(OmitSection 8.2to 8.4)

Course Objectives	
Title	**ALGEBRAIC STRUCTURES-II**
Course Code	
CO-1	The course is intended to prepare the students for mathematical theory and methods of linear algebra, in particular vector space over the real and complex numbers, dual spaces, inner product space, algebra of linear transformation and matrices of canonical forms and triangular forms.
CO-2	Discuss about sets, subsets and partitials and operations on groups.
CO-3	Express problems from relevant areas of application in a mathematical form suitable for further analysis.
CO-4	Determine linear independence for vectors in R^n.
CO-5	Understand the relationship between a linear transformation and its matrix representation.

Course Outcome	
Title	**ALGEBRAIC STRUCTURES-II**
Course Code	
CO-1	Understand the concept of vector spaces, subspaces, bases, dimension and theory properties.
CO-2	Determine linear independence for vectors in R^n.
CO-3	For a linear transformation between vector spaces, discuss its matrix relative to give bases.
CO-4	Understand the relationship between a linear transformation and its matrix representation.
CO-5	Understand how to determine the angle between vectors and the orthogonality of vectors.

Syllabus	
Title	**ALGEBRAIC STRUCTURES-II**
Course Code	
Unit 1	Vectorspaces.Elementarybasicconcepts-linearindependenceandbasesChapter4Section4.1and4.2.
Unit 2	Dualspaces Chapter4Section4.3.
Unit 3	Inner product spaces.Chapter4Section4.4
Unit 4	Algebra of linear transformations- characteristic roots.Chapter6Section6.1and6.2.
Unit 5	Matrices-canonicalforms-triangularforms.Chapter6Section6.3and6.4.

Course Objectives	
Title	**REALANALYSIS-II**
Course Code	
CO-1	To provide students with the specialist knowledge necessary for basic concepts in Real Analysis.
CO-2	It strives to enable students to learn basic concepts about functions of bounded variation grasp basic concepts about the total variation.
CO-3	Learn about Riemann-Stieltjes integrals, sequences and series of functions.
CO-4	Learn the theory of Riemann-Stieltjes intergrals, to be aquainted with the ideals of the total variation and to able to deal with functions of bounded variation.
CO-5	Learn to define sequences in terms of functions from N to a subset of R

Course Outcome	
Title	**REALANALYSIS-II**
Course Code	
CO-1	Understand many properties of the real line R, including completeness and Archimedean properties
CO-2	Learn to define sequences in terms of functions from N to a subset of R
CO-3	Recognize bounded, convergent, divergent, cauchy and monotonic sequence and to calculate their limits inferior and the limit superior and the limit of a bounded sequences.
CO-4	Apply the ratio, root, alternating series and limi comparison tests for convergence and absolute convergence of an infinite series of real numbers
CO-5	Understand many properties of the real line R, including completeness and Archimedean properties

Syllabus	
Title	**REALANALYSIS-II**
Course Code	
Unit 1	ContinuousFunctionsonMetricSpaces:Opensets-closedsets-Discontinuousfunction on R^1. Connectedness, Completeness and Compactness :More about opensets-Connectedsets.Chapter5Section5.4to5.6 Chapter6Section6.1and 6.2
Unit 2	Bounded sets and totally bounded sets: Complete metric spaces-compact metric spaces,continuous functions on a compact metric space, continuity of inverse functions, uniformcontinuity. Chapter6Section6.3to6.8
Unit 3	Calculus:Setsofmeasurezero,definitionoftheRiemannintegral,existenceoftheRiemannintegral-properties ofRiemannintegral. Chapter7Section7.1to7.4
Unit 4	Derivatives-Rolle'stheorem, Lawofmean, Fundamentaltheoremsofcalculus.Chapter7Section7.5to7.8
Unit 5	Taylor'stheorem-Pointwiseconvergenceofsequencesoffunctions,uniformconvergenceofsequencesoffunctions.Chapter8Section8.5Chapter9 Section9.1 and 9.2

Course Objectives	
Title	**COMPLEX ANALYSIS**
Course Code	
CO-1	To understand and learn to use Argument principle.
CO-2	To study the functions with positive real parts.
CO-3	To understand the modules of a complex valued functions.
CO-4	To understand range of analytic functions and concerned results**.**
CO-5	Learn some elementary functions and valuate the contour integrals.

Course Outcome	
Title	**COMPLEX ANALYSIS**
Course Code	
CO-1	Learn the significance of differentiability of complex functions leading to the understanding of cauchy-riemann equations
CO-2	Learn some elementary functions and valuate the contour integrals.
CO-3	Understand the role of cauchy-Goursat theorem and the cauchy integral formula.
CO-4	Expand some simple functions as their Taylor and Laurent series.
CO-5	classify the nature of sigulariries, find residues and apply cauchy residue theorem to evaluate integrals.

Syllabus	
Title	**COMPLEX ANALYSIS**
Course Code	
Unit 1	ANALYTICFUNCTIONS:FunctionsofaComplexVariable– Limit-TheoremsonLimits–Continuuous functions-Differentiability – Cauchy – Riemann equations – Analytic functions-Harmonicfunctions–Conformalmapping. Chapter1–sec 2.1to2.9.
Unit 2	BILINEAR TRANSFORMATIONS:Elementary transformations – Bilinear transformations – Cross ratio-Fixed Points of Bilinear Transformations – Mapping by Elementary Functions- The Mapping$w=z^2, z^n$,nisapositiveinteger,$w=e^z$,sinz,cosz. Chapter3–sec 3.1to3.4,Chapter5–sec 5.1to5.5
Unit 3	Complex Integration – definite integral – Cauchy's Theorem – Cauchy's integral formula –Higherderivatives.Chapter6–sec6.1to6.4
Unit 4	Seriesexpansions–Taylor'sseries–Laurent'sSeries–Zeroesofanalyticfunctions-Singularities.Chapter7–7.1to7.4
Unit 5	Residues–Cauchy'sResidueTheorem–Evaluationofdefiniteintegrals.Chapter8–8.1to8.3.

Course Objectives	
Title	**GRAPHY THEORY**
Course Code	
CO-1	Understand the basic of graph theory and various properties.
CO-2	Model problems using graphs and to solve these problems algorithmically.
CO-3	Optimize the solutions to real problems like transport problems etc.
CO-4	Apply graph theory concepts to solve real world applications like routing,TSP/traffic control, etc.
CO-5	Model problems using graphs and to solve these problems algorithmically.

Course Outcome	
Title	**GRAPHY THEORY**
Course Code	
CO-1	Solve problem using basic graph theory
CO-2	To write precise and accurate mathematical definition of object in graph theory.
CO-3	Use definition in graph theory to identify and construct examples and to distinguish examples from non-examples
CO-4	Understand Eulerian and Hamiltonian graphs.
CO-5	Apply the knowledge of graphs to solve the real-life problem.

Syllabus	
Title	GRAPHY THEORY
Course Code	
Unit 1	GRAPHSANDSUBGRAPHS:IntroductionDefinitionandexamples,degrees, subgraphs,isomorphism, independent sets and coverings, intersection graphs and line graphs, matrices, operations on graphs Chapter 2Sections2.0– 2.9(Omitsection2.5)
Unit 2	DEGREE SEQUENCES AND CONNECTEDNESS :Degree sequences and graphic sequences – simpleproblems.Walks,trails,paths,connectednessandcomponents,blocks,connectivity–simple problems. Chapter3Sections3.0–3.2,Chapter4Sections4.0–4.4
Unit 3	Eulerian and Hamiltoniangraphs-Chapter5 Sections5.0–5.2
Unit 4	TREES : Characterisation of Trees, Centre of a Tree -simple problems.Planarity:Definitionandproperties,characterizationofplanargraphs.Chapter6Sections 6.0–6.2,Chapter8Sections8.0–8.2
Unit 5	DIRECTEDGRAPHS:Definitionandbasicproperties,pathsandconnections,digraphsandmatrices,tournaments-Chapter10Sections 10.0–10.4

Course Objectives	
Title	**OPERATION RESEARCH**
Course Code	
CO-1	The course emphasizes the role of optimization in operations Research.
CO-2	Students will gain an overall perspective in the types of methodologies identified.
CO-3	Basic theory and computational strategies for exact and heuristic solutions of integer.
CO-4	With the projects assignments, the students will gain hands on experience in mathematical programming computation through the use of modeling language OPL and optimization software complex.
CO-5	Solve business problems and apply it's applications by using mathematical analysis.

Course Outcome	
Title	**OPERATION RESEARCH**
Course Code	
CO-1	Identify and develop operational research models from the verbal description of the real world problems.
CO-2	Solve business problems and apply it's applications by using mathematical analysis.
CO-3	Develop the ideas of developing and analyzing mathematical models for decision problems, and their systematic solution.
CO-4	Understand the mathematical models that are needed to solve optimization problems.
CO-5	Decision making under uncertainity and risk.

Syllabus	
Title	OPERATION RESEARCH
Course Code	
Unit 1	LINEARPROGRAMMING:Formulation–graphicalsolution.Simplexmethod.Big-Mmethod.Duality-primal-dualrelation. Chapter6Sections6.1–6.13,6.20–6.31
Unit 2	TRANSPORTATIONPROBLEM:MathematicalFormulation.BasicFeasiblesolution.NorthWestCornerrule,LeastCostMethod,Vogel'sapproximation.OptimalSolution.UnbalancedTransportationProblems.DegeneracyinTransportationproblems. Assignmentproblem:Mathematical Formulation. Comparison with Transportation Model.HungarianMethod.UnbalancedAssignmentproblems Chapter9Sections9.1–9.12,Chapter8Sections8.1–8.5
Unit 3	SEQUENCINGPROBLEM:njobson 2machines–njobson 3machines–twojobsonmmachines –njobsonmmachines. Gametheory:Two-personZero-sumgamewithsaddlepoint–withoutsaddlepoint–dominance–solving2xnormx2gamebygraphicalmethod. Chapter10Sections10.1–10.6,Chapter12Sections12.1– 12.15
Unit 4	QUEUINGTHEORY:Basicconcepts.SteadystateanalysisofM/M/1andM/M/Smodelswithfinite andinfinitecapacities. Chapter5Sections5.1–5.18
Unit 5	NETWORK:ProjectNetworkdiagram–CPMandPERTcomputations.(Crashingexcluded)Chapter13 Sections13.1–13.10

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF MICROBIOLOGY

Program :**B.Sc. Microbiology**

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	To create a centre of Academic Excellence in the field of education in Microbiology.
PO-2	Provide a sound academic background for overall development of personality for a successful career in Microbiology.
PO-3	Provide an environment that fosters continuous improvement and innovation in the subject.
PO-4	Inculcate in student's right skills oriented towards self-development.
PO-5	To inculcate in students the need for the value of dignity of labor and the attitude and proper community orientation and civic responsibilities in their outlook.

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Students will be able to describe diversity of microorganisms, bacterial cell structure and function, microbial growth and metabolism, and the ways to control their growth by physical and chemical means.
PSO-2	Students will explain the role of microorganisms in food production and preservation, their ability to cause food-borne infections and demonstrate practical skills in fundamental microbiological techniques.
PSO-3	Students will demonstrate engagement in the Microbiology discipline through involvement in their post-graduation period, research or internship activities, and outreach their goals specific to microbiology.
PSO-4	Understand the importance of immunity,pathogenesis , cultivation , identification and control of pathogen through prophylaxis and therapeutics
PSO-5	Evaluate the important role of microorganisms related to soil.food and agricultural for environmental conservation and food safety

Course Objectives	
Title	**General Microbiology & Microbial Physiology**
Course Code	**SN21A**
CO-1	To understand the key features of the structure, growth, physiology and behavior of bacteria.
CO-2	To provide basic knowledge to deal with the study of genetic, metabolic strategies and ecology of microorganisms.
CO-3	To understand the main microbiological techniques to be applied in the laboratory.
CO-4	Students acquire knowledge to the use of bacteria in the lab and the main sterilization techniques.
CO-5	To provide students with the basis to face the study of the major fundamentals of microbiology including bacteriology, virology and immunology.

Course Outcome	
Title	**General Microbiology & Microbial Physiology**
Course Code	**SN21A**
CO-1	Demonstrate theory and practical skills in microscopy a n d their handling techniques and staining procedures.
CO-2	Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes.
CO-3	Know various Culture media and their applications and also understand various physical and chemical means of sterilization.
CO-4	Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae
CO-5	Know the various Physical and Chemical growth requirements of bacteria and get equipped with various methods of bacterial growth measurement.

Syllabus	
Title	**General Microbiology & Microbial Physiology**
Course Code	**SN21A**
Unit 1	History of Microbiology- Contributions of Scientists - Anton Von Leeuwenhoek, Louis Pasteur, Robert Koch, Edward Jenner, Alexander Flemming, Joseph Lister. Spontaneous generation Vs Biogenesis hypothesis - Germ theory of diseases- Koch postulates. Classification of Microorganisms - Three Kingdom, Whittaker's Five Kingdom and Eight kingdom. General characteristics of a cellular microorganisms - (Viruses, Viroids, Prions) and cellular microorganisms (Bacteria, algae, fungi and protozoa), Differences between prokaryotic and eukaryotic microorganisms.
Unit 2	Microscopy: Light Microscopy - Simple, Compound, Dark field, Phase Contrast, Fluorescence and Electron Microscopy – SEM, TEM. Staining methods–Principles of staining, simple staining, negative staining, differential staining, Gram and Acid Fast Staining, flagella staining, capsule and endospore staining.
Unit 3	Culture media and pure culture techniques- Streak plate, Pour plate and Spread plate methods. Anaerobic culture – Anaerobic Jar.Methods of Sterilization- Physical Methods - Mode of Action and Applications of Heat- Dry and Moist, Pasteurization and Tyndallisation, Chemical Methods - Mode of action and applications - Alcohol, Halogen, Heavy Metals, Phenol and Phenol derivatives, Formaldehydes. Methods of bacterial identification- morphological and biochemical properties.
Unit 4	Nutrition and Growth of Bacteria - Photoautotrophs, Photoorganotrophs, Chemolithotrophs (Ammonia, Nitrite, Sulfur, Hydrogen, Iron oxidizing Bacteria), Chemoorganotrophs. Nutrition transport mechanisms – Passive diffusion and Active transport. Culture media -Types. Bacterial Growth, Generation time and Growth Curve.
Unit 5	An overview of Metabolism - Embden Meyerhof Pathway, Entner-Doudoroff Pathway, Pentose Phosphate Pathway, Tricarboxylic Acid Cycle. Electron Transport Chain and Oxidative Phosphorylation.ATP synthesis. Fermentation-Homolactic Fermentation, Heterolactic Fermentation, Mixed Acid Fermentation, Butanediol Fermentation. Photosynthesis - An Overview of chloroplast structure. Photosynthetic Pigments, Light Reaction-Cyclic and non-cyclic Photophosphorylation. Dark Reaction - CalvinCycle.

Course Objectives	
Title	**Practical – I General Microbiology & Microbial Physiology**
Course Code	**SN221**
CO-1	To develop skills and competencies in standard microbiological laboratory techniques.
CO-2	Train students in the proper use and maintenance of the research grade laboratory microscope with emphasis on oil immersion methods.
CO-3	Train students in aseptic technique, prophylaxis, and the proper methods relating to the safe manipulation and maintenance of microorganism.
CO-4	Train students in fundamental laboratory methodology to include the use of differential media, metabolic/enzymatic testing and associated reagents.
CO-5	Provide students with a hands-on familiarity with basic research procedure and associated critical and investigative thinking skills utilizing identification of unknown microorganismal specimens & Provide students with an understanding of important facts, concepts, and the investigative procedures of a microbiology producing accurate, skilled clinical laboratory workers with strong ethical and professional values.

Course Outcome	
Title	**Practical – I General Microbiology & Microbial Physiology**
Course Code	**SN221**
CO-1	Properly prepare and view microbiological specimens for examination using bright field microscopy.
CO-2	Use pure culture and selective techniques to enrich for and isolate microorganisms, using proper aseptic technique.
CO-3	Estimate the number of microorganisms in a sample using viable plate counts
CO-4	Evaluate a microbiological problem in the context of an unknown microorganism, using appropriate media-based methods for identification. Accurately document and report observations and interpretations made during laboratory exercises.
CO-5	Use appropriate microbiological lab equipment and methods, in order to conduct and analyze experimental measurements relevant to microbiology. Practice safe microbiology, using appropriate protective and emergency procedures

Syllabus		
Title	**Practical – I General Microbiology & Microbial Physiology**	
Course Code	**SN221**	
Unit 1	Cleaning of glass wares Sterilization principle and methods- moist heat- dry heat and filtration methods. Media preparation: liquid media, solid media, agar slants, agar plates, basal, enriched, selective media preparation- quality control of media, growth supporting properties, sterility check of media.	
Unit 2	Pure culture techniques: streak plate, pour plate, decimal dilution. Culture characteristics of microorganisms: growth on different media, growth characteristics and description. Demonstration of pigment production.	
Unit 3	Microscopy: light microscopy and bright field microscopy. Motility demonstration: hanging drop, wet mount preparation, dark field microscopy, semi solid agar, Craigie's tube method. Staining techniques: smear preparation, simple staining, Gram's staining and Acid fast staining.	
Unit 4	Morphology of microorganisms: morphological variations in algae, morphology of fungi, slide culture technique. Antibiotic sensitivity testing: Disc diffusion test with standard strains. Micrometry: Demonstration of size of yeast and fungal filaments.	
Unit 5	Physiology characteristics: IMViC test, H2S, Oxidase, catalase, urease test. Carbohydrate fermentation test, maintenance of pure culture, paraffin method, stab culture, maintenance of mold culture.	

Course Objectives	
Title	**NME (Good Laboratory Practices)**
Course Code	**SC5AC**
CO-1	Students will understand the essential practices that need to be followed inside a laboratory / industry
CO-2	Students will have awareness on safety measures and Industry standards.
CO-3	The content minimizes the gap between Academics and Industry.
CO-4	Students will have the knowledge about the quality control and quality assurance
CO-5	Students know about the waste management

Course Outcome	
Title	**NME (Good Laboratory Practices)**
Course Code	**SC5AC**
CO-1	Understand the essential practices that need to be followed inside aIndustry laboratory.
CO-2	Have awareness on the safety measures followed in the Industry.
CO-3	Understand the standards followed in Industry
CO-4	Relating and differentiating the laboratory protocols and procedure followed in Academics and Industries.
CO-5	Understand the maintenance of microbiological instruments

Syllabus	
Title	**NME (Good Laboratory Practices)**
Course Code	**SC5AC**
Unit 1	**Biotechnology lab organization** Types of labs associated with Biotechnology (General lab, microbial culture lab, plant tissue culture lab, Fermentation lab, computational stimulation lab), Types of Chemical (Analytical grade, molecular grade) and its various arrangement (Arrangement of basic chemicals, solvent, acid and base, fine chemicals like dyes, protein and enzyme storage units), Physical chemical characteristics: hygroscopic, corrosive, volatile properties; Fire and explosion hazard data, Health hazards (how to use UVilluminator), Fumigation technique.
Unit 2	Regulatory affairs: Methods and types of documentation (pre-lab writes, result recording and post lab report: interpretation of result), Dilution factor calculation, Molarity, percentage, dilution of concentrated solution, metric units (kg to gms and vice -versa).
Unit 3	**Instrument calibration and importance** Principles, use and maintenance of laboratory instruments like Autoclave, hot air oven, Incubators, Water bath, Refrigerator, Centrifuge, Calorimeter, pH meter, Haemocytometer, Microtomes, Electronic balances, Biosafety cabinets. SOP preparation for instrumentation
Unit 4	**GLP & Biotechnology Industry standards** Good Laboratory guidelines, Elements of GLP, Standard Operating Procedures and its importance, Quality Assurance & Quality control, Internal audit basics, ISO, BIS and HACCP standards
Unit 5	**Types of wastes and safe disposal methods** Definition of waste, types of waste: Biological and chemical waste, methods of Safe Disposal of biological and chemical waste: treatment methods of Ethidium Bromide solutions, Electrophoresis Gels, Contaminated Gloves, debris, Wastes containing sodium azide, Silver staining solutions, Perchloric acid, Nanoparticle wastes, Spill management, Awareness and training for personnel.

Course Objectives	
Title	**Basic and Applied Immunology**
Course Code	**SN22A**
CO-1	The students will be able to identify the cellular and molecular basis of immune responsiveness.
CO-2	The students will be able to describe the roles of the immune system in both maintaining health and contributing to disease.
CO-3	The students will be able to describe immunological response and how it is triggered and regulated.
CO-4	Students get the knowledge about immune response related to tumuor immunology
CO-5	Students have gain the knowledge about different types of immune cells

Course Outcome	
Title	**Basic and Applied Immunology**
Course Code	**SN22A**
CO-1	Students will understand the key concepts in immunology.
CO-2	Understand the overall organization of the immune system**.**
CO-3	Conceptualize how the collection of individual clones of lymphocytes (termed the "immune repertoire") arises from rearrangement within two genetic loci: The Ig gene in B cells and the antigen receptor in T cells.
CO-4	Learn how "clonal selection" allows for the expansion of a limited number of antigen recognizing lymphocytes in response to a specific antigenic stimulus
CO-5	To make them understand the salient features of antigen antibody reaction &its uses in diagnostics and various other studies.

Syllabus	
Title	**Basic and Applied Immunology**
Course Code	**SN22A**
Unit 1	Introduction - History, Scope of Immunology and Recent developments. Cells of Immune System. Hematopoiesis. Mononuclear - Phagocytic System.LymphoidOrgans.Primary – Thymus, Bone Marrow, and Bursa of Fabricius, Secondary - Lymph Node and Spleen.Tertiary - CALT, GALT and MALT.Innate and Acquired immunity.Humoral& Cell mediated immunity. Mechanism of immune response.
Unit 2	Antigen - Types, Properties and Function.Haptens, Adjuvants. Antibody: Structure, and Types of antibody, Theories of Antibody formation. Monoclonal antibody. Complement pathways- Classical and Alternative pathways.
Unit 3	Antigen – Antibody reaction- Immunohematology-ABO, In vitro methods: precipitation reactions, agglutination, Immunofluroscence, ELISA and RIA. *In vivo* methods: skin tests –Mantoux test.
Unit 4	Hypersensitivity – Introduction to Hypersensitivity Reactions. Type I – Mechanism, Primary Mediators, Secondary Mediators, Symptoms and test for Type I Hypersensitivity. Type II - Mechanism and Symptoms. Type III- Mechanism and Diseases - Serum sickness, Arthus reaction. Type IV- Mechanisms& types - Tuberculin. Autoimmune disorders - Rheumatoid Arthritis and SLE.
Unit 5	Major Histocompatability complex (MHC) - Introduction, MHC types and pathways, Applications of MHC, Graft rejection.TransplantationImmunology.Vaccines – Types- Live, Attenuated, Sub-unit and Recombinant Vaccines, Immunization schedule. Cancer immunology- Malignant tumors (leukemiasandlymphomas).

Course Objectives	
Title	**PRACTICAL-II: Basic and Applied Immunology**
Course Code	**SN222**
CO-1	Developing a working knowledge of the principles and procedures of serology by utilizing Immunological laboratory techniques.
CO-2	Producing accurate, skilled clinical laboratory workers with strong ethical and professional values.
CO-3	Promoting respect and understanding of allied health professionals through renewed understanding of the clinical laboratory technician's role as a member of the allied health care team.
CO-4	Developing a working knowledge of the principles and procedures of ELISA technique
CO-5	Demonstrate and detailed study about the diagnosis of immunological techniques

Course Outcome	
Title	**PRACTICAL-II: Basic and Applied Immunology**
Course Code	**SN222**
CO-1	Apply principles of safety, quality assurance and quality control in Immunology/Serology.
CO-2	Evaluate specimen acceptability
CO-3	Describe the principles involved in the immune response.
CO-4	Explain the principles of and perform serological tests.
CO-5	Evaluate and correlate test results with associated diseases or conditions.

Syllabus	
Title	**PRACTICAL-II: Basic and Applied Immunology**
Course Code	**SN222**
Unit 1	Blood groups and typing.Precipitation reaction in Gel-Outchelony double diffusion, Single Radial Immunodiffusion.VDRL, RPR.
Unit 2	Complement fixation test.Titrationof amboceptor and complement (demonstration only).Immunofluorescene, (Demonstration only), ELISA
Unit 3	Isolation of Buffy coat, using heparin lymphocytes (T cells, B cells), Enumeration of different cell types, Peripheral blood cell counts, absolute cell counts.
Unit 4	Antibody productions in rabbits against sheep RBC and its titration (Demonstration) Anaphylactic reactions in guinea pigs.Arthus reaction in rabbits, (Demonstration).
Unit 5	Skin tests, both immediate and delayed hypersensitivity reactions to egg proteins, bacterial, fungal antigens. (Demonstration)

Course Objectives	
Title	**NME (Food Preservation)**
Course Code	**SL52C**
CO-1	To understand the basic principles of food preservation.
CO-2	To learn the food preservation techniques.
CO-3	To prepare preserved foods
CO-4	To learn about the food fermentation technical
CO-5	To learn about the pathogenic microorganisms present in food

Course Outcome	
Title	**NME (Food Preservation)**
Course Code	**SL52C**
CO-1	Student should be able to discuss the causes of food spoilage.
CO-2	Student should be able to explain the food preservation techniques.
CO-3	Students should be able to prepare preserved food.
CO-4	Students should be able to discuss about the fermented foods
CO-5	Students have knowledge about the pathogenic organisms

Syllabus	
Title	**NME (Food Preservation)**
Course Code	**SL52C**
Unit 1	Importance of preservation – basic principles of preservation, food deterioration-agents causing spoilage, types of spoilage, prevention and need for preservation.
Unit 2	Food preservation techniques Preservation by heat – blanching, pasteurization, sterilization, concentration. Drying methods- sun, mechanical, freeze and osmotic drying, Changes during drying Preservation by low temperature – Refrigeration & freezing, factors to be considered in low temperature preservation.
Unit 3	Preservation by ionizing radiations- units, process, effect on microorganisms, effect of irradiation overdose on foods.
Unit 4	Preservation by use of preservatives –sugar, salt, chemicals
Unit 5	Preparation of preserved food products (any 3) Fruits – Jams, Jellies, Squashes,Cordials, marmalades, candy Vegetables – Pickles

Course Objectives	
Title	**Molecular Biology**
Course Code	**SN23A**
CO-1	To describe the general principles of gene organization and expression in both prokaryotic and eukaryotic organisms.
CO-2	Discuss the various macromolecular components of cells and their functions.
CO-3	To understand the chemical synthesis of polynucleotide, transcription and translation process.
CO-4	To study the various types of mutations can alter the structure of a polypeptide chain.
CO-5	To study the processing of protein and distribution.

Course Outcome	
Title	**Molecular Biology**
Course Code	**SN23A**
CO-1	Students can explain concepts such as gene structure and function, gene regulation, microbial genetics, mutation and DNA repair, DNA sequencing.
CO-2	Students can gain insight into the most significant molecular and cell-based methods used today to expand our understanding of biology.
CO-3	They can understand the chemical and molecular processes that occur in and between cells.
CO-4	Students can understand the synthesis, structure, and function of nucleic acids and proteins in prokaryotes and eukaryotes.
CO-5	To gain the knowledge of functions of polycistronic mRNA and monocistronic mRNA.

Syllabus	
Title	**Molecular Biology**
Course Code	**SN23A**
Unit 1	Primary Structure of Nucleic Acids, ABZs of DNA Secondary Structure, Denaturation and Renaturation of DNA, Supercoils and Cruciforms: Tertiary Structure in DNA. Ribonucleic Acid, types of RNA and Secondary and Tertiary Structure of RNA.
Unit 2	Prokaryotic replication- model of replication - semiconservative mode of replication-replication forks, semi-discontinuous replication, Okazaki fragments.Bacteriophages M13 and ΦX174 replication,rollingcirclemodelofreplication.Enzymology of replication- role of DNA polymerases I, II, III, gyrase, topoisomerases, helicase, ligases and SSB proteins.Theta replication in *E.Coli*- initiation events at Ori C, elongation events on the replication fork and termination - fidelity of replication inhibition of replication.
Unit 3	Transcription- prokaryotic RNA polymerases - role of sigma factor. TATA box, promoter, closed and open promoter complexes- initiation, elongation and termination of transcription, post transcriptional modifications in prokaryotes (tRNA and rRNA). Inhibitors of transcription.
Unit 4	Protein synthesis: Ribosome, formation of initiation complex, initiation factors and their regulation, elongation and elongation factors, termination, inhibition factors of protein synthesis, genetic code, aminoacylation of tRNA,
Unit 5	Regulation of activity of Genes and Gene products in Prokaryotes: The lactose system and the operon model, The Galactose operon, The Arabinose operon, The Tryptophan operon, Regulation of Translation, Regulation of the synthesis of Ribosomes, Feedback Inhibition.

Course Objectives	
Title	**Practical-III: Molecular Biology**
Course Code	**SN241**
CO-1	To review critically the fundamental and key concepts of Molecular Biology and gene cloning.
CO-2	To grasp a common and valuable techniques used in molecular Biology.
CO-3	To understand a broad range of experimental techniques used in molecular biology and how they are used to improve the concepts of replication, transcription and translation.
CO-4	To gain the knowledge of the theories underlying both basic and some advanced methods in molecular biology
CO-5	To know the knowledge of the special experimental methods like Isolation of chromosomal DNA and Plasmid DNA.

Course Outcome	
Title	**Practical-III: Molecular Biology**
Course Code	**SN241**
CO-1	To understand the concepts such as gene structure and function, gene regulation, microbial genetics,
CO-2	Use basic laboratory equipment, apparatus and procedures for molecular study.
CO-3	Safely carry out a range of laboratory techniques used for the isolation, purification and manipulation of biomolecules, for example PCR, DNA recombination techniques and electrophoresis.
CO-4	Laboratory exercise provides the students skills about the DNA manipulation and routine laboratory techniques.
CO-5	To understand the concepts such as PCR techniques and mutation

Syllabus	
Title	**Practical-III: Molecular Biology**
Course Code	**SN241**
Unit 1	Estimation of DNA by diphenylamine method.Estimation of RNA by rcinol method.
Unit 2	Isolation of Plasmid DNA by Alkalysismethod.Isolation of genomic DNA from prokaryotes. Isolation of Chromosomal DNA from Eukaryotic cells.Eg. Leaves.
Unit 3	Isolation of RNA from yeast. Isolation of antibiotic resistant mutants.
Unit 4	Preparation of competent cells.
Unit 5	Transformation of *E.coli*.

Course Objectives	
Title	**Soil and Agricultural Microbiology**
Course Code	**SN24A**
CO-1	To provide students with useful information regarding the taxonomical, physiological, and environmental aspects of soil microorganisms.
CO-2	To learn the roles of soil microbes, such as decomposing dead organic matter, enriching the soil with nutrients, increasing water infiltration, improving soil texture, etc.
CO-3	To provide students with knowledge concerning soil microorganisms both harmful and beneficial and how to control and enhance each respectively.
CO-4	To acquire knowledge on such topics as: organisms and interactions, mycorrhizal symbiosis, biological dinitrogen fixation (both symbiotic and non-symbiotic).
CO-5	To know the role of microorganisms in bio geo chemical cycles.

Course Outcome	
Title	**Soil and Agricultural Microbiology**
Course Code	**SN24A**
CO-1	On completion of the course, students will develop skill regarding various methods used in agriculturally important microbes and disease management of plant diseases.
CO-2	Students will develop the knowledge in soil texture and soil fertility.
CO-3	Students will learn that the soil is an excellent habitat for multitude of microorganisms balancing the soil ecosystem.
CO-4	Attainment of course objectives will mean realization of the various beneficial effects of soil microorganisms on soil health. Conversely, students learned that some soil microbes are deleterious.
CO-5	The knowledge acquired in Soil Microbiology will enhance the student's competency in the performance of their duties as future employees in the field of Agronomy/Soil Science.

Syllabus	
Title	**Soil and Agricultural Microbiology**
Course Code	**SN24A**
Unit 1	Soil microbiology - quantitative and qualitative micro flora of different soils-role of microbes in soil fertility-tests for soil fertility - soil structure, soil formation - characterization of soil types and importance.
Unit 2	Biogeochemical cycles-role of micro organisms in carbon, phosphorus, sulphur and iron cycles. Methods of studying ecology of soil micro organisms-microbial gas metabolism-carbon dioxide, hydrogen, and methane and hydrogen sulphide.
Unit 3	Microbial interactions between microorganisms, plant and soil.Rhizoplane, rhizosphere, phyllosphere, spermosphere, mycorrhizae.Microbial association with insects-gut micro flora - symbiosis between microbes and insects; organic matter decomposition.
Unit 4	Nitrogen cycle; ammonification- nitrification- de-nitrification- nitrogen fixation- Biofertilizers (bacterial, cyanobacteria and azolla), mycorrhiza and its types and crop response-bio-pesticides (bacterial, viral and fungal) saprophytes for pathogen suppression.
Unit 5	Principles of plant infection and defense mechanisms. Symptoms, Etiology, Epidemiology and Management of the following plant diseases: Bacterial disease – Citrus canker, blight of paddy, Fungal disease- Red rot of sugarcane, Black stem rust of wheat, Tikka leaf spot, Wilt of cotton, Viral Disease – TMV, Vein clearing disease.

Course Objectives	
Title	**Environmental studies**
Course Code	**ENV4B**
CO-1	The Environmental Studies curriculum is designed to provide you with the ability to investigate environmental issues from a rigorous interdisciplinary perspective by integrating insights and information from the natural sciences, social sciences, and humanities.
CO-2	The Environmental studies curriculum is desgnie to know about the various types of cycles Ike nitrogen cycle
CO-3	Students learn about the various pathogenic plant disease caused by different kinds of microorganisms
CO-4	Students learn about the various types of interaction
CO-5	Students get the knowledge about types of soils and know about the soil fertility

Course Outcome	
Title	**Environmental studies**
Course Code	**ENV4B**
CO-1	Demonstrate a scientific understanding of the physical and biological dynamics of global ecologies including first-hand knowledge of local and regional ecosystems.
CO-2	Analyze the social, economic, and political and policy dynamics involved in both the emergence and the resolution of environmental problems
CO-3	Explain and analyze the historical development, ethical implications, and religious dimensions of the human relationship with the nonhuman world
CO-4	Explain about the various types of pollution control and control measures
CO-5	Demonstrate about the food web and food chain relationship and relationships about biodiversity

Syllabus	
Title	**Environmental studies**
Course Code	**ENV4B**
Unit 1	**Introduction to Environmental Studies** Multidisciplinary nature of environmental studies; Scope and importance; concept of sustainability and sustainable development.
Unit 2	**Ecosystem (2 lectures)** What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem Food chains, food webs and ecological succession, Case studies of the following ecosystem: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystem (ponds, stream, lakes, rivers, ocean, estuaries)
Unit 3	**Natural Resources : Renewable and Non – renewable Resources (6 lectures)** Land resources and landuse change: Land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water: Use and over –exploitation of surface and ground water, floods, droughts, conflicts over water (international and inter-state). Energy resources: Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.
Unit 4	**Biodiversity and Conservation (8 lecturers)** Levels of biological diversity: genetics, species and ecosystem diversity, Biogeographic zones of India: Biodiversity patterns and global biodiversity hot spots India as a mega- biodiversity nation, Endangered and endemic species of India. Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservations of biodiversity: In-situ and Ex-situ Conservation of biodiversity.

	Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.
Unit 5	**Environmental Pollution (8 lecturers)** Environmental pollution: types, causes, effects and controls: Air, Water, soil and noise Pollution. Nuclear hazards and human health risks Solid waste management: Control measures of urban and industrial waste Pollution case studies.
Unit 5	**Environmental Policies & Practices (8 lecturers)** Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture Environment Laws: Environment Protection Act, Air (Prevention & Control of Pollution) Act; Water (Prevention and Control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD). Nature reserves, tribal populations and rights, and humanWildlife conflicts in Indian context.
Unit 6	**Human Communities and the Environment (7 lectures)** Human population growth, impacts on environment, human health and welfare. Resettlement and rehabilitation of projects affected persons; case studies. Disaster management: floods, earthquake, cyclone and landslides. Environmental movements : Chipko, Silent ValleyBishnois of Rajasthan. Environmental ethics : Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies(e.g. CNG Vehicles in Delhi)
Unit 7	**Field Work (6 lectures)** Visit to an area to document environmental assets: river /forest/ flora/ fauna etc. Visit to a local polluted site – Urban / Rural/ Industrial/ Agricultural. Study of common plants, insects, birds and basic principles of identification. Study of simple ecosystem- pond, river, Delhi Ridge etc.

Course Objectives	
Title	**Medical Bacteriology**
Course Code	
CO-1	To learn the different types of medically important bacteria, their properties, collection, transportation, isolation, based on their virulence nature, pathogenesis and diagnosis methods.
CO-2	To learn about the isolation and identification of bacteria from different clinical specimens.
CO-3	To learn about the antimicrobial sensitivity test
CO-4	To learn about the treatment and prophylaxis for each and every pathogenic organisms
CO-5	It provides immense knowledge about morphological and cultural characteristics features of bacteria

Course Outcome	
Title	**Medical Bacteriology**
Course Code	
CO-1	This course helps to understand the properties of various pathogenic bacteria and to know the procedure for collecting, transporting and isolation of pathogens from clinical specimens
CO-2	It provides the knowledge on the sensitivity of pathogen to a particular antibiotic which can be given for treating patients against pathogen.
CO-3	It helps students to know the pathological conditions and virulence nature of pathogen inside the host
CO-4	The course describes the diagnosis methods to identify the pathogen by various tests and also helps to suggest particular antibiotics against the bacteria.
CO-5	The course also helps to students to know the epidemiology and prophylaxis methods related to the pathogen.

Syllabus	
Title	**Medical Bacteriology**
Course Code	
Unit 1	Classification and General Properties of medically important bacteria.Principles and specific procedures for the collection and transport of clinical samples from skin, respiratory tract (upper and lower), urinary tract, genital tract and blood.
Unit 2	Isolation of bacteria from clinical specimens: Primary media for the isolation of microorganisms, common staining procedures (Gram, Negative – Capsule, Acid fast and spore staining) and biochemical tests. Antimicrobial sensitivity testing by Kirby-Bauer disc diffusion method and determination of MIC by broth dilution method.
Unit 3	Morphology, cultural characteristics, pathogenicity, Laboratory diagnosis, prevention and treatment of diseases caused by the following organisms: Staphylococcus aureus, Streptococcus pyogenes, Corynebacteriumdiphtheria,Mycobacterium tuberculosis and Mycobacteriumleprae
Unit 4	Vibrio cholera, Haemophilusinfluenzae,Pseudomonasaeruginosa, Bordetellapertussis. Escherichia coli, Salmonella typhi, Shigella, Proteus, Klebsiella pneumonia, Neisseria meningitides and Neisseria gonorrhea.

Course Objectives	
Title	**Medical Mycology and Parasitology**
Course Code	
CO-1	Describe Morphology, Lifecycle, Pathology and laboratory diagnosis of fungi and parasites.
CO-2	Classify parasites and fungi.
CO-3	Perform appropriate laboratory techniques used in the processing of specimens and identification of parasites and fungi.
CO-4	To learn about the different types of dimorphic fungi
CO-5	To learn about the pathogenic and non pathogenic fungi

Course Outcome	
Title	**Medical Mycology and Parasitology**
Course Code	
CO-1	Understand the classification and characteristics of fungi and parasites.
CO-2	Provide knowledge about collection and transport of Specimens.
CO-3	Studied the pathogenesis and laboratory diagnosis of disease caused by parasites .
CO-4	Prevention and awareness of public health.
CO-5	Understand the diagnosis procedures of fungi

Syllabus	
Title	**Medical Mycology and Parasitology**
Course Code	
Unit 1	Morphology, Taxonomy, Reproduction, Classification of fungi.Generalcharacteristics of Zycomycetetes, Ascomycetes, Basidiomycetes and Deuteromycetes.
Unit 2	Superficial Mycoses- Pityriasisversicolor, Tineanigra, Piedra. Cutaneous MycosesDermatophytoses(Trichophyton, Epidermophyton and Microsporum). Subcutaneous Mycoses- Eumycoticmycetoma.Systemic Mycoses- Histoplasmosis.Oppurtunistic Mycoses- Candidiasis andCryptococcosis.
Unit 3	Collection and transport of specimens. Isolation of fungi from clinical specimens: Methods for direct microscopic examination of specimens (KOH wet mount, KOH with calcofluor white, India ink, Tissue stains, LPCB stain, cellophane tape mount), culture technique-primary media, slide culture technique, germ tube test, Carbohydrate fermentation and assimilation test. Antifungal agents.
Unit 4	General introduction to Medical Parasitology.Classification of medically important parasites. Morphology, life cycle, pathogenesis, clinical features, laboratory diagnosis, prevention and treatment of diseases caused by the following organisms: Entameoba (histolytica and coli), flagellates (Giardia lamblia, Leishmaniadonovani), Sporozoa- Plasmodium (malariaeandfalciparum).
Unit 5	Introduction to Helminths. Platyhelminthes: Taenia (sagi solium), Schistosomahaematobium, Fasciola hepatica, Paragonimuswestermani. Nematihelminthes: Ascarislumbricoides, Enterobiusvermicularis, Wuchereriabancrofti, Dracunculusmedinensis. Laboratory techniques in parasitology: Examination of faeces for ova and cyst by direct wet mount and iodine wet mount, concentration methods (Floatation and sedimentation techniques), Examination of blood for parasites. Cultivation ofprotozoanparasites.

Course Objectives	
Title	**Medical Virology**
Course Code	
CO-1	To provide knowledge, about virus, their structure, DNA and RNA viruses, effect of virus on cell growth,
CO-2	To provide Knowledge about the cultivation of virus
CO-3	Learn about the different types of cell culture and vaccine production
CO-4	To provide knowledge about the replication stages of different virus
CO-5	To learn about the diagnosis and prophylaxis procedures of virus

Course Outcome	
Title	**Medical Virology**
Course Code	
CO-1	Students gain knowledge of properties, diagnosis and cultivation of virus.
CO-2	Understand and learn about various virus life cycle and treatment of viral infections
CO-3	Able to learn about immunization schedule.
CO-4	Learn about various types of bacteriophage, their structure, and life cycle of bacteriophage
CO-5	Gains knowledge about antiviral agents and also about vaccine production

Syllabus	
Title	**Medical Virology**
Course Code	
Unit 1	General characteristics of viruses: Structure (nucleic acid, capsid, envelope) and replication. Laboratory diagnosis of viral diseases: Microscopy, culture and isolation, serological diagnosis of viral infections. Cultivation of viruses– inoculation in animals, embryonated eggs and tissue culture.
Unit 2	Morphology, mode of transmission, pathogenesis, symptoms, laboratory diagnosis, prophylaxis and control of diseases caused by the following viruses – Arboviruses (Flavi virus), Picorna viruses (Polio virus and Rhinovirus), Hepatitis viruses (HAV, HBV, HCV, HDV), Rabies virus, Orthomyoviruses (Influenza virus) and Paramyxoviruses (Mumps and Measles virus).
Unit 3	Pox viruses (Variola, Vaccinia), Herpes viruses (Herpes simplex, Varicella zoster), Adeno viruses, Rota viruses and HIV viruses. Oncogenic viruses (Human Papilloma virus): Introduction, characteristics of transformed cells, mechanism of viral oncogenesis and clinical manifestations.
Unit 4	Bacteriophages – Types, Morphology and life cycle (lytic and lysogenic). Significance of phages.Study of recent outbreaks of human diseases (SARS, Swine flu, Ebola, Dengue, Chikungunya) – causes, spread and preventive measures.
Unit 5	Antiviral agents and their mode of action.Interferons. Viral vaccines - types, Immunization schedule.

Course Objectives	
Title	**Practical V Medical Bacteriology, Mycology, Parasitology and Virology**
Course Code	
CO-1	This course helps to learn about collection, transportation, processing of different clinical specimens and also enhances the skills of techniques to isolate and identify pathogenic bacteria, fungi, bacteriophages and parasites from clinical specimens.
CO-2	To learn about the cultural characteristics of different bacteria
CO-3	To learn about the different types of selective media and differential media
CO-4	To learn about the biochemical characterization of various bacteria
CO-5	To learn about the antimicrobial sensitivity of various bacteria

Course Outcome	
Title	**Practical V Medical Bacteriology, Mycology, Parasitology and Virology**
Course Code	
CO-1	Learn the procedure for collecting, transporting of clinical specimens and processing by staining techniques and enumeration methods.
CO-2	Enhances the skills of isolation, identification and sensitivity of pathogen to a particular antibiotic which can be given for treating patients against pathogen.
CO-3	Helps students to isolate bacteriophages from sewage sample by plaque assay method
CO-4	The course describes the diagnosis methods to identify the pathogen by various tests and also helps to suggest particular antibiotics against the bacteria.
CO-5	The course also helps to students to know the epidemiology and prophylaxis methods related to the pathogen.

Syllabus	
Title	**Practical V Medical Bacteriology, Mycology, Parasitology and Virology**
Course Code	
Unit 1	General requirements for collection and transport of clinical Specimens. Isolation of organisms from clinical materials viz: Throat swab, Pus, Urine, Sputum, Stool etc. Enumeration of Bacteria in Urine, Quantitative UrineCulture
Unit 2	Identification of bacterial pathogens from clinical specimens and their biological reactions.Simple, differential and special staining techniques.Antimicrobial Sensitivity testing by Kirby-Bauer disc-diffusion technique and determination of MIC by broth dilution method. **UNIT III** Identification of pathogenic viruses in Slides/ Smears / Spotters.Isolation of phage from naturalsources.
Unit 3	Identification of pathogenic viruses in Slides/ Smears / Spotters.Isolation of phage from naturalsources.
Unit 4	KOH and Lactophenol preparations for skin scrapings for dermatophytes.Microscopic identification and cultural characteristics of medically important fungi and lab contaminants. Germ tube, carbohydrate assimilation and fermentation tests for yeasts.
Unit 5	Direct examination of faeces- wet mount and Lugol's iodine method-demonstration of protozoan cysts and helminthes eggs. Concentration techniques of stool specimen- floatation and sedimentation methods.Examination of blood for malarial parasites- thin and thick smearpreparation.Identification of pathogenic parasites in slides/ specimens as spotters.

Course Objectives	
Title	**Elective I Biotechnology and Genetic Engineering**
Course Code	
CO-1	The purpose of this course is to introduce the basic molecular biological concepts and techniques used in the fields of genetic engineering.
CO-2	It helps to learn about the different types of vectors
CO-3	To learn about the various recombinant pharmaceutical products
CO-4	To understand about the various types of enzymes used in genetic engineering
CO-5	To learn about the application of transgenic plants and transgenic animals

Course Outcome	
Title	**Elective I Biotechnology and Genetic Engineering**
Course Code	
CO-1	Gaining an appreciable knowledge of dealing with ethical issues relating to science
CO-2	Gaining and understanding basic molecular and cellular biology concepts and techniques.
CO-3	Gaining the knowledge about current experimentation in genetic engineering.
CO-4	Gaining knowledge about the various types of vectors used in genetic engineering
CO-5	From that curriculum students know about the ethical issues about the biotechnological products

Syllabus	
Title	**Elective I Biotechnology and Genetic Engineering**
Course Code	
Unit 1	Biotechnology–Definition & history, Microbial production of industrial enzymes (Amylase , Lipase , Proteases). Methods for immobilization of enzymes, application of soluble and immobilized enzymes; enzyme-based sensors.
Unit 2	Production of biotechnological products- Insulin, interferon, human growth hormone, recombinant vaccine, gene therapy methods.
Unit 3	Principles and application of genetic engineering. Host cell restriction; Restriction modification; Restriction enzymes: Types- Nucleases, Ribonucleases, DNA ligases, Tag DNA Polymerases, Methylases, Topoisomerases (I and II), Gyrases, and ReverseTranscriptases.
Unit 4	Vectors: Plasmid vectors: pSC101, pBR322, pUC series (18, 19) and Tiplasmids based vectors; Bacteriophage vectors: Lambda phage vectors, phagemids, cosmids, Viral vectors: Vaccinia, Retroviral, SV40 and Baculoviral system
Unit 5	Methods of Gene transfer – transformation, Electroporation, microinjection and biolistic gun. Genomic DNA and cDNA library Construction; Screening methods- Analysis of Recombinant DNA; Polymerase chain reaction; Principles and techniques of nucleic acid hybridization; Southern, Northern, Western blotting techniques Applications of genetic engineering in agriculture; health and industry. Development of transgenic plant andanimal.

Course Objectives	
Title	**Environmental Microbiology**
Course Code	
CO-1	To provide a basic understanding of environmental microbiology including
CO-2	The functional diversity of microorganisms in the environment in relation to human welfare and ecosystem health
CO-3	Microbial interactions with pollutants in the environment and the fate of microbial pathogens in the environment.
CO-4	To learn the basic principles of environment microbiology and be able to apply these principles to understanding and solving problems in water quality and bioremediation.
CO-5	To become familiar with current research in environmental microbiology.

Course Outcome	
Title	**Environmental Microbiology**
Course Code	
CO-1	Appreciate the diversity of microorganism and microbial communities inhabiting a multitude of habitats and occupying a wide range of ecological habitats.
CO-2	Learn the occurrence, abundance and distribution of microorganism in the environment and their role in the environment and also learn different methods for their detection and characterization
CO-3	Competently explain various aspects of environmental microbiology and microbial ecology and to become familiar with current research in environmental microbiology.
CO-4	Understand the basic principles of environment microbiology and be able to apply these principles to understanding and solving environmental problems – waste water treatment and bioremediation
CO-5	Know the Microorganisms responsible for water pollution especially Water- borne pathogenic microorganisms and their transmission

Syllabus	
Title	**Environmental Microbiology**
Course Code	
Unit 1	Introduction: Organization of the biosphere and components of ecosystem, Natural habitats of microorganisms, Microbial communities in aquatic and terrestrial habitats, Microorganisms as components of ecosystem-as producers and decomposers
Unit 2	Microbes in air: Composition of Air; Number and kinds of organisms in air; Distribution and sources of air borne organisms, droplet nuclei - aerosol , Assessment of air quality - some important air borne diseases caused by bacteria, fungi, viruses their symptoms and preventive measures.
Unit 3	Aquatic Microbiology: Distribution of Microorganisms in the Aquatic Environment- fresh water (ponds,lake,River), Sources and Types of Water Pollution, Biological Indicators of Water Pollution. Determination of the quality of Water - MPN Index, Membrane Filtration, Biological Oxygen Demand potability of water - microbial assessment of water quality, water borne diseases and preventive measures.
Unit 4	Waste Treatment: Types of wastes - Characterization of solid and liquid wastes - wastes treatment and useful byproducts, Solid - Saccharification - gasification – composting, Vermicoposting - liquid waste treatment - aerobic - anaerobic methods.
Unit 5	Degradation of pesticides and detergents; Degradation of lignin; synthetic polymers, Petroleum and hydrocarbon degradation, Detoxification of heavy metals (chromium, lead, arsenic, mecury).

Course Objectives	
Title	**Food & Dairy Microbiology**
Course Code	
CO-1	This course helps students to learn the different microflora in different foods and factors influencing their growth.
CO-2	This course provides knowledge on the role of food microbiota in spoilage, contamination and Preservation.
CO-3	It also helps students to study the food borne diseases and their outbreaks along with their investigation methods.
CO-4	This course concentrates on the preparation of different fermented products (cheese, yogurt, oriental fermented foods, etc.,)
CO-5	This course helps students to learn the different microflora in different foods and factors influencing their growth.

Course Outcome	
Title	**Food & Dairy Microbiology**
Course Code	
CO-1	Understand the significance and activities of various microorganisms in Food.
CO-2	Ability to learn the different preservation techniques such as low temperature, freezing, etc., chemical preservation to prevent food spoilage and contamination.
CO-3	Know the important spoilage organisms and their mechanisms in foods and thus identify methods to control.
CO-4	It provides the knowledge on the basis of food safety regulations and the use of standard methods and procedures for the microbiological analysis of food
CO-5	It helps students to know the beneficial role of microorganisms in fermented foods and in food processing of different types of fermented food products

Syllabus	
Title	**Food & Dairy Microbiology**
Course Code	
Unit 1	Food as a substrate for micro organisms-.Micro organisms important in food microbiology; Molds, yeasts and bacteria - General Characteristics - Classification and importance
Unit 2	Principles of food preservation - Asepsis - Removal of micro organisms, anaerobic conditions - High temperature - Low temperature - Drying - Food additives.
Unit 3	Contamination and spoilage - Cereals, sugar products, vegetables and fruits, meat and meat products, milk and milk products - Fish , Poultry
Unit 4	Food borne infections and intoxications - bacterial, non -bacterial - Food borne disease outbreaks - Laboratory testing - preventing measures - Food sanitation - plant sanitation -Employees' health standards.
Unit 5	Food fermentations: Bread cheese, vinegar, fermented vegetables (sauerkraut), fermented dairy products (yoghurt,). Spoilage and defects of fermented dairy products - oriental fermented foods

Course Objectives	
Title	**Practical VI ENIVRONMENTAL, FOOD& DAIRYMICROBIOLOGY**
Course Code	
CO-1	This course helps students to learn the different analysis techniques in isolation, enumeration of bacteria, yeast and mold from different food samples, water, air, milk etc.
CO-2	It provides the skills for handling the disease outbreak.
CO-3	It helps in creating basic skills in handling the laboratory procedures.
CO-4	It helps to learn about the quality of milk
CO-5	To learn about the microbial load iin various water samples.

Course Outcome	
Title	**Practical VI ENIVRONMENTAL, FOOD& DAIRYMICROBIOLOGY**
Course Code	
CO-1	Helps to learn the enumeration of bacteria in milk sample by Standard Plate Count Method.
CO-2	Ability to learn the rapid test to check the quality of milk samples and determine the reason for the contamination
CO-3	Know the presence of important and common spoilage organisms in various spoiled foods like nuts etc., by their morphological features, staining techniques and biochemical studies.
CO-4	Enhances the knowledge on finding the BOD and COD level of waste water and report the quality of drinking water by standard procedures
CO-5	It provides the knowledge on the prevalence of air microflora in different locations by settle plate method. Helps to create knowledge on detection of aflatoxins from food samples

Syllabus	
Title	**Practical VI ENIVRONMENTAL, FOOD& DAIRYMICROBIOLOGY**
Course Code	
Unit 1	Detection of number of Bacteria in milk by breed count. Detection of number of bacteria in milk by standard plant count.
Unit 2	Determination of quality of milk sample by methylene blue reductase test and Resorzurin method.
Unit 3	Isolation of yeast and molds from spoiled nuts, fruits, and vegetables. Bacteriological examination of specific food a) Curd b) Raw meat c) Fish d) Ice cream
Unit 4	Determination of BOD and COD of wastewater. Water analysis a) MPN method b) Memberane filter method.
Unit 5	Quantification of microorganisms in air by settle plate and air sampler methods. Detection of aflatoxin B1 from moldy grains using thin layer chromatography

Course Objectives	
Title	**Elective II Industrial & Pharmaceutical Microbiology**
Course Code	
CO-1	To provide knowledge and understanding of Pharmaceutical Microbiology relevant to health care.
CO-2	To provide knowledge about use of microorganisms to manufacture antibiotics, protein.
CO-3	Ability to apply the techniques used in different phase of industry.
CO-4	To learn about the various quality control of pharmaceutical products
CO-5	To learn about the media formulation of different types of microorganisms grown in large scale production

Course Outcome	
Title	**Elective II Industrial & Pharmaceutical Microbiology**
Course Code	
CO-1	Discover new useful microorganism and store for later use
CO-2	Describe the main steps and process used to produce biological products in industry.
CO-3	Understand ethical and commercial issues such as patenting and licensing
CO-4	Understand the different types of primary and secondary metabolites of microorganisms
CO-5	Understand about the commercial value of microbial products

Syllabus	
Title	**Elective II Industrial & Pharmaceutical Microbiology**
Course Code	
Unit 1	General introduction to fermentation process. Industrially important microbes (Streptomyces, Saccharomyces, Penicillium) Fermentation media-desired qualities- media formulation strategies- carbon, nitrogen, vitamin, mineral sources, role of buffers, precursors, inhibitors, inducers and antifoams.
Unit 2	Types of fermentation-fermentors-basic functions, design and components, asepsis and containment requirement.Specifications of fermentors- sterilization of fermentors- aseptic inoculation methods
Unit 3	Microbial products of commercial use-Penicillin, ethanol, vitamin B12, protease, citric acid and glutamic acid.

Unit 4	Down stream processing - objective and criteria, foam separation, precipitation methods, filtration, industrial scale centrifugation and cell disruption methods. Liquid-liquid extraction, solvent recovery-chromatography
Unit 5	Ecology of microorganisms affecting pharmaceutical industries-atmosphere-water- raw materials- packaging- equipment. Factors affecting microbial spoilage of pharmaceutical products - Cotntrol of contamination during manufacture- good pharmaceutical manufacturing process.Quality control and validation of Pharmaceutical products.Sterility test-Microbial limit test (*Staphylococcus, E.coli, Salmonella* and *Pseudomonas*).

Course Objectives	
Title	**: Elective III: Microbial Marketable Products**
Course Code	
CO-1	To provide knowledge and understanding of Microbial products
CO-2	To make them learn the large scale cultivation microbes used as bio fertilizers, food, SCP etc.,
CO-3	To provide knowledge about the , trademarking, licensing and Marketing of the products
CO-4	To learn about the patent of the various products

Course Outcome	
Title	**Elective III: Microbial Marketable Products**
Course Code	
CO-1	Acquire the knowledge about Spirulina cultivation and edible mushroom cultivation
CO-2	Acquire a thorough understanding of the importance of probiotics in human health and their production on a large scale
CO-3	Get an awareness of the availability of natural pigment and its application, Bio fertilizers and their application
CO-4	Imbibe knowledge on the various marketing strategy such as patenting, trade mark, marketing, license procurement etc.
CO-5	Get aawarness about the cultivation of mushroom to improve the economic scale of the students
CO-5	To learn about the probiotic property in commercial microorganisms

Syllabus	
Title	**: Elective III: Microbial Marketable Products**
Course Code	
Unit 1	Morphology and structure of *Spirullina maxima* and *Spirullinsplatensis.*Biochemicalcomposition,phycobiliprotein, beta carotene and UV Protecting pigments. Methods of cultivation - Freshwater, marine and hyper saline – photobioreactors, plate method, tubular, annular and plate airlift. Tank construction, Race way pond – open and closed - construction, Scale-up cultivation.Contaminants identification and processing.Harvesting, drying and packaging.Uses& Application of Spirulina.
Unit 2	Mushroom fungi – *Agaricus*sp.,*Calocybe*sp., *Pleurotus*sp., and *Volvariella*sp., biochemical composition, nutrient value, compounds and flavanoids. Cultivation – Tropical and temperate types, growth media preparation - compost, waste recycling, isolation, spawn production; spawn running, harvesting and packing. Construction cultivation shed - Small scale and large scale production setup. Diseases and control measures. Medicinal properties,
Unit 3	Introduction probiotics, mechanism of probiotics, Probiotic microorganism- Bacteria and Yeast Structure and cultural characteristics of *Lactobacillus* sp., *Saccharomyces* sp. Nutritional sources, yeast propagation. Cultivation and fermentation techniques: Raw materials, Fermentor design, construction, production, microbial growth requirements, quality testing, stability during storage, packing. Commercial Probiotic dairy products, Health benefits.Safety of probiotics in legalstatus
Unit 4	Microbial pigments – allophycocyanin, phycocyanin, phycoerythrin, chlorophyll (Bacterial andcyanobacterial), Pigment proteins applications – medical, industrial and textile, extraction methods. biological nutrient management – organic manures, Biofertilizers – soil improvement, structure and cultural characteristics of *Rhizobiu*m sp., *Azotobacter*sp., *Azospirillum*sp., *Nostoc*sp. Cultivation – raw material, fermentor design, mass production, harvesting, macro quality analysis, grading, Packaging and post harvestmanagement.
Unit 5	General principle of intellectual property rights, concept of property..Forms of IPR- law of copyrights, Trademark, Patents, industrial design, trade secrets, application of different forms.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF PHYSICS

PROGRAM :B.Sc PHYSICS

Program Objectives	
	On Completion of Program student will able to
PO-1	Become knowledgeable in the subject of Physics and apply the principles of the same to the needs of the Institution
PO-2	Gain Analytical skills in the fields of Physics
PO-3	Makes the student to feel the power of knowledge
PO-4	Makes the student to confidently compete with any graduate
PO-5	Perform experiments and interpret the results of observation, including making an assessment of experimental uncertainties, device performance and fabrication of circuits in PC Boards.

Program Specific Outcomes	
	On Completion of Program student will able to
PSO-1	Apply the basic principles of Physics to the events occurring around us and also in the world.
PSO-2	Apply the knowledge of physics in the domain of research and development
PSO-3	Apply the knowledge to develop the sustainable and eco-friendly technology for pollution free environment.
PSO-4	Collaborate effectively on team-oriented projects in the field of Physics.
PSO-5	. Understand the concepts and significance of the various physical phenomena

Course Objectives	
Title	**PROPERTIESOFMATTERANDSOUND**
Course Code	**SR21A**
CO-1	To make the students learn the properties of material sand acoustics.
CO-2	To understand the bending of beams
CO-3	To study the waves and oscillations
CO-4	To gain over all knowledgein acoustics
CO-5	the different methods of producing ultrasonic waves

Course Outcome	
Title	**PROPERTIESOFMATTERANDSOUND**
Course Code	**SR21A**
CO-1	Analyze the strength of materials in terms of their size and shape.
CO-2	Understand the fluid dynamics that gives the fundamental knowledge over many practical applications
CO-3	Analyze the phenomena of simple harmonic motion and the properties of systems executing such motions
CO-4	Know the different methods of producing ultrasonic waves and its applications
CO-5	Determine the modulus of elasticity through different experimental techniques

Syllabus	
Title	**PROPERTIESOFMATTERANDSOUND**
Course Code	**SR21A**
Unit 1	ELASTICITY(12HOURS) Hooke's Law – Stress–Strain diagram –Elastic constants –Poisson's ratio – Relation betweenelastic constants and Poisson's ratio – Workdoneinstretchingand twisting awire – Twistingcoupleonacylinder - Rigidity modulus by Static torsion– Torsionalpendulum (withandwithoutmasses)
Unit 2	BENDINGOFBEAMS(12Hours) Cantilever– Expression for Bending moment – Expression for depression at the loaded end of thecantilever–Oscillations of a cantilever – Expression for time period-Experiment to find Young'sModulus – Non-Uniform bending– Experiment to determine Young's Modulus by Koenig'smethod- Uniform Bending-Expression for elevation-Experiment to determine Young's Modulususingmicroscope
Unit 3	BENDINGOFBEAMS(12Hours) Cantilever– Expression for Bending moment – Expression for depression at the loaded end of the cantilever–Oscillations of a cantilever – Expression for time period-Experiment to find Young's Modulus – Non-Uniform bending– Experiment to determine Young's Modulus by Koenig's method- Uniform Bending-Expression for elevation-Experiment to determine Young's Modulus using microscope Viscosity:-Definition-Streamline and Turbulent motion – Rate of flow of liquid in a capillary tube-Poiseuille's formula –Corrections-Terminal Velocity and Stoke's formula–Variation of Viscosity of a liquid with Temperature
Unit 4	WAVESANDOSCILLATIONS(12Hours) Simple Harmonic Motion – Differential Equation of SHM – Graphical representation of SHM –Composition of two S.H.M in a straight line-at right angles-Lissajous's figures-Free, Damped,Forcedvibrations-Resonance andSharpness of resonance.Lawsoftransversevibrationofstrings-Sonometer-DeterminationofACfrequencyusingsonometer-DeterminationoffrequencyusingMelde'sapparatus.
Unit 5	ACOUSTICSOFBUILDINGSANDULTRASONICS(12Hours) Intensity ofsound – Decibel – Loudnessofsound –Reverberation – Sabine'sreverberationformula –Acoustic Intensity–Factors affectingtheAcoustics ofBuildings.Ultrasonicwaves–ProductionofUltrasonicWaves–Piezoelectriccrystalmethod–Magnetostrictioneffect–ApplicationofUltrasonic Waves.

Course Objectives	
Title	**THERMALPHYSICS**
Course Code	**SR22A**
CO-1	Tomakethestudentsunderstandthevariousthermodynamicalconceptsandprinciplesandtosolveproblems.
CO-2	To study about thermometry.
CO-3	To learn entropy and thermodynamic relations.
CO-4	To gain over all knowledge in thermal physics
CO-5	To basic aspects of kinetic theory of gases and the mean free path of molecular collision

Course Outcome	
Title	**THERMALPHYSICS**
Course Code	**SR22A**
CO-1	Acquire knowledge of Heat and different measurement techniques in calorimetry
CO-2	Use thermodynamic terminology correctly
CO-3	Explain fundamental thermodynamic properties
CO-4	Learn the basic aspects of kinetic theory of gases and the mean free path of molecular collision
CO-5	know about Vander Waals' equation of state and the Joule-Thomson effect

Syllabus	
Title	**THERMALPHYSICS**
Course Code	**SR22A**
Unit 1	**KINETICTHEORYOFGASESANDMEANFREEPATH(12Hours)** Review of results of kinetic theory of gases: (Pressure exerted by gas -rms, average and mostprobable speed-Equipartition Theorem – Heatcapacities)-Distribution of molecular velocitiesin aperfectgas-Distributionofmolecularspeeds-Mean freepath(ZerothandFirst order)
Unit 2	**TRANSPORTPHENOMENAANDREALGASES(12Hours)** Transportphenomena-Viscosity (Zeroth orderapproximation)-Effectsof TemperatureandPressure on viscosity- Thermal Conductivity- Diffusion – Real gases -Deviations from Perfectgas behaviour- Regnault's Experiment – Vander Waals' equation of state – Discussion of VanderWaals' equation – Joule Experiment – Porous Plug experiment – Joule –Thomson Coefficient forVanderWaals'gas
Unit 3	**THERMOMETRYANDCALORIMETRY(12Hours)** Platinum resistance thermometer – Calendar and Griffith's bridge – Thermistor – Specific heatcapacity – Specific heat capacity of solids – Dulong and Petit's law – Specific heat capacity ofliquid – method of mixtures – Barton's correction – Specific heat capacity of gases – C_p and $C_v$by Regnault's andCallendar& Barne'smethods–Variation of SpecificHeatCapacity ofDiatomic Gases.
Unit 4	**ENTROPYANDTHERMODYNAMICRELATIONS(12Hours)** Entropy- Entropy change in reversible processes – Reversible heat transfer- Clausius inequality -Entropy change in irreversible process-the principle of increase of entropy-Joule's expansion-the entropy form of first law- Entropy of an Ideal gas- Entropy of mixing - Unavailable energy:Thermal death of universe - Physical concept of entropy-Maxwell relations-Thermodynamicrelationsinvolvingheatcapacities-TdSequations.
Unit 5	

Course Objectives	
Title	**MATHEMATICALMETHODSINPHYSICS**
Course Code	**SR23A**
CO-1	To familiarize students with essential mathematical methods for solving advanced problems intheoreticalphysics.
CO-2	Tounderstandthespecial functions.
CO-3	Tostudythematrices and eigenvalues and eigen vectors
CO-4	Togain overall knowledge in applications of Mathematics.
CO-5	To develop the skill of problem-solving ability

e

Course Outcome	
Title	**MATHEMATICALMETHODSINPHYSICS**
Course Code	**SR23A**
CO-1	To use advanced mathematical methods and theories on various mathematical and physics problems.
CO-2	To develop the skill of problem-solving ability
CO-3	Use Matrices to solve simultaneous equations
CO-4	Solve quantum mechanical problems using special functions and polynomials.
CO-5	Apply Fourier series to simple circuits.

Syllabus	
Title	**MATHEMATICALMETHODSINPHYSICS**
Course Code	**SR23A**
Unit 1	**VECTORCALCULUS(12Hours)** ScalarandVectorFields-GradientofaScalarfunction-DivergenceofaVectorfunction-Curl-Line Integral, SurfaceIntegraland Volume Integral (Simple Problems) - Gauss DivergenceTheorem-Stoke'sTheoremandGreen'sTheorem(StatementandProof)-SphericalPolarCoordinates - Expressions for Gradient, Divergence, Curl and Laplacian Operator in Cartesian andSphericalPolarCoordinates.
Unit 2	**SPECIALFUNCTIONS(12Hours)** Special Functions - Beta and Gamma Functions- Definitions - Symmetry Property of Betafunction- Evaluation of Integralsusing BetafunctionTransformationofBetafunction-EvaluationofGammaFunction-Thevalueof Transformations of Gammafunction (Otherforms) - Relation between Beta and Gamma functions - Simple Problems in beta and gammafunctions-SeriesSolutionsforBessel,Legendre and HermiteDifferentialEquations
Unit 3	**MATRICES(12Hours)** Special Types of Matrices - Symmetric and Skew-symmetric Matrices - Hermitian and Skew-HermitianMatrices-OrthogonalMatrices-UnitaryMatrices-Properties-CharacteristicsEquation - Determination of Eigen valuesand Eigen vectors- Properties - Statementand Proofof Cayley-Hamilton Theorem -SimpleProblems-Inverseof Matrixby CHTheorem-Diagonalizationof2x2RealSymmetric Matrices.
Unit 4	**COMPLEXVARIABLES(12Hours)** Basics of Complex Numbers and their Graphical Representation - Euler's Formula, De-Moivre'sTheorem - Functions of Complex Variables - Limit, Continuity and Differentiability - AnalyticFunction-Definition-Cauchy-RiemannConditions-ExamplesofAnalyticFunctions(Analyticity)-Cauchy-RiemannConditionsinPolarForm
Unit 5	**FOURIERSERIES(12Hours)** Fourier Series in the interval (-π to π) - Definition – Dirichlet's Conditions (Statement Only) -Determination of Fourier Coefficients -Even and Odd Functions and their Fourier expansions.Sine and Cosine Periodic Functions - Simple Problems in Fourier Series in the interval (-π to π) - ApplicationsofFourierseries-HalfWaveRectifierandSawToothWave.

Course Objectives	
Title	**MECHANICS**
Course Code	**SR24A**
CO-1	To make the students understand the basic principles of mechanics and enable them to analyze and solve problems
CO-2	To learn the laws of motion.
CO-3	To study the principles behind planetary motion.
CO-4	To gain over all knowledge in mechanics
CO-5	Understand the space - time concept through relativity

Course Outcome	
Title	**MECHANICS**
Course Code	SR24A
CO-1	Understand the Newton's law of motion
CO-2	Know the motion of a particle in a Gravitational, electric and magnetic fields
CO-3	Acquire knowledge on the conservation law
CO-4	Gain knowledge on the basics of dynamics of linear and rotational motion
CO-5	Realize the basic principles behind planetary motion

Syllabus	
Title	**MECHANICS**
Course Code	**SR24A**
Unit 1	**NEWTON'SLAWS OFMOTION(12Hours)** Newton's Laws of Motion- Forces and Equations of Motion- Motion of a Particle in a UniformGravitational Field- Newtonian law of Universal Gravitation-Examples-Electric and MagneticForces on aChargedParticle-TheMagneticFieldandLorentzForce-Examples-Motion ofCharged Particle in a Uniform Electric and Magnetic Field-Conservation of Momentum-ContactForces:Friction-Problems
Unit 2	**CONSERVATION LAWS(12Hours)** Definition of concepts-Conservation of Energy-Work-Kinetic and Potential energy- Examples-Conservative Forces-Potential Energy and Conservation of Energy in Gravitational and Electricfield-Example Conservation of Linear and Angular Momentum: Internal forces and Momentum conservation-Center of mass- Examples- General Elastic Collision of Particles of Different Masses- Systemwith VariableMass-Examples-Conservation of Angular Momentum-Torque due toInternalForces-Torque due to Gravity- Angular momentum about Center Of Mass- Proton scattering byheavynucleus.
Unit 3	**HARMONICOSCILLATORANDINVERSESQUARELAWOFFORCE** Mass on spring-Simple Pendulum (Force, energy and torque method)-Compound Pendulum-LCcircuit- Motion of systems displaced from position of stable equilibrium-Average kinetic energyandpotentialenergy.Inverse Square Law of Forces and Static Equilibrium- Orbits: Equation and Eccentricity-Circularorbit-Kepler'slaws-Examples
Unit 4	**ELEMENTARYRIGIDBODYDYNAMICS (12Hours)** The Equation of Motion-Angular Momentum and Kinetic Energy-Moment of inertia-ParallelAxisTheorem-PerpendicularAxisTheorem-Examples-Rotationaboutfixedaxis:TimeDependenceofMotion-Examples-Rollingwithoutslipping(threemethods)-TorqueaboutCenterofMass-Examples
Unit 5	**SPECIALRELATIVITY (12Hours)** ConstancyofSpeedoflight-Michelson-MorleyExperiment-Invarianceof'c'–Basicassumptions- Lorentz Transformation- Length Contraction-Examples- Time Dilation of MovingClocks–Examples–VelocityTransformation–VelocityAddition–VariationofMasswithVelocity-Aberrationoflight–LongitudinalDopplerEffect

Course Objectives	
Title	**OPTICS&SPECTROSCOPY**
Course Code	
CO-1	Tounderstandthedefectsinlensesandrectifyingmethods.
CO-2	TostudytheapplicationsofInterference,diffractionandpolarization.
CO-3	Togainoverallknowledgeinspectroscopic techniques
CO-4	Extract the dynamic information about the molecules using the spectroscopic techniques
CO-5	resolving power and dispersive power

Course Outcome	
Title	**OPTICS&SPECTROSCOPY**
Course Code	
CO-1	Know the methods of rectifying different defects in lenses.
CO-2	Work with interferometers and other optical instruments.
CO-3	Distinguish between resolving power and dispersive power.
CO-4	Understand the rectilinear propagation of light.
CO-5	Be conversant with production and detection of different types of polarized light.

Syllabus	
Title	**OPTICS&SPECTROSCOPY**
Course Code	
Unit 1	**GEOMETRICALOPTICS(12Hours)** Aberrationinlenses-Sphericalaberrationinalens - Methodsofminimizingsphericalaberration- Condition for minimum spherical aberration in the case of two lenses separated by a distance -Chromatic aberration in lenses - Condition for achromatism of two thin lenses (In and out ofcontact) - Dispersion produced by a thin prism - Achromatic prisms - Combination of prisms toproduce(i)Dispersionwithoutdeviation(ii)Deviationwithoutdispersion- Directvisionspectroscope. Eyepieces-Ramsden'sandHuygens'seyepieces -Construction,Theory
Unit 2	**INTERFERENCE(12Hours)** Analytical treatmentof interference-Expression forintensity -Condition formaxima andminima in terms of phase and path difference - Coherent

	sources, Interference in thin films –transmitted and reflected - Colour of thin films -Air wedge - Determination of diameter of thinwire - Test for optical flatness - Determination of wavelength of light using Newton's rings - Haidinger's fringes - Michelson's Interferometer – Theory - Applications - Determination ofwavelength-Thicknessofthintransparentmaterialandresolutionofinterferometer.
Unit 3	**DIFFRACTION (12Hours)** Fresnel diffraction - diffraction at a circular aperture and narrow wire – Fraunhofer diffraction -Single slit - Double slit - (Simple theory) - Plane diffraction grating – Plane transmission gratingelement– Missingorder-Overlappingspectra-Maximumnumberoforders-Determinationof wavelengths using grating - Normal incidence - Dispersive power of a grating - Rayleigh'scriterion for resolution - Limit of resolution of the eye - Resolving power of Telescope andmicroscope - Resolving power of prism and grating - Difference between resolving power anddispersive power.
Unit 4	**POLARISATION(12Hours)** Doublerefraction-Nicol prism -Polarizerandanalyser-Huygensexplanation of doublerefraction in uni-axial crystals - Dichroism - Polaroids and their uses - Double image polarizingprisms - Quarterwave plate and Half wave plate-Plane, elliptically and circularly polarizedlight-Productionanddetection-Babinet'sCompensator-OpticalActivity-Fresnel'sexplanation of optical activity - Specific rotatorypower - Determination using Laurent's halfshade polarimeter.
Unit 5	**SPECTROSCOPY (12Hours)** Introduction to spectroscopy - Electromagnetic spectrum - Characterization of electromagneticradiation - Quantization of energy - Regions of the spectrum – Classification of molecules –Microwave spectroscopy – Rigid rotator - Vibrational spectroscopy – Harmonic oscillator -Raman effect - Experimental set up - Characteristics of Raman lines -Ultraviolet spectroscopy-Origin and theory of ultraviolet spectra- Introduction to Nuclear Magnetic Resonance – QuantumdescriptionofNMR-Larmorequation-Chemicalshift(Qualitative study)

Course Objectives	
Title	**ELECTRICITYANDELECTROMAGNETISM**
Course Code	
CO-1	To give the students a firm understanding of the basics of Electricity and Magnetism.
CO-2	Tofamiliarizethefundamentalsofelectromagnetictheoryandapplication sofelectromagneticinduction
CO-3	To learn Electromagnetic inducations and its applications.
CO-4	To acquire overall knowledge in electromagnetism.
CO-5	the relation between electric and magnetic fields

Course Outcome	
Title	**ELECTRICITYANDELECTROMAGNETISM**
Course Code	
CO-1	Demonstrate Gauss law, Coulomb's law for the electric field and apply it to systems of point charges as well as line, surface and volume distribution of charges
CO-2	Understand the principle of capacitors and dielectric properties
CO-3	Explain Faraday and Lenz's laws to articulate the relation between electric and magnetic fields
CO-4	Use Ballistic Galvanometer with the state of art.
CO-5	Apply Maxwell’s equations to arrive at different optical constants

Syllabus	
Title	**ELECTRICITYANDELECTROMAGNETISM**
Course Code	
Unit 1	**ELECTROSTATICSI (12Hours)** Properties of charges - Coulomb's law and its Validity –Superposition Principle – Electric fieldand Electric Potential – Relations between field and potential - Energy consideration – Flux –Gauss law – Linear, Surface and Volume charge distributions – Solutions of Laplace equation – StabilityofCharges–Electricdipole–Multipoleexpansion
Unit 2	**CONDUCTORS,CAPACITORSANDDIELECTRICS(12Hours)** ElectricalImagesanditsApplications(EarthedsheetandearthedSphericalconductor)–Capacitance – Energy Consideration – Classical Radius of an Electron –Polarization Density –Polarization Charge Densities – Relation between D, E and P, Gauss's law in the presence of adielectric–Boundary condition on DandE
Unit 3	**MAGNETICEFFECTSOFANELECTRICCURRENT(12Hours)** Biot-Savart'slawanditsApplicationtoCircularLoop-HelmholtzGalvanometer-Ampere'sCircuital Law both in Integral and Differential Form and its Application to Current Carrying Loop,SolenoidandToroid-Properties ofB:Curland Divergence Force on a current element in a magnetic field-Moving coil Ballistic Galvanometer-DampingCorrection-Figure ofMerit-DeterminationofAbsolute Capacitanceofacapacitor
Unit 4	**ELECTROMAGNETICINDUCTION(12Hours)** Faraday's law of Electromagnetic Induction (Differential and Integral form)-Lenz's law-SelfInductance– Mutual Inductance – Coefficient of Coupling-Self Inductance of a long solenoid-MutualInductanceoftwocoils-MeasurementofLandMusingBallisticGalvanometer-Transformers-Constructionandworking-EfficiencyandEnergyloss
Unit 5	**ELECTROMAGNETICWAVES(12Hours)** Typesofcurrents-ConceptofDisplacementCurrent–Maxwell'sequations–Maxwell'sequations in Free Space-Electromagnetic Waves Equations-Velocity of EM wave-TransversenatureofEMwave-Poyntingvectoranditssignificance-ReflectionandTransmissionofelectromagnetic waves a taninterfaceofnon-conducting medium

Course Objectives	
Title	**QUANTUMMECHANICS**
Course Code	
CO-1	To introduce to the undergraduate students the development and formulation of Quantum Mechanics, its underlying Mathematical and Physical principles through exactly solvable problems.
CO-2	To earn the wave nature of particles.
CO-3	To solve one dimensional eigenvalue problems.
CO-4	To gain over all knowledge in Quantum mechanics and its applications.
CO-5	time dependent and independent Schrödinger equations

Course Outcome	
Title	**QUANTUMMECHANICS**
Course Code	
CO-1	Know the inadequacies of classical mechanics in explaining microscopic phenomena
CO-2	Introduce with the concept of matter waves and their existence proved by experimental¬ procedure and uncertainty principle in physical measurements
CO-3	Formulate quantum mechanics through Schrodinger equation and associated different operators
CO-4	Derive time dependent and independent Schrödinger equations
CO-5	Find eigen values and eigen functions of one dimensional and three-dimensional problems

Syllabus	
Title	**QUANTUMMECHANICS**
Course Code	
Unit 1	**ORIGINOFQUANTUMMECHANICS (12Hours)** Limitations of Classical Physics- Black – Body Radiation Curve-Optical Spectra- PhotoelectricEffect- Specific Heat of Solids – Planck's Quantum Hypothesis - Compton Effect- QuantumTheory of Specific Heat-Bohr Atom Model of Hydrogen Atom- Franck and Hertz Experiment –Inadequacyof(Old)QuantumTheory
Unit 2	**WAVEMECHANICS (12Hours)** Wave Nature of Particles – Matter Waves – Diffraction Experiment-Heisenberg's UncertaintyPrinciple - Application of Uncertainty Relation – Principle of Super Position –Wave Packet -Time dependent Schrodinger Wave Equation- Interpretation of the Wave Function, ProbabilityInterpretation, Probability Current Density and Equation of Continuity- Ehrenfest theorem-TimeIndependentSchrodingerWaveEquation-StationaryStates,AdmissibilityConditions
Unit 3	**FORMALISMOFQUANTUMMECHANICS(12Hours)** LinearVectorSpace–OrthogonalFunctions–LinearOperator-EigenFunctionsandEigenvalues-HermitianOperator-PostulatesofQuantumMechanics–SimultaneousMeasurabilityofObservables-EigenValues ofAngularMomentumOperators-LadderOperators
Unit 4	**ONEDIMENSIONALEIGENVALUEPROBLEMS (12Hours)** Square Well Potential: Rigid Walls, Finite Walls and Potential Barrier – Alpha Emission - LinearHarmonicOscillator(SeriesMethod)–FreeParticle
Unit 5	**THREE-DIMENSIONALENERGYEIGENVALUEPROBLEMS(12Hours)** Particle Moving in a Spherically Symmetric Potential – Radial and Angular Part of SchrodingerEquation-SystemofTwoInteractingParticles-RigidRotator–HydrogenAtom-RadialEquation–SolutiontoRadialEquation–EnergyEigenValuesandEigenFunctions

Course Objectives	
Title	**BASICELECTRONICS**
Course Code	
CO-1	Tostudythecharacteristicsandapplicationofvarioussemiconductor devices.
CO-2	TostudythebasicsofelectronicInstrumentation
CO-3	Tounderstandthe working of a transistor amplifier.
CO-4	Tolearn the basics of instrumentations.
CO-5	Togainoverallknowledgein electronic compoents.

Course Outcome	
Title	**BASICELECTRONICS**
Course Code	
CO-1	Handle basic electronic devices like diode and transistor
CO-2	Construct amplifiers of different specification
CO-3	Apply Barkhausen criteria to oscillators
CO-4	Understand the different types of multivibrators
CO-5	Get an idea about Instrumentation

Syllabus	
Title	**BASICELECTRONICS**
Course Code	
Unit 1	**SEMICONDUCTORS (10Hours)** Bandgap-ForbiddenGap-ValenceandConductionBands-PureSemiconductors-ImpurityinSemiconductors-Energy band Diagram and Fermi level-Fermi Energy and Carrier Concentrationof Intrinsic and Extrinsic Semiconductors-PN junction- barrier- Voltage across the junction - JunctionDiodes-ZenerDiodes-V-Icharacteristics-LightEmittingDiodes-PhotoDiodes
Unit 2	**TRANSISTORAMPLIFIER (14Hours)** Transistors-CB andCEmodes-Characteristics-

	TwoPortRepresentation of a Transistor-h-parameters-ACequivalentcircuitusing'h'parameters-AnalysisofanAmplifierusinghparameters (CE configuration only)-Expression for current gain, voltage gain, input impedance,output impedance and power gain- RC Coupled Amplifier - Frequency Response - Analysis oflow, mid and high frequency regions - Classification of Amplifiers - Class A Power Amplifier –PushPull-ClassB PowerAmplifier-EmitterFollower
Unit 3	**OSCILLATORSANDMULTIVIBRATORS (12Hours)** Feedback in amplifiers - Effect of Negative Feedback-Barkhuesen Condition For Oscillations -Hartley and Colpit's Oscillators, Phase Shift and Wien's Bridge Oscillators - Expression forFrequencyofOscillationandconditionforOscillationineachcase. Multivibrators-Astable,MonostableandBistableMultivibrator-usingtransistors
Unit 4	**SPECIALSEMICONDUCTORDEVICESANDWAVESHAPINGCIRCUITS (12 Hours)** UnipolarDevices-FET–Construction-Working-Characteristics-FETAmplifiers-UJT–Construction-Working-Characteristics-UJT-SawToothWaveGenerator-SCR–Characteristics–SCRasaSwitch-SCRRectifier.ClippingandClampingCircuits-BiasedClipper-RCTimeConstant-IntegratingandDifferentiatingCircuits
Unit 5	**BASICSOFINSTRUMENTATION(12Hours)** Definition of measurement and Instrument - Block Diagram of an Instrument – Components – Input,Output,Processingelementofaninstrument–FunctionalElementsofPressureThermometer–Typesofinstrument–Basicdefinition–Accuracy,Precision,Sensitivity,Threshold, Resolution, Drift, Dead Zone, Selectivity, Hysteresis, Range, Bias, Repeatability,Reproducibility–Errors.

Course Objectives	
Title	**ATOMICPHYSICS& LASERS**
Course Code	
CO-1	To study the transition from particle towavenature
CO-2	To study the atomic structure and spectral series with electric and magnetic field To inculcate indepth knowledge in Lasers
CO-3	To inculcate in depth knowledge in lasers.
CO-4	To understand atomic structure and LS and JJ coupling

Course Outcome	
Title	**ATOMICPHYSICS& LASERS**
Course Code	
CO-1	Use Photo electric effect appropriately
CO-2	Analyze the atomic structure and associated coupling schemes
CO-3	Understand the splitting of spectral lines due to electric and magnetic fields
CO-4	Be familiar with X rays and its applications
CO-5	Distinguish different types of Lasers

Syllabus	
Title	**ATOMICPHYSICS& LASERS**
Course Code	
Unit 1	**PHOTO-ELECTRICEFFECT (10Hours)** RichardsonandComptonexperiment-LawsofPhotoelectricemission-EinsteinPhoto ElectricEquation-Millikan'sExperiment-VerificationofPhotoelectricequation-Photoelectriccells-Photo emissivecells -Photovoltaiccell-Photo conducting cell-Photomultiplier.
Unit 2	**ATOMICSTRUCTURE (10Hours)** Bohr and Sommerfeld atom models - Vector atom model - Pauli's exclusion principle -Explanation of periodic table - various quantum numbers - angular momentum and magneticmoment - coupling schemes - LS and JJ coupling - special quantisation - Bohr magnetron –

	SternandGerlachexperiments
Unit 3	**FINESTRUCTUREOFSPECTRALLINES (15Hours)** ExcitationandIonization Potential–FrankandHertz's experiment-Davis andGoucher'smethod-Spectral termsandnotions-selectionrules-intensity ruleandintervalrule-finestructure of sodium D_2 lines - Alkali Spectra - Fine Structure of Alkali Spectra - Spectrum ofHelium - Zeeman effect - Larmor's theorem - Debye's explanation of normal Zeeman effect-AnomalousZeemaneffect-theoreticalexplanation-Lande's`g'factorandexplanationofsplitting of D_1 andD_2lines of sodium -Paschen-Back effect- Stark effect(qualitative studyonly).
Unit 4	**X-RAYS (10Hours)** X-rays: Bragg's law - X-ray spectroscopy - characteristic X-ray spectra - continuous X-rayspectra - X-ray absorption and fluorescence - Moseley's law - uses of X-rays-Compton effect - ExperimentalverificationofComptoneffect
Unit 5	**Lasers (15Hours)** Basic principles of laser – Einstein Coefficients – Condition for light amplification - Populationinversion - Threshold condition – Optical resonators (Qualitative only) -Types of Lasers –SolidState lasers - Ruby and Nd-YAG Laser - Gas lasers - He-Ne and Co_2 Lasers- Construction andWorking-Semiconductorlasers-(Homojunction&Heterojunction)-IndustrialandMedicalApplications

Course Objectives	
Title	**NUCLEAR& RADIATIONPHYSICS**
Course Code	
CO-1	To studythe basicstructureofnucleusand nuclearmodels
CO-2	Toanalysetheradioactivityofnuclearsubstancesandradiationhazard.
CO-3	To introducetheconceptofelementaryparticles
CO-4	To learn the applications of radiation in the field of medicine.
CO-5	Togainoverallknowledgein nuclear physics.

Course Outcome	
Title	**NUCLEAR& RADIATIONPHYSICS**
Course Code	
CO-1	To study the basicstructureofnucleusand nuclearmodels
CO-2	Toanalysetheradioactivityofnuclearsubstancesandradiationhazard Tointroducetheconceptofelementaryparticles.
CO-3	To studythe basicstructureofnucleusand nuclearmodels
CO-4	Toanalysetheradioactivityofnuclearsubstancesandradiationhazard Tointroducetheconceptofelementaryparticles.
CO-5	To studythe basicstructureofnucleusand nuclearmodels

Syllabus	
Title	**NUCLEAR& RADIATIONPHYSICS**
Course Code	
Unit 1	**GENERALPROPERTIESOFNUCLEI (10Hours)** Nuclear size, charge, mass-Determination of nuclear radius-Mirror nucleus method-Massdefect and Binding energy-Packing Fraction - Nuclear Spin - Magnetic dipole moment - Electricquadrupolemoment-Nuclearmodels-Liquiddropmodel-Weizackersemiempiricalmassformula-ShellmodelandMagicnumbers-Collectivemodel-Nuclearforces-Mesontheory ofNuclearForce(qualitative).
Unit 2	**RADIOACTIVITY(15Hours)** NaturalRadioactivity-LawofDisintegration-halflifeandmeanlifeperiod-unitsofRadioactivity-Transient and Secular equilibrium-Radiocarbon Dating-Age of Earth - Alpha rays-Characteristics-Geiger-Nuttal law-α-ray Spectra-Gamow's Theory of α-

	decay (qualitative study)-Beta rays-Characteristics-Beta ray spectra-Neutrino hypothesis-Violation of Parity Conservation-ExperimentalVerificationwithCo_{60}-gammaraysandInternalconversion-NuclearIsomerism.
Unit 3	**RADIATIONDETECTORSANDPARTICLEACCELERATOR(10Hours)** Ionisationchamber-G.M.Counter-QuenchingandResolvingtime-ScintillationCounter-PhotoMultiplierTube–Thermoluminescence-ThermoluminescenceDosimetry(TLD)-LinearAccelerator-Cyclotron-Synchrocyclotron -Betatron
Unit 4	**RADIATIONPHYSICS(15Hours)** Nuclear fission - Chain reaction- Reactor theory – Critical size of a reactor - General aspect ofreactordesign-Classificationofreactors-Pressurizedheavywater reactor–Fastbreeder reactor- Radiation hazards - Biological effects of radiation – Radiation sickness - Radiation units andOperational limits - Radiation Survey Meters -Pocket Dosimeter - Control of Radiation hazards -Radioisotopesusedfortherapy-Nuclearmedicine-Industrialapplications–Foodpreservatives
Unit 5	**ELEMENTARYPARTICLES (10Hours)** Classification of Elementary Particles-Fundamental Interaction-Elementary Particle- QuantumNumbers - Isospin and Strangeness - Conservation laws and Symmetry-Basic Ideasabout Quark-QuarkModel

Course Objectives	
Title	**SOLIDSTATEPHYSICS**
Course Code	
CO-1	Tounderstandthe fundamentalconceptsofcrystalstructure.
CO-2	Toanalyzethe crystalstructureusingX-raydiffraction methods.
CO-3	Toacquireknowledgeonthebasicsofmagneticphenomenaonmaterialsandvarioustypesofmagnetization
CO-4	Tolearnthepropertiesofsuperconductingmaterials
CO-5	To understand the different types of bonding in solid substances.

Course Outcome	
Title	**SOLIDSTATEPHYSICS**
Course Code	
CO-1	Helps as pre-requisite for understanding materials science, nanoscience, etc.
CO-2	Gives relationship between structure and properties of the solid state systems.
CO-3	To understand the importance of superconducting materials in engineering applications.
CO-4	To understand the different types of bonding in solid substances.
CO-5	To understand the magnetic and dielectric properties of crystalline structures

Syllabus	
Title	**SOLIDSTATEPHYSICS**
Course Code	
Unit 1	:CRYSTALSTRUCTURE Crystallattice–PrimitiveandUnitcells–Bravaislattices:TwoDimensionalandThreeDimensionalBravaislattices–MillerIndices–StructureofCrystals–ClosePacking:Hexagonal close packing and Cubic close packing – Sodium chloride structure, ZincBlendestructure,Diamondstructure.
Unit 2	XRAYDIFFRACTIONANDDEFECTSINSOLIDS X ray diffraction – Bragg's law –Van Laue equations-Experimental methods: Laue method,PowdercrystalmethodandRotatingcrystalmethod. Defects in solids - Point defects - Frenkel and Schottky defects – Equilibrium concentrations -Line defects -Edge dislocation andScrew dislocation -Surface defects -Grain boundary -

EffectsofCrystalimperfections

Unit 3 CHEMICALBONDS

Interatomic forces –Condition for bonding - Different types of chemical bonds - Ionic bond –Cohesive energy of Ionic Crystals and Madelung constant - Born Haber cycle-Covalent bond - Metallicbond-vanderWaalsbond-Hydrogenbond.

Unit 4 DIELECTRICPROPERTIES

Dielectric materials - Polarization, Susceptibility and Dielectric constant - Local fieldor Internalfield - Clausius - Mossotti relation - Sources of Polarizability– Electronic Polarizability– lonicPolarizability–Orientational Polarizability - Frequency and temperature effects on polarization -DielectricBreakdown– PropertiesofdifferenttypesofInsulatingmaterials.

Unit 5 MAGNETISM ANDINTRODUCTIONTOSUPERCONDUCTORS

Different types of magnetic materials - Classical theory of Diamagnetism (Langevin theory) -Langevin theory of Paramagnetism - Weiss theory of Para magnetism– Heisenberg interpretationon Internal field and Quantum theory of Ferromagnetism –Antiferromagnetism- Hard and softMagneticmaterials.

Superconductivity-Generalproperties– CriticalTemperatureandCriticalMagneticfield-TypeIand IISuperconductors–Meissnereffect-BCStheory-ApplicationsofSuperconductors.

Course Objectives	
Title	**INTEGRATEDELECTRONICS**
Course Code	
CO-1	Tostudythedifferentnumbersystemsassociatedwithdigitalcomputation
CO-2	Tointroducethecountersandregisters.
CO-3	Tohavein-depthknowledgeinarithmeticoperationsofanoperationalamplifier

Course Outcome	
Title	**INTEGRATED ELECTRONICS**
Course Code	
CO-1	Through knowledge on different number systems
CO-2	The skill to simplify the logics using Karnaugh map and Boolean algebra
CO-3	Detailed knowledge in storing and retrieving a data through mux and demux
CO-4	The skill to customize the counters to the need through serial and parallel counters
CO-5	Gain knowledge in logic circuits

Syllabus	
Title	**INTEGRATED ELECTRONICS**
Course Code	
Unit 1	FUNDAMENTAL DIGITAL ELECTRONICS Numbersystems–Binary–Hexadecimal–Binaryaddition–subtraction(1'sand2'scompliment method) – Multiplication - Division - BCD – Conversion – Simplification of logiccircuits - using (i) Boolean algebra, (ii)Karnaugh map– Demorgan's theorems -NAND andNORasUniversalBuildingBlocks.
Unit 2	COMBINATIONALLOGICCIRCUITS Binary Half & Full adder and Subtractor Circuits - BCD Half & Full Adder and SubtractorCircuits–4BitBinaryAdder/Subtractor(IC 7483)-Encoder–Decoder-Multiplexer-Demultiplexer.

Unit 3	SEQUENTIALLOGICCIRCUITS 1 bit Memory-Latch –R-S flip flop- J-K flip flop, D flip flop and T-flip flops -Race aroundcondition -J-KMaster/Slaveflipflop–Asynchronous andSynchronous Counters-BCDcounter – Up/Down counters - Ring and Twisted Ring Counter-Shift Registers - Serial AndParallelRegisters.
Unit 4	OP-AMP- BASICAPPLICATIONS CharacteristicsParameters–DifferentialGain–CMRR–SlewRate–Bandwidth-Applications – Unity Follower**,** Inverter, Non-Inverter, Integrator, Differentiator, Summing, Difference andAveraging Amplifier - Solving Simultaneous Equations - Comparator - Square Wave Generator -SchmittTrigger-Wien's BridgeOscillator
Unit 5	:TIMER, DAC/ADC Timer555-InternalBlockDiagramandWorking–AstableMultivibrator–MonostableMultivibrator-Schmitt Trigger-D/A Converter - Binary Weighted Method - A/D Converter – SuccessiveApproximationMethod

Course Objectives	
Title	**MICROPROCESSOR8085ANDMICROCONTROLLER**
Course Code	
CO-1	Tostudythe architectureofthemicroprocessor8085andmicrocontroller 8051
CO-2	To develop the skill of writing programs.
CO-3	Detailed knowledge in interfacing IO devices,
CO-4	To learn the basics of micro controllers.

Course Outcome	
Title	**MICROPROCESSOR8085ANDMICROCONTROLLER**
Course Code	
CO-1	Describe the general architecture of a microcomputer system and architecture &organization of 8085 Microprocessor and understand the difference between 8085 and advanced microprocessor
CO-2	Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor
CO-3	Understand and classify the instruction set of 8085 microprocessor and distinguish the use of different instructions and apply it in assembly language programming.
CO-4	Understand the architecture and operation of Programmable Interface Devices and realize the programming & interfacing of it with 8085 microprocessor
CO-5	Understand the concepts of interrupts and microcontrollers

Syllabus	
Title	**MICROPROCESSOR8085ANDMICROCONTROLLER**
Course Code	
Unit 1	Microprocessor8085Architecture Introduction to Microprocessor – Architecture of Microprocessor 8085-Internal registers (8-bit &16-bit)-CPU-ALU-TypesofSystemBus-BusStructure-multiplexinganddemultiplexingaddress/data bus-Instruction Register and Decoder - Timing and Control Unit-Interrupts andSerial I/O (principle only)-external memory – Block diagram of 8085-Programmer's model of8085-pinconfigurationof8085.
Unit 2	Instruction Set-I Machine Language and Assembly Language-Addressing

	modes-types of instruction format-DataTransfer typeinstructions-Arithmetic and logical instructions–Branchinginstructions-loopingand time delay -system clock-T-state-instruction and machine cycles-Timing diagram for MOVR_d,R_s-MVIA,data8-LXIR_P,16bits,memoryread andmemorywrite cycle.
Unit 3	InstructionSet-IIandProgramming SpecialInstructions:Rotateinstructions-stackandsubroutinerelatedinstructions-PSW-peripheralinstructions-I/OandMachineControlInstructions. Assembly Language Programs – Addition– Subtraction–Multiplication (8-bit) – Division (8-bit)Ascending / Descending Order, Largest/Smallest (single byte)-Addition of N numbers (singlebyte)-code conversionprogram
Unit 4	Memory/IoInterface Memory Interface(Basics)–memory mappedI/O& I/OmappedI/O-GeneratingControlSignals – Interfacing 2KX8 EPROM – 2KX8 RAM -Interfacing I/O ports to 8085-Hand shakesignals-FunctionalblockdiagramandworkingofPPI-8255-Interfacing8255to8085-LEDInterface.
Unit 5	InterruptsandIntroductiontoMicrocontrollers Interrupts in 8085- Generation of RST codes-Hardware, software interrupts and their function-Interrupts pulse width and Triggering levels-Interrupt priority-Vector interrupt model -SIM andRIMinstructions-SimplepolledandInterruptcontrolleddatatransfer-IntroductiontoMicrocontroller–ComparisonofMicroprocessorandMicrocontroller.

Course Objectives	
Title	**ELECTIVE-I(A):NUMERICALMETHODS**
Course Code	
CO-1	Tostudythecomputationaltechniquesinvolvedindifferentmathematical manipulation.
CO-2	The learn the various methods of solving transcendental and differential equations.
CO-3	To develop Detailed knowledge in curve fitting
CO-4	To develop the skill of problem solving

Course Outcome	
Title	**ELECTIVE-I(A):NUMERICALMETHODS**
Course Code	
CO-1	Solve simultaneous equations using method of triangularisation
CO-2	Find the inverse of a matrix using Gauss Jordan Method
CO-3	Solve Algebraic, Transcendental and Differential Equation using different methods
CO-4	To fit a curve for the given data using principles of least squares
CO-5	Integrate the functions using different rules like Simpsons 1/3 rule

Syllabus	
Title	**ELECTIVE-I(A):NUMERICALMETHODS**
Course Code	
Unit 1	SIMULTANEOUSLINEARALGEBRAICEQUATIONS Method of Triangularisation - Gauss elimination method - Inverse of a matrix - Gauss- Jordanmethod
Unit 2	NUMERICAL SOLUTION OF ALGEBRAIC, TRANSCENDENTAL ANDDIFFERENTIALEQUATION Bisection method – Regula falsi method - Newton - Raphson method - - Horner's method - Solutionofordinarydifferentialequation-Euler'smethod.
Unit 3	INTERPOLATION Finite differences – Operators Δ, ∇,D – Relation between operators –Linear interpolation –Interpolation with equal intervals – Newton forward interpolation formula –Newton backwardinterpolationformula.

Unit 4	CURVEFITTING Principlesofleastsquares - fittingastraightline- linearregression- fittinganexponentialcurve.
Unit 5	NUMERICALINTEGRATION TrapezoidalRule - Simpson's1/3ruleand3/8rule - Applications- Weddle'srule

Course Objectives	
Title	**ELECTIVE-I(B): PROBLEMSSOLVINGSKILLSINPHYSICS**
Course Code	
CO-1	Physicswithproblems“pleasure”
CO-2	Physicswithoutproblems“pressure”
CO-3	Toinculcatetheproblem-solvingskills indifferentareasofphysics

Course Outcome	
Title	**ELECTIVE-I(B): PROBLEMSSOLVINGSKILLSINPHYSICS**
Course Code	
CO-1	Think Laterally and provide necessary solution
CO-2	Use appropriate mathematical methods to given problem
CO-3	Verify whether the answer obtained is correct or not
CO-4	Use logical and other skills to solve problem
CO-5	Clear all the entrance examinations leading higher education in premier institutions

Syllabus	
Title	ELECTIVE-I(B): PROBLEMS SOLVING SKILLS IN PHYSICS
Course Code	
Unit 1	PROBLEMSINMECHANICS Newton laws of motion for various systems (1, 2 and 3 dimension), Conservation laws andcollisions,Rotationalmechanics,centralforce,Harmonicoscillator,specialtheoryofrelativity
Unit 2	: PROBLEMSINTHERMALPHYSICS Kinetic theory– Laws of Thermodynamics – Ideal Gas law– Various Thermodynamic process–Entropy calculation for various process– Heat engine–TS and PV diagram–Free energies andvariousrelations
Unit 3	PROBLEMSINELECTRICITY&MAGNETISM Electrostatics– calculation of Electrostatic quantities for various configurations– Conductors,Magneto statics– Calculation of Magnetic quantities for various configuration, Electromagneticinduction,Poyntingvector,Electromagneticwaves.
Unit 4	PROBLEMSINQUANTUMMECHANICS Origin of Quantum mechanics– Fundamental Principles of Quantum mechanics– potential wellsandharmonicoscillator– Hydrogenatom
Unit 5	PROBLEMSINGENERALPHYSICS&MATHEMATICS Plotting the graphs for various elementary and composite functions– Elasticity–Viscosity andsurfacetension–fluids–Buoyancy–pressure– Bernoulli'stheorem–applications–wavesandoscillations,Errors andpropagationoferrors

Course Objectives	
Title	**ELECTIVE-I(C):GEOPHYSICS**
Course Code	
CO-1	To make the students understand the basic principles of geophysics
CO-2	To make the students understand the basic principles of geomagnetism
CO-3	To make the students understand the basic conceptsofearthquakes

Course Outcome	
Title	**ELECTIVE-I(C):GEOPHYSICS**
Course Code	
CO-1	Understand the different layers of the atmosphere
CO-2	Know the details about geophysical and chemical methods
CO-3	Gain sufficient knowledge on the earthquakes and Tsunami warning systems
CO-4	Have an idea on geomagnetism and gravity
CO-5	Understand the radioactivity of the earth

Syllabus	
Title	**ELECTIVE-I(C):GEOPHYSICS**
Course Code	
Unit 1	PHYSICSOFTHEEARTH Introduction toGeophysics-Earth as amemberof the solarsystem-Atmosphere-Ionosphere-Asthenosphere-Lithosphere-HydrosphereandBiosphere-Meteorology-OceanographyandHydrology
Unit 2	: GEOPHYSICALANDGEOCHEMICALMETHODS Geophysical methods: Geo referencing using Arc GIS software-Electrical Methods-QualitativeinterpretationofVerticalElectricalSoundingcurves–Preparingpseudocrosssectionforelectricalresistivitydataandinter

	pretation. Geochemicalmethods:Introduction-Principlesofgroundwaterchemistry-Sourcesofcontamination-Groundwaterqualityanalysisusinggeochemicalmethods.
Unit 3	INTRODUCTIONTOSEISMOLOGY The earth's interior and crust as revealed by earthquakes-Rayleigh waves and Love waves-Elasticreboundtheory-Continentaldrift-Earthquakemagnitudeandintensity-Horizontalseismographandseismographequation-Tsunami-CausesandImpacts-Tsunamiwarningsystems.
Unit 4	GEOMAGNETISMANDGRAVITY Historical introduction –The physical origin of magnetism-Causes of the main field-Dynamotheoryofearth'smagnetism. Gravitationalpotential-Laplace'sequationandPoisson'sequation-Absoluteandrelativemeasurementsofgravity-Wordengravimeter.
Unit 5	: GEOCHROLOGYANDGEOTHERMAL PHYSICS Radioactivityoftheearth-Radioactivedatingofrocksandminerals-Geologicaltimescale-Theageoftheearth. Flowofheattothesurfaceoftheearth–Sourcesofheatwithintheearth-Processandheattransportandinternaltemperatureofearth

Course Objectives	
Title	**MEDICALPHYSICS**
Course Code	
CO-1	To gain a broad and fundamental understanding in Physics while developing particular expertiseinmedicalapplications
CO-2	To study the production of X-rays and its various applications
CO-3	To study the various medical imaging techniques.
CO-4	To acquire overall knowledge in how physics finds applications in the field of medicine

Course Outcome	
Title	**MEDICALPHYSICS**
Course Code	
CO-1	Understand the different layers of the atmosphere
CO-2	Know the details about geophysical and chemical methods
CO-3	Gain sufficient knowledge on the earthquakes and Tsunami warning systems
CO-4	Have an idea on geomagnetism and gravity
CO-5	Understand the radioactivity of the earth

Syllabus	
Title	**MEDICALPHYSICS**
Course Code	
Unit 1	X-RAYS ElectromagneticSpectrum-ProductionofX-Rays-X-RaySpectra-Brehmsstrahlung-Characteristic X-Ray - X-Ray Tubes - Coolidge Tube - X-Ray Tube Design - Tube Cooling -Stationary Mode - Rotating Anode X-Ray Tubes -Tube Rating - Quality and Intensity of X-Ray.X-Ray Generator Circuits - Half Wave and Full Wave Rectification - Filament Circuit - KiloVoltageCircuit-HighFrequencygenerator-Exposure Timers -HTCables
Unit 2	RADIATIONPHYSICS RadiationUnits-Exposure-AbsorbedDose-RadtoGray-KeraRelativeBiologicalEffectiveness - Effective Dose: Sievert (Sv)- Inverse Square Law - Interaction Ofradiation withMatter - Linear Attenuation Coefficient- Radiation Detectors -Thimble Chamber - CondenserChambers - Geiger Counter - Scintillation Counter -Ionization Chamber - Dosimeters - SurveyMethods - AreaMonitors -TLDandsemiconductorDetectors.
Unit 3	MEDICALIMAGINGPHYSICS Radiological Imaging - Radiography - Filters - Grids - Cassette - X-Ray Film - Film processing -Fluoroscopy -

	Computed Tomography Scanner - Principle Function - Display - Generations -Mammography- Ultrasound Imaging - Magnetic Resonance Imaging - Thyroid Uptake System - Gamma Camera(OnlyPrinciple,Functionanddisplay)
Unit 4	RADIATIONTHERAPYPHYSICS Radiotherapy - KiloVoltage Machines - Deep Therapy Machines - Tele-Cobaltmachines -Medical LinearAccelerator - Basics of Teletherapy Units - Deep X-Ray, TelecobaltUnits,Medical Linear Accelerator - Radiation Protection - External Beam characteristics - Phantom -Dose Maximum And Build Up - Bolus – Percentage depth Dose - Tissue - Air Ratio - BackScatterFactor
Unit 5	RADIATIONPROTECTION Principles of Radiation Protection - Protective Materials - Radiation Effects -Somatic, GeneticStochastic and Deterministic Effect- Personal Monitoring Devices- TLD Film Badge - PocketDosimeter

Course Objectives	
Title	**ELECTIVE-II(C):FIBEROPTICS**
Course Code	
CO-1	Togain indepthknowledgeinopticalfibres
CO-2	To study the transmission characteristics of optical fibres.
CO-3	To learn the uses of optical fibres.
CO-4	To acquire knowledge about optical detectors

Course Outcome	
Title	**ELECTIVE-II(C):FIBEROPTICS**
Course Code	
CO-1	Functional knowledge regarding the need of radiological protection
CO-2	Gain knowledge on diagnostic and therapeutic application like X-rays, Ultrasound imaging, Magnetic resonance imaging etc.,
CO-3	Gets familiar with various detectors used in medical imaging
CO-4	Hands on training which will be useful for the students to enter the job market

Syllabus	
Title	**ELECTIVE-II(C):FIBEROPTICS**
Course Code	
Unit 1	FIBEROPTICS–INTRODUCTION Structure of Fiber-Why Silica (Sio_2) as Fiber-Snell's Law-Total Internal Reflection-Meridionaland Skew Rays- -Acceptance Angle and Cone- Numerical Aperture- Goos-Haenchen Shift-StepAnd Graded Index Fibers - Single Mode and Multimode Fiber – V-Number – Number Of Modesin Step and GradedMultimode Fibers- Analog& Digital Optical Fiber Communication (OFC)System-Advantages OfOFC.
Unit 2	TRANSMISSIONCHARACTERISTICSOFOPTICALFIBERS Losses in Silica Glass Fibers-Intrinsic, Extrinsic and OH^- Absorption Losses – Scattering Losses-Linear: Rayleigh and Mie Scattering, Nonlinear: Stimulated Brillouin and Raman Scattering-Intramodal and Intermodal Dispersion Losses-Microand MacroBending Losses-EvanescentField-AttenuationSpectrumforanUltra-Low-Loss Single ModeFiber
Unit 3	OPTICALFIBERCONNECTION Introduction-MultimodeandSingleModeFiberJoints–FusionandMechanicalSplices–Cylindrical Ferrule & Duplex and

	Multiple Fiber Connectors –Grin-Rod Lenses-Three & FourPortandWDMCouplers
Unit 4	OPTICALSOURCES Basic Concepts of Absorption and Emission of Radiations-LED Power and Efficiency-DoubleHeterojunction LED-Surface & Edge Emitting LED–Optical Output Power-Output Spectrum-Modulation Bandwidth-Reliability- LASER Diodes-Gain Guided Lasers-Quantum-Well Lasers-FiberLasers
Unit 5	OPTICALDETECTORS OpticalDetectionPrinciples-QuantumEfficiency-Responsivity-PINPhotodiode-SpeedofResponse-Noise-AvalanchePhotodiodes(APD):GermaniumAPD-MeritsandDemerits-MultiplicationFactor-Mid-InfraredPhotodiodes–PhotoTransistors-PhotoConductiveDetectors-Eye Diagrams.

Course Objectives	
Title	**ELECTIVE-III(B):ASTROPHYSICS**
Course Code	
CO-1	Tomakethestudentsunderstandthenatureofuniversefromvarioustheoriesandphenomena.
CO-2	Tostudy theimportanceandsciencebehindtheAstrophysicsforthefutureinventionandspaceresearch.
CO-3	To gain indepth knowledge of steller evolution.
CO-4	To learn about milky way galaxy.

Course Outcome	
Title	**ELECTIVE-III(B):ASTROPHYSICS**
Course Code	
CO-1	Understand the overview of communications signals transmitted over optical fibers and optical fiber communication devices.
CO-2	Understand the importance of fiber optic material like GA As laser, LED, modulation formats and modulation and demodulation.
CO-3	Understand and differentiate losses and couplers and its function
CO-4	Understand the basic concepts in the process involving the parameters like modulation and¬demodulation.
CO-5	Learn the various fiber optic materials

Syllabus	
Title	**ELECTIVE-III(B):ASTROPHYSICS**
Course Code	
Unit 1	Earliest AstronomyandTheoriesofUniverse Origin–EarliestAstronomy(2500–100BC)–PythagoreanSphericalEarth–Aristotle'sEarthasCentre–CopernicusTheory–Kepler'sLaw – Galileo'sobservations – Newton'sSynthesis. Originoftheuniverse–TheBigBangTheory–Thesteadystate theory–TheOscillatingUniversetheory

Unit 2	AstronomicalScalesandInstruments AstronomicalScales–AstronomicalDistance–MassandTime–StellarTemperature–Astronomical Instruments–The Earth's Atmosphere and the Electromagnetic Radiation –OpticalTelescopes–RadioTelescopes–TheHubbleSpaceTelescope(HST)–AstronomicalSpectrographs– Photographic Photometry–PhotoelectricPhotometry–Spectrophotometry.
Unit 3	SolarSystem The sun–Structure of the Sun –Nuclearreactionsin sun – Photosphere–Chromosphere–corona – solar prominences – Sunspot cycle – Theory of sunspots – Solar flare– solar constant –Temperatureofthe sun–Solarenergy–Solarwind–Othermembersofthe solarsystem
Unit 4	StellarEvolution Birth of a star– Death of a star –Red giant stars –Chandrasekhar limit – white dwarfs –Blackholes – Quasars – Nebulae – Supernovae Binary stars – Origin of binary stars –Variable stars –Flarestars–Constellations–Zodiac–Magnitudeandbrightness–Luminositiesofstars–Measurementofstellardistance–Geometricalparallaxmethod–Distancefromredshiftmeasurement
Unit 5	TheMilky wayGalaxy The milky way – Basic Structure and Properties of the Milky Way–The General Rotation Law–Density Distribution of Gas and Spiral structure of the Galaxy– The Mass of the Galaxy – Magnetic Field in the Galaxy – Cosmic Rays –Continuous Radio Emission in the Galaxy–Hubble'slaw–Types ofgalaxies

Course Objectives	
Title	**WEATHERFORECASTING**
Course Code	
CO-1	To enable them to develop an awareness and understanding regarding the causes and effects ofdifferentweatherphenomenonandbasicforecastingtechniques
CO-2	To learn about weather systems.
CO-3	To understand the climate changeand its effects.
CO-4	To gain overall knowledge about weatherforecasting

Course Outcome	
Title	**WEATHERFORECASTING**
Course Code	
CO-1	To learn basic techniques to measure temperature and its relation with cyclones and anticyclones Gain knowledge of simple techniques to measure wind speed and its directions, humidity and rainfall.
CO-2	Understand various causes of climate change like global warming, air pollution, aerosols, ozone depletion and acid rain.
CO-3	Develop skills needed for weather forecasting
CO-4	Uncertainties in predicting weather based on statistical analysis
CO-5	

Syllabus	
Title	**WEATHERFORECASTING**
Course Code	
Unit 1	**:IntroductiontoAtmosphere** Elementaryideaofatmosphere-Physicalstructureandcomposition-compositionallayeringoftheatmosphere-Variationofpressureandtemperaturewithheight-Airtemperature-Requirementstomeasureairtemperature-Temperaturesensors-types;atmospheric pressure: its measurement-Cyclones andanticyclones- its characteristics.
Unit 2	**MeasuringtheWeather** Wind-forcesactingtoproducewind;windspeeddirection:units,itsdirection-measuring wind speed and direction; humidity, clouds and rainfall, radiation: absorption,emission andscatteringinatmosphere-Radiationlaws.
Unit 3	**WeatherSystems** Globalwindsystems-airmassesandfronts-classifications-jetstreams-localthunderstorms-tropicalcyclones:classification-tornadoes-hurricanes
Unit 4	**ClimateandClimateChange** Climate: its classification- causes of climate change-global warming and its outcomes- airpollution-aerosols,ozonedepletion,acidrain,environmentalissuesrelated toclimate.
Unit 5	**BasicsofWeatherForecasting:** Weather forecasting: analysis and its historical background- need of measuring weather-types of weather forecasting- weather forecasting methods- criteria of choosing weatherstation-basicsofchoosingsiteandexposure-satellitesobservationsinweatherforecasting- weather maps-uncertainty andpredictability-probability forecasts

Course Objectives	
Title	**CORE PRACTICAL-I**
Course Code	SR221
CO-1	To develop the skill of doing science experiments.
CO-2	To calculate the various constant values.
CO-3	To demonstrate the physics concepts.

Course Outcome	
Title	**CORE PRACTICAL-I**
Course Code	SR221
CO-1	Able to reproduce the constant values
CO-2	To develop the skill of doing physics experiments.
CO-3	To learn about the uses of various apparatus.
CO-4	Able to prove the laws
CO-5	Will be able to calculate various parameters.

Syllabus	
Title	**CORE PRACTICAL-I**
Course Code	**SR221**
Unit 1	1. Young's modulus–Non-uniformBending– Pinandmicroscope.
Unit 2	2. Young's modulus–UniformBending–ScaleandTelescope
Unit 3	3. Rigiditymodulus– Torsionalpendulum(withoutsymmetricalmasses)
Unit 4	4. RigiditymodulusandMomentofInertia– Torsionalpendulum(Withsymmetricmasses)
Unit 5	5. SurfaceTensionand InterfacialSurface Tension– DropWeightMethod
Unit 6	6. CoefficientofViscosityofLiquid– GraduatedBurette(radiusofcapillarytubebyMercurypellet method).
Unit 7	7. Sonometer–FrequencyofTuningFork
Unit 8	8. Sonometer–RelativeDensityofaSolidandLiquid
Unit 9	9. Specificheatcapacityofliquid–Method ofMixtures(Half-timecorrection).
Unit 10	10. ComparisonofViscosities oftwoLiquids–BuretteMethod
Unit 11	11. Focallength,Power,R andRefractiveIndexofalongFocus ConvexLens
Unit 12	12. Focallength,Power,R andRefractiveIndexofaConcaveLens
Unit 13	13. P.O.Box–Temperature coefficientofresistance
Unit 14	14. Spectrometer–RefractiveindexofaGlassPrism
Unit 15	15. Spectrometer–HollowPrism-Refractiveindexofaliquid.
Unit 16	16. Newton's lawofcooling-SpecificheatCapacityoftheLiquid
Unit 17	17. CareyFoster'sBridge-ResistanceandSpecificResistance
Unit 18	18. Potentiometer–Calibrationofa Low Range Voltmeter
Unit 19	19. Deflectionmagnetometer–TanAPosition

Course Objectives	
Title	**CORE PRACTICAL-II**
Course Code	SR241
CO-1	To develop the skill of doing science experiments.
CO-2	To calculate the various constant values.
CO-3	To demonstrate the physics concepts.

Course Outcome	
Title	**CORE PRACTICAL-II**
Course Code	SR241
CO-1	Able to reproduce the constant values
CO-2	To develop the skill of doing physics experiments.
CO-3	To learn about the uses of various apparatus.
CO-4	Able to prove the laws
CO-5	Will be able to calculate various parameters.

Syllabus	
Title	**CORE PRACTICAL-II**
Course Code	**SR241**
Unit 1	1. Young'sModulus-Cantilever-Depression-(Staticmethod-ScaleandTelescope).
Unit 2	2. Young’sModulus–Uniformbending–Pin&Microscope.
Unit 3	3. RigidityModulus-Static Torsion(ScaleandTelescope)
Unit 4	4. CompoundPendulum-gandk
Unit 5	5. Sonometer-A.C.Frequency-SteelandBrasswires.
Unit 6	6. Melde'sstring-Frequency,RelativeDensityofasolidandliquid.
Unit 7	7. Thermalconductivityo fabadconductor-Lee'sdiscmethod.
Unit 8	8. Spectrometer-GratingNandλ-minimumdeviationmethod.
Unit 9	9. Spectrometer-μofaglassprism-i-dCurve
Unit 10	10. Airwedge-Thicknessofawire.
Unit 11	11. DeflectionMagnetometer–TanBposition
Unit 12	12. mandBH-DeflectionMagnetometer-TanCpositionandvibrationmagnetometer
Unit 13	13. CareyFosterBridge -Temperaturecoefficientofresistanceofacoil.
Unit 14	14. Potentiometer–Specificresistance ofthegivenwire.
Unit 15	15. Potentiometer-Ammetercalibration.
Unit 16	16. Potentiometer-Emfofthermocouple.
Unit 17	17. Figureofmeritofgalvanometer(MirrororTableGalvanometer).
Unit 18	18. Surfacetension– Capillaryrisemethod.
Unit 19	19. Specificheat ofcapacity– Joule’scalorimeter.

Course Objectives	
Title	**CORE PRACTICAL-III (GENERAL)**
Course Code	
CO-1	To develop the skill of doing science experiments.
CO-2	To calculate the various constant values.
CO-3	To demonstrate the physics concepts.

Course Outcome	
Title	**CORE PRACTICAL-III (GENERAL)**
Course Code	
CO-1	Able to reproduce the constant values
CO-2	To develop the skill of doing physics experiments.
CO-3	To learn about the uses of various apparatus.
CO-4	Able to prove the laws
CO-5	Will be able to calculate various parameters.

Syllabus	
Title	**CORE PRACTICAL-III (GENERAL)**
Course Code	
Unit 1	1. Young'smodulusofthematerialofthebeam-NonuniformBending-Koenig'smethod.
Unit 2	2. Young'smodulusofthematerialofthebeam-UniformBending-Koenig'smethod.
Unit 3	3. Newton'srings-R_1,$R_2$and µofconvex lens.
Unit 4	4. Spectrometer-(i-i') curve-RefractiveIndex.
Unit 5	5. Spectrometer - Small angled prism - Normal incidence and emergence. Determination ofthe refractiveindexofthematerialofprism.
Unit 6	6. Spectrometer–Dispersivepowerofaprism.
Unit 7	7. Spectrometer–Dispersivepowerofagrating.
Unit 8	8. Spectrometer-Cauchy'sconstant.
Unit 9	9. Bifilarpendulum–Parallelthreads–verificationoftwotheorems.
Unit 10	10. Fieldalongtheaxisofacircular coil-Deflectionmagnetometer- $B_H$andM.
Unit 11	11. Fieldalong theaxisofacircularcoil-vibrationmagneticneedle -B_H.
Unit 12	12. Potentiometer-Calibrationofhighrangevoltmeter.
Unit 13	13. Potentiometer–conversionofgalvanometer intovoltmeter.
Unit 14	14. Potentiometer–conversionofgalvanometerintoammeter.
Unit 15	15. BallisticGalvanometer- Absolutecapacitanceofacapacitor.
Unit 16	16. BallisticGalvanometer-ChargeSensitivity
Unit 17	17.BallisticGalvanometer-ComparisonofMutualinductances.
Unit 18	18.BallisticGalvanometer.-ComparisonofCapacities
Unit 19	19. DeterminationofwavelengthHe-NeLaserbydiffraction.
Unit 20	20. SpectrometerGrating-Normalincidencemethod-WavelengthofMercurySpectrum

Course Objectives	
Title	**CORE PRACTICAL-IV (BASIC ELECTRONICS)**
Course Code	
CO-1	To develop the skill of doing electronic experiments.
CO-2	To verify the circuit outcomes.
CO-3	To demonstrate the electronic concepts.

Course Outcome	
Title	**CORE PRACTICAL-IV (BASIC ELECTRONICS)**
Course Code	
CO-1	Able to reproduce the various electronic circuits
CO-2	To develop the skill of doing electronic experiments.
CO-3	To learn about the uses of various apparatus.
CO-4	Able to verify the theorems.
CO-5	Will be able to calculate various parameters.

Syllabus	
Title	**CORE PRACTICAL-IV (BASIC ELECTRONICS)**
Course Code	
Unit 1	1. A.C.Circuit–LCR–Seriesresonance.
Unit 2	2. A.C.Circuit–LCR–Parallelresonance.
Unit 3	3. Bridgerectifier- Zenerregulatedpowersupply-9Vcharacteristics.
Unit 4	4. VerificationofDemorgan'stheorem.
Unit 5	5. Emitterfollower.
Unit 6	6. FETcharacteristics.
Unit 7	7. CommonSource FETamplifier.
Unit 8	8. UJTcharacteristics
Unit 9	9. UJT asRelaxationoscillator.
Unit 10	10. SCRcharacteristics.
Unit 11	11. Transistor–Astable multivibrator.
Unit 12	12. Transistor–Bistablemultivibrator.
Unit 13	13. Transistor–Phaseshiftoscillator.
Unit 14	14. Transistor–Wien'sbridgeoscillator.
Unit 15	15. NANDandNORasuniversalgates.
Unit 16	16. HalfAdder &Fulladder(usingbasic logicgatesandEx-ORgateorNANDgatesonly).
Unit 17	17. HalfSubtractor&Fullsubtractor(usingbasiclogicgatesandEx-ORgateorNAND gatesonly).
Unit 18	18. RCcoupledsinglestageCETransistoramplifier–frequencyresponse.19.Decode Counterusing7490
Unit 19	20. 4BitShiftRegisterusing7473/7476

Course Objectives	
Title	**CORE PRACTICAL-V (APPLIED ELECTRONICS)**
Course Code	
CO-1	To develop the skill of doing microprocessor experiments.
CO-2	To verify variousmicroprocessor operations.
CO-3	To demonstrate the microprocessor programs

Course Outcome	
Title	**CORE PRACTICAL-V ((APPLIED ELECTRONICS)**
Course Code	
CO-1	Able to reproduce the microprocessor arithmetic operations.
CO-2	To develop the skill of doing microprocessor experiments.
CO-3	To learn about the uses of microprocessor programs
CO-4	Able to verify various operations of amplifiers.
CO-5	Will be able to calculate various parameters.

Syllabus	
Title	**CORE PRACTICAL—V (APPLIED ELECTRONICS)**
Course Code	
Unit 1	1. Microprocessor–8085–8bitAddition
Unit 2	2. Microprocessor–8085– 8bitSubtraction
Unit 3	3. Microprocessor–8085–8bitMultiplication
Unit 4	4. Microprocessor– 8085–8bitDivision
Unit 5	5. Microprocessor– 8085– Sorting ofgivensetofnumbersinascending order
Unit 6	6. Microprocessor– 8085– Sorting ofgivensetofnumbersindescending order
Unit 7	7. Microprocessor–8085– Findingthelargestno.inagivensetofnumbers.
Unit 8	8. Microprocessor–8085 – Findingthesmallestno.inagivensetofnumbers.
Unit 9	9. Microprocessor–8085 –reversingtheelementsinanarray.
Unit 10	10. Microprocessor–8085–AdditionofNNumber ofsinglebytenumbers
Unit 11	11. Opamp741 -Inverting,Non-Invertingamplifier, unityfollower.
Unit 12	12. Opamp741- Summinganddifferenceamplifier
Unit 13	13. Opamp741–Differentiator, integrator
Unit 14	14. OPamp741–Solvingsimultaneousequations.
Unit 15	15. OPamp741–Astablemultivibrator.
Unit 16	16. Opamp741– Wien’sBridgeoscillator
Unit 17	17. Opamp741 - PhaseShiftoscillator
Unit 18	18. Opamp741-SolvingSimultaneousEquations
Unit 19	19. 555-Timer- SchmittTrigger
Unit 20	20. 555-Timer-Astableoperation
Unit 21	D/AConverter–4bit,binaryweightedresistormethod

Course Objectives	
Title	**ALLIED PHYSICS-I (THEORY)**
Course Code	SR3AA
CO-1	This paper introduces the students to the basic concepts of Elasticity
CO-2	To learn about Rotational motion,
CO-3	To study the laws of Heat and thermodynamics,
CO-4	To gain overall knowledge about sound, Optics, Atomic and Nuclear Physics

Course Outcome	
Title	**ALLIED PHYSICS-I (THEORY)**
Course Code	SR3AA
CO-1	To Explore the fundamental concepts of physics
CO-2	To mport knowledge about the importance of material properties, heat, sound, optics, atomic and nuclear physics.
CO-3	To Understand the energy involved in nuclear reaction ¬
CO-4	To Carry out the practical by applying these concepts ¬ Get depth knowledge of physics in day today life
CO-5	To Get depth knowledge of physics in day today life

Syllabus	
Title	**ALLIED PHYSICS-I (THEORY)**
Course Code	SR3AA
Unit 1	Properties of Matter Young's modulus – Rigidity modulus – Bulk modulus – Poisson's ratio (definition alone) – Bending of beams – Expression for Bending Moment – Determination of Young's Modulus – Uniform and Non-Uniform bending. Expression for Couple per unit twist – Work done in twisting a wire – Torsional oscillations of a body– Rigidity modulus of a wire and M.I. of a disc by Torsion Pendulu
Unit 2	Viscosity Viscosity – Viscous force – Co-efficient of Viscosity – Units and Dimensions – Poiseuille's formula for co-efficient of viscosity of a liquid – determination of co-efficient of viscosity using burette and comparison of Viscosities - Bernoulli's theorem – Statement and proof – Venturi meter – Pitot tube.
Unit 3	Conduction, Convection and Radiation Specific heat Capacity of Solids and Liquids – Dulong and Petit's law – Newton's law of Cooling – Specific Heat Capacity of a Liquid by Cooling – Thermal Conduction –Coefficient of Thermal Conductivity by Lee's disc Method. Convention Process – Lapse Rate – Green House Effect – Black Body Radiation – Planck's Radiation Law – Rayleigh Jean's Law, Wien's Displacement Law – Stefan's Law of Radiation. (No Derivations)
Unit 4	Thermodynamics Zeroth and I Law of Thermodynamics – II law of Thermodynamics – Carnot's engine and Carnot's cycle – Efficiency of a Carnot's Engine – Entropy – Change in Entropy in Reversible and Irreversible Process – Change in entropy of a perfect gas – Change in Entropy when Ice is converted into steam.
Unit 5	Optics Interference – Conditions for Interference Maxima and Minima – Air Wedge – Thickness of A Thin Wire – Newton's Rings – Determination of Wavelength Using Newton's Rings. Diffraction – Difference Between Diffraction and Interference – Theory of Transmission Grating – Normal Incidence – Optical Activity – Biot's Laws – Specific Rotatory Power – Determination of Specific Rotatory Power Using Laurent's Half Shade Polarimeter.

Course Objectives	
Title	ALLIED PHYSICS-II (THEORY)
Course Code	SR3AB
CO-1	This paper introduces the student to the basic concepts of current electricity,
CO-2	To understand about electronics
CO-3	To gain knowledge about digital electronics.

Course Outcome	
Title	ALLIED PHYSICS-II (THEORY)
Course Code	SR3AB
CO-1	To Acquire knowledge on elementary ideas of electricity and magnetism
CO-2	To Emphasize the significance of laws involved in electric circuits
CO-3	To Understand the basics of operational amplifier
CO-4	To Apply the principles of electronics in day to life
CO-5	To Apply the characteristics of electronic devices in practicals

Syllabus	
Title	ALLIED PHYSICS-II (THEORY)
Course Code	SR3AB
Unit 1	Current Electricity Ohm's law – Law of resistance in series and parallel – Specific resistance – capacitors – capacitors in serial and parallel – Kirchoff's laws – Wheatstone's network – condition for balance Carey-Foster's bridge – measurement of resistance – measurement of specific resistance – determination of temperature coefficient of resistance – Potentiometer – calibration of Voltmeter.
Unit 2	: Electromagnetism Electromagnetic Induction – Faraday's laws – Lenz law – Self Inductance – Mutual Inductance – Experimental Determination-Coefficient of Coupling A.C. Circuits – Mean value – RMS value – Peak value – LCR in series circuit – impedance – resonant frequency – sharpness of resonance.
Unit 3	Atomic and Nuclear Physics Bohr's atom model – radius energy – Atomic excitation – Ionization potential – Frank and Hertz Method – Nucleus – Nuclear properties – Mass defect – Binding energy. Radio isotopes – Uses of radio isotopes – Nuclear fusion and Nuclear fission – X-rays – Production – properties – Derivation of Bragg's law – uses of X-raysin industrial and medical fields
Unit 4	nalog Electronics Semiconductor – PN junction diode – Bridge rectifier – Zener diode – Regulated power supply. Transistor – Working of a transistor – Transistor characteristics: CE Configuration – current gain relationship between α and β – Transistor Characteristics – CE Configuration only – CE amplifier – feedback – Hartley oscillator – Colpitt's oscillator.
Unit 5	Digital Electronics Number system – Decimal – Binary – Octal and Hexadecimal system – Double Dabble method – Binary addition, subtraction and multiplication– conversion of binary number to octal and hexadecimal numbers and vice versa. Logic gates – OR, AND, NOT, XOR, NAND and NOR gates – truth tables – Half adder and Full adder circuits – Laws and theorems of Boolean's algebra – De Morgan's theorems.

Course Objectives	
Title	ALLIED PHYSICS-I & II – (PRACTICALS)
Course Code	SR3A1
CO-1	To learn the basic concepts of physics
CO-2	To calculate various physics constants
CO-3	To study the skill of design electronic circuits
CO-4	To understand the various electronic components

Course Outcome	
Title	ALLIED PHYSICS-I & II – (PRACTICALS)
Course Code	SR3A1
CO-1	To gain knowledge about physics constants
CO-2	To understand basic operations of logic gates.
CO-3	To develop the skill to assemble simple electronic circuits
CO-4	To develop the skill to measure the values
CO-5	To analyse the constants various physics methods.

Syllabus	
Title	ALLIED PHYSICS-I & II – (PRACTICALS)
Course Code	SR3A1
Unit 1	Young's Modulus by Non-uniform bending using Pin and Microscope
Unit 2	2. Young's Modulus by Non-uniform bending using Optic lever–Scale and telescope
Unit 3	3. Rigidity modulus by Static torsion method.
Unit 4	4. Rigidity modulus by Torsional oscillations without mass
Unit 5	5. Surface tension and Interfacial Surface tension–Drop Weight method
Unit 6	6. Comparison of Viscosities of two liquids–Burette method
Unit 7	7. Specific heat Capacity of a liquid–Half time correction
Unit 8	8. Sonometer–Determination of a.c frequency
Unit 9	9. Newton'srings-Radiusof curvature
Unit 10	10. Airwedge–Thicknessof awire
Unit 11	11. Spectrometer–Grating–Wavelengthof Mercurylines–Minimum deviation method
Unit 12	12. Potentiometer–VoltmeterCalibration
Unit 13	13. P.O. Box–Specific resistance
Unit 14	14. B.G.–Figureof Merit (table galvanometer ------
Unit 15	15. Construction of AND, OR, NOT gates–using diodes and Transistor
Unit 16	16. Zener Diode–Characteristics
Unit 17	17. NAND gate as a universal gate

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF ENGLISH

Program : **B A ENGLISH**

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	Remember the critical thinkers or philosophers and their seminal works. Understand the significance of major critical theories.
PO-2	Analyse the themes and structure of literary works and examine dominant ideologies in a literary work, and also to evaluate a literary work using a theoretical framework.
PO-3	Acquire historical and cultural knowledge of the past. Develop critical thinking by being exposed to original ideas and philosophies
PO-4	Prepare the students to use English language proficiently and to lay the foundation for various eligibility tests
PO-5	Expose the students to the world of English literature and to make them realize the universal truths discussed in it, leading to a holistic life

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Apply the knowledge of Literature in the domain of English
PSO-2	Solve the complex problems in the field of English language teaching with an understanding of the societal, legal and cultural impacts of the solution
PSO-3	Involvement of the students in analyzing and interpreting literature and to make students realize how life and literature are closely connected
PSO-4	Form a part of member in a team with right attitudes

Course Objectives	
Title	**COMMUNICATIVE ENGLISH-I**
Course Code	**LZ11A**
CO-1	To write with clarity at all levels, conciseness, and relevance to the assigned topic at a standard appropriate to the course level.
CO-2	To enhance the level of literary and aesthetic experience of students and to help them respond creatively.
CO-3	To sensitize students to the major issues in the society and the world.
CO-4	To be able to write, expand an idea and contract a passage.
CO-5	To help them think and write imaginatively and critically.

Course Outcome	
Title	**COMMUNICATIVE ENGLISH-I**
Course Code	**LZ11A**
CO-1	Apply the right way of pronunciation through the knowledge of phonetics.
CO-2	Develop the ability to restate a text in Simpler Terms.
CO-3	Develop the practice of note taking.
CO-4	Express one's viewers through the skill of speech.
CO-5	Develop the ability to listen to a conversation in English.

Syllabus	
Title	**COMMUNICATIVE ENGLISH-I**
Course Code	**LZ11A**
Unit 1	1. Listening and Speaking a. Introducing self and others b. Listening for specific information c. Pronunciation (without phonetic symbols) i. Essentials of pronunciation ii. American and British pronunciation iii. Identify topic sentences. 2. Reading and Writing a. Reading short articles – newspaper reports / fact based articles i. Skimming and scanning ii. Diction and tone iii. Identifying topic sentences b. Reading aloud: Reading an article/report c. Journal (Diary) Writing 3. Study Skills - 1 a. Using dictionaries, encyclopedias, thesaurus Grammar in Context: Naming and Describing • Nouns & Pronouns • Adjectives

Unit 2	1. Listening and Speaking a. Listening with a Purpose b. Effective Listening c. Tonal Variation d. Listening for Information e. Asking for Information f. Giving Information. 2. Reading and Writing 1. a. Strategies of Reading: Skimming and Scanning b. Types of Reading : Extensive and Intensive Reading c. Reading a prose passage d. Reading a poem e. Reading a short story 2. Paragraphs: Structure and Types a. What is a Paragraph? b. Paragraph structure c. Topic Sentence d. Unity e. Coherence f. Connections between Ideas: Using Transitional words and expressions g. Types of Paragraphs 3. Study Skills II: Using the Internet as a Resource a. Online search b. Know the keyword c. Refine your search d. Guidelines for using the Resources e. e-learning resources of Government of India f. Terms to know 4. Grammar in Context Involving Action-I a. Verbs b. Concord
Unit 3	1. Listening and Speaking a. Giving and following instructions b. Asking for and giving directions c. Continuing discussions with connecting ideas 2. Reading and writing a. Reading feature articles (from newspapers and magazines) b. Reading to identify point of view and perspective (opinion pieces, editorials etc.) c. Descriptive writing – writing a short descriptive essay of two to three paragraphs. 3. Grammar in Context: Involving Action – II Verbals - Gerund, Participle, Infinitive • Modals
Unit 4	1. Listening and Speaking a. Giving and responding to opinions 2. Reading and writing a. Note taking b. Narrative writing – writing narrative essays of two to three paragraphs 3. Grammar in Context: Tense • Present • Past • Future
Unit 5	1. Listening and Speaking a. Participating in a Group Discussion 2. Reading and writing a. Reading diagrammatic information – interpretations maps, graphs and pie charts b. Writing short essays using the language of comparison and contrast 3. Grammar in Context: Voice (showing the relationship between Tense and Voice)

Course Objectives	
Title	**BRITISH LITERATURE- PAPER I**
Course Code	**AG21A**
CO-1	To make the students to explain how socio-historical factors have influenced individual texts and how individuals text and how individual texts are representative of their age.
CO-2	To develop a clear understanding of Renaissance Humanism that provides the basis for the texts suggested.
CO-3	To have a nuanced understanding of the dramatic literature of the Elizabethan period, with regard the classical and romantic strains embedded in the plays.
CO-4	To make the students to know the major theme of satire poems that belongs to 17th and 18th century.
CO-5	To have learnt the historical background and the literary developments from rural to urban in 18th century.

Course Outcome	
Title	**BRITISH LITERATURE- PAPER I**
Course Code	**AG21A**
CO-1	Apply theoretical approaches to critical reading of literary text.
CO-2	Appraise the fundamental Concepts, principles theories, and terminology used in the main branches of Science.
CO-3	Access health care needs of different groups in society.Apply disciplinary principles and practices to new or complex environments.
CO-4	Understand significant developments in the History of English & American literature.
CO-5	Apply theoretical approaches to critical reading of literary text.

Syllabus	
Title	**BRITISH LITERATURE- PAPER I**
Course Code	**AG21A**
Unit 1	1: Poetry (Detailed) 1.1 “My galley charged” Sir Thomas Wyatt 1.2 “Alas, so all things now” Henry Howard 1.3 “Tell me, thou skilful shepherd’s swain” Michael

	Drayton 1.4 “Not marble, nor the gilded monuments”: William Shakespeare (Sonnet 55) 1.5 “A Valediction: Forbidding Mourning” John Donne 1.6 “How soon hath time” John Milton 1.7 “The Pulley” George Herbert 1.8 “The Retreat” Henry Vaughan
Unit 2	2: Poetry (Non-Detailed) 2.1 “Prothalamion” Edmund Spenser ("CALM was the day...end my song" (Stanzas 1&2)) 2.2 “Astrophel and Stella” Philip Sidney (Sonnet XXXI: With how sad steps, O Moone, ...) 2.3 “Paradise Lost” (Book I - lines 1 - 83) John Milton 2.4 “The Garden” Andrew Marvell
Unit 3	3: Prose (Detailed) 3.1 “Of Revenge” Francis Bacon 3.2 “Of Studies” Francis Bacon
Unit 4	UNIT 4: Prose (Non-Detailed) 4.1 Book of Job: Prologue (chapters 1–2) 4.2 And The Bible
Unit 5	Drama (Detailed) 5.1 Doctor Faustus

Course Objectives	
Title	**SHAKESPEARE**
Course Code	**AG21B**
CO-1	To explain the relationship between a text and literary traditions, movements, styles, genres and forms.
CO-2	To find out a text within historical, social, cultural, theoretical and philosophical contexts in students.
CO-3	To gain the knowledge and understand contemporary issues and perspectives from literature.
CO-4	To identify the generic diversity in Shakespearean plays and describe significant features of Shakespearean oeuvre.
CO-5	To analyse prominent themes in Shakespearean plays appreciate Shakespearean language, literary elements and conventions.

Course Outcome	
Title	**SHAKESPEARE**
Course Code	**AG21B**
CO-1	Understand & interpret Shakespearean drama.
CO-2	Read and Interpret criticism and apply it within an academic argument.
CO-3	Undertake textual analysis of Shakespeare's Plays and to enact in professional carriers as a Drama teacher.
CO-4	Work with others in the exploration of Ideas and to collectively negotiate solutions to problems.
CO-5	Write logical and coherent arguments based on the evidence and engage in critical debate.

Syllabus	
Title	**SHAKESPEARE**
Course Code	**AG21B**
Unit 1	History HenryIV,Part II [ForAnnotations:ActI-Scenes1,3&5;ActII-Scenes2;ActIII-Scenes;ActIV- Scene; Act V - Scene Shakespeare‟sHistories–HistoricalSources-CommonFeatures-Language- ReflectionoftheEnglishsocialclass
Unit 2	Comedy TwelfthNight [ForAnnotations:ActI-Scenes1&2;ActII-Scenes1&4;ActIII - Scene2;ActIV - Scene 4; Act V - Scene 5] ShakespeareanComedies-Sources-Commonfeatures-Comedythrough language-Themes-Complexplots-MistakenIdentities-Foolsand Clowns- Use of songs-Dramatic devices
Unit 3	TragedyMacbeth [ForAnnotations: Act I-Scenes1,3&5; Act2 -Scenes1&2; Act III-Scenes2&4; Act IV - Scene 1;Act V - Scenes 1& 8] ShakespeareanTragedies-Sources-ElementsofShakespeareanTragedies–Themes–Language-Dramaticaspects-TragedyandModern Dramatists
Unit 4	Tragicomedy TheTempest[ForAnnotations:ActI-Scene2;Act2-Scene2;ActIII-Scene1; Act IV - Scene 1; Act V - Scene 1]ShakespeareanTragicomedy-genreofplay-dramaticelements-characters- Functions-InfluenceontheRomanticsandon19th& 20thcentury dramatists
Unit 5	Shakespeare’sTheatre 5.1PlayhousesandtheGlobeTheatre–StagingofthePlay-Audience-Actors, Costumes- Influences

Course Objectives	
Title	**BACKGROUND TO ENGLISH LITERATURE-I**
Course Code	**AG31A**
CO-1	To introduce basic concepts about English history, literary forms and literary periods with linguistic, historical and legendary background.
CO-2	To enable students understand the contexts and background from medieval British literature up until the Elizabethan and Jacobean age.
CO-3	To describe the distinct period of British literature.
CO-4	To write brief notes on seminal literary forms and devices.
CO-5	To write brief essays on the historical background of the same period.

Course Outcome	
Title	**BACKGROUND TO ENGLISH LITERATURE-I**
Course Code	**AG31A**
CO-1	Students have knowledge of research. methods in literary studies and advanced knowledge of literature in the English language and literary theory.
CO-2	Thorough working knowledge of current literary critical approaches, theories and methodologies in the field of literary Studies in English
CO-3	Analyze texts in light of their historical and intellectual background.
CO-4	Students have advanced critical reading skills and advanced skills in scholarly writing in English.
CO-5	Can extend his / her knowledge and skills to new -areas in order to carry out advanced assignments and Projects, also beyond specific application to literary studies in English.

Syllabus	
Title	**BACKGROUND TO ENGLISH LITERATURE-I**
Course Code	**AG31A**
Unit 1	Poetry – Metrical Romance, Ballad [Folk, Literary, Mock], Lyric, Sonnet [Petrarchan, Spenserian, Shakespearean], Allegory Drama[MysteryandMoralityPlays,Tragedy[Classical,Senecan,Romantic, Heroic, Neo-Classical,], Masque and Anti-Masque Prose-Fable,Parable,Essay[Aphoristic,Personal,Periodical,Critical] oFiction[Short-story,Novel],Non-Fiction[Biography,Auto-Biography]
Unit 2	**ImpactoftheHistoryoflanguageonLiteraturefrom11thto17th Century**OriginofLanguage-pages1-7 TheDescentoftheEnglishLanguage–pages8-16. TheOldEnglish(Anglo-Saxon)Period–pages17-41 TheMiddleEnglishPeriod–pages42-67 Text.HistoryofEnglishLanguagebyF.T.Wood.Trinity Press. Revised edition, 2016.]
Unit 3	Impact of Socio- Political History in Literature from 11 to 17 Century MEDIEVAL EUROPE Western Christendom, Papacy, Charlemagne, Carolingian heritage, Mediterranean Europe, Vikings, Anglo-Saxon ENG-land – pages 120-138 [Text – The PENGUIN History of Europe by J.M. Roberts, 1996.] CRUSADES [1095- 1291] ➢ Ottoman Wars [1265-1453] ➢ Fall of Constantinople [1453] ➢ European Renaissance, Reformation and Counter-Reformation– pages 222 – 230 [Text: A History of ENG-land. John Thorn, Roger Lockyer and David Smith. AITBS Publishers, India. 2012.] ➢ Modernity and modern history[End of Medieval Period] – pages 233-238 ➢ Enlightenment – pages 267-271 [Text – The PENG-uin History of Europe by J.M.Roberts, 1996.] MEDIEVAL ENGLAND ➢ The Norman Conquest [1066] – pages 80-84

- A Struggle for Power – Magna Carta [1215] – pages 126-128
- Henry VI and the Wars of Roses [1421- 71] – pages 199-212 TUDOR DYNASTY
- Henry VIII and the Break with Rome. – pages 231- 253
- Queen Mary– pages 261-264
- Elizabeth I and the Succession – pages 265-274
- The Conquest of the Armada– pages 275- 286
- The English Renaissance – pages 287-291
- Elizabethan England – pages 292- 310 CIVILWAR AND CROMWELL [1642 – 58]

"Charles I and Parliament" – pages 311-317

- "Civil War" – pages 326-340

[Text Book: A History of ENG-land. John Thorn, Roger Lockyer and David Smith. AITBS Publishers, India. 2012

Unit 4

- Literary History
- Anglo-Saxon Literature – Romanized Britons, Arthurian romance, alliterative verse, development of English Christianity - pages 3- 6. "Development of Middle English Prose and Verse"- The Norman conquest, Anglo-French language, French cultural domination of Europe, French as the courtly language, west Saxon dialect – pages 31- 35.
- Middle English Literature - Courtly French romance, the fable as a famous medieval literary form – pages 68 – 70. "Chaucer" – pages 89 – 91; "Gower" – pages 121 - 123
- The Early Tudor Scene – new geographical discoveries and their impact on literature, beginning of the idea of national state - pages – 147 – 148.
- Spenser and his Time – pages 165 – 166 first paragraph.
- Drama from the Miracle Plays to Marlowe - English poetic drama, dramatic elaborations of the liturgy, transition from liturgical drama to miracle play – pages 208 – 210; "University Wits" – Elizabethan popular drama –page 226; "Christopher Marlowe" – „Tamburlaine, the Great" - page 235.
- Shakespeare – professional man of the theatre - page 246
- Drama from Jonson to the Closing of Theatres – Shakespeare and Ben Jonson – pages 309 – 311 first paragraph; analysis of English Poetic drama– 344 last

paragraph.

- Poetry after Spenser: the Jonsonian and the Metaphysical Traditions – page 360; Donne‟s influence – page 368.
- John Milton – seventeenth century political background, effects of Civil war, Milton‟s formative years – pages 390 – 392
- Prose in the 16th and 17th Centuries - pamphleteering, colloquial prose formalised – pages 458-459; Bible translations – pages 461-472; Holinshed‟s „Chronicles‟ – page 474; Walter Raleigh‟s „History of the World‟ – page 475; Francis Bacon – pages 485 – 488; Thomas Hobbes – pages 495-496

[Text - A Critical History of English Literature- Volume I – From the Beginning to Milton by David Daiches. Revised. Indian Edition 2010. Supernova Publishers.]

Periods of English Literature – pages 279-285 [Text - A Glossary of Literary Terms by M.H. Abrams.]

Unit 5 Impact of European and British Legend on Literature

[Text – Bulfinch‟s Mythology]

- Valhalla – the Valkyrior
- Thor‟s Visit to Jotunheim
- The death of Baldur – the Elves – Runic Letters – Skalds – Iceland
- The Druids – Iona
- Beowulf
- Robin Hood and his Merry Men

King Arthur and the Knights of the Round Table -Sir Gawain, Launcelot of the Lake ,Perceval, Tristram and Iseult

Course Objectives	
Title	**COMMUNICATIVE ENGLISH -II**
Course Code	**LZ12A**
CO-1	To make the students aware of the correct usage of English grammar in writing and speaking.
CO-2	To improve the students ability to build and enrich their communication skills.
CO-3	To increase the reading speed and comprehension of academic articles.
CO-4	To enlarge the vocabulary of the students by keeping a vocabulary journal.
CO-5	To equip the students with basic knowledge to pursue careers in publishing, journalism and advertising.

Course Outcome	
Title	**COMMUNICATIVE ENGLISH -II**
Course Code	**LZ12A**
CO-1	Ability to understand a conversation in English.
CO-2	Developing the correct method of pronunciation by learning phonetics.
CO-3	Develop speaking skills through various speaking activities.
CO-4	Develop the ability to recreate a text in simple forms.
CO-5	Increase the practice of note taking.

Syllabus	
Title	**COMMUNICATIVE ENGLISH -II**
Course Code	**LZ12A**
Unit 1	1. Listening and Speaking a. Listening and responding to complaint (formal situation) b. Listening to problems and offering solutions (informal) 2. Reading and writing a. Reading aloud (brief motivational anecdotes) b. Writing a paragraph on a proverbial expression/motivational idea. 3. Word Power/Vocabulary a. Synonyms & Antonyms 4. Grammar in Context ● Adverbs Prepositions
Unit 2	1. Listening and Speaking a. Listening to famous speeches and

	poems b. Making short speeches- Formal: welcome speech and vote of thanks. Informal occasions- Farewell party, graduation speech 2. Reading and Writing a. Writing opinion pieces (could be on travel, food, film / book reviews or on any contemporary topic) b. Reading poetry b.i. Reading aloud: (Intonation and Voice Modulation) b.ii. Identifying and using figures of speech - simile, metaphor, personification etc. 3. Word Power a. Idioms & Phrases 4. Grammar in Context Conjunctions and Interjections
Unit 3	1. Listening and Speaking a. Listening to Ted talks b. Making short presentations – Formal presentation with PPT, analytical presentation of graphs and reports of multiple kinds c. Interactions during and after the presentations 2. Reading and writing a. Writing emails of complaint b. Reading aloud famous speeches 3. Word Power a. One Word Substitution 4. Grammar in Context: Sentence Patterns
Unit 4	1. Listening and Speaking a. Participating in a meeting: face to face and online b. Listening with courtesy and adding ideas and giving opinions during the meeting and making concluding remarks. 2. Reading and Writing a. Reading visual texts – advertisements b. Preparing first drafts of short assignments 3. Word Power a. Denotation and Connotation 4. Grammar in Context: Sentence Types
Unit 5	1. Listening and Speaking a. Informal interview for feature writing b. Listening and responding to questions at a formal interview 2. Reading and Writing a. Writing letters of application b. Readers' Theatre (Script Reading) c. Dramatizing everyday situations/social issues through skits. (writing scripts and performing) 3. Word Power a. Collocation 4. Grammar in Context: Working With Clauses

Course Objectives	
Title	**BRITISH LITERATURE -II**
Course Code	**AG22A**
CO-1	To understand the relevant social, historical, and aesthetic contexts of these literary works.
CO-2	To Improve writing skills in both content and mechanics
CO-3	To understand the relevant social, historical, and aesthetic contexts of these literary works.
CO-4	To develop the ability to recognize and identify significant achievements in British literature.
CO-5	To Improve speaking skills in self chosen activities.

Course Outcome	
Title	**BRITISH LITERATURE -II**
Course Code	**AG22A**
CO-1	Understand about various critical and theoretical approaches to literature.
CO-2	Understand about critical strategies for reading, interpreting, and writing about texts.
CO-3	Develop knowledge of professions and careers in which the English degree would be necessary or helpful.
CO-4	Understand the relevant social, historical, and aesthetic literary works.
CO-5	Improve writing skills in both content and mechanics.

Syllabus		
Title	**BRITISH LITERATURE -II**	
Course Code	**AG22A**	
Unit 1	UNIT 1:Poetry (Detailed) "Macflecknoe" "Tyger" "ForA"ThatAndA"That" "Threeyearsshegrew" "KublaKhan" "FromChildeHarold"sPilgrimage" "Ozymandias" "Odeto a Nightingale"	John Dryden William Blake Robert Burns Wordsworth SamuelTaylorColeridge Lord Byron PBShelley JohnKeats
Unit 2	:Poetry (Non detailed) "TheRapeoftheLock:CantoIII "(lines125-178) Alexander Pope "TheRimeoftheAncient Mariner" S.T.Coleridge "EssayonManFromEpistleII" AlexanderPope "TheDesertedVillage" OliverGoldsmith	
Unit 3	Prose "Dream-Children:AReverie" "SirRogerattheTheatre"	Charles Lamb JosephAddison
Unit 4	Drama 4.1TheRivals	R.B.Sheridan
Unit 5	Fiction 5.1PrideandPrejudice	Jane Austen

Course Objectives	
Title	**INDIAN WRITING IN ENGLISH**
Course Code	**AG22B**
CO-1	To enable the students to understand the evolution of Indian Writing in English.
CO-2	To identify the impact of the west on Indian Writing through representative texts.
CO-3	To create awareness towards the problems of interpreting Indian culture via English language.
CO-4	To familiarise with the work of significant Indian writers of poetry, prose, fiction, and drama.
CO-5	To develop the skill of self expression through creative writing.

Course Outcome	
Title	**INDIAN WRITING IN ENGLISH**
Course Code	**AG22B**
CO-1	Understand the concept Indian Literature aspect.
CO-2	The students would have gained knowledge about the masterpieces in Indian English Literature.
CO-3	Gain an insight into the society, politics and art.
CO-4	The background reading of East and West state, culture and language would have widened their idea and thoughts.
CO-5	Reading of autobiographies would have helped them to refine their life.

Syllabus		
Title	**INDIAN WRITING IN ENGLISH**	
Course Code	**AG22B**	
Unit 1	IPoetry "OurCasuarinaTree" "Coromandel Fishers" "Nightofthe Scorpion" "Introduction" "TheBus" "TheFrogandtheNightingale" "HerGarden" Narcissus"	Toru DuttSarojini Naidu Nissim Ezekiel Kamala DassArun Kolatkar Vikram Seth MeenaAlexander EasterineKire
Unit 2	Prose "IndiaandGreece"&"TheOldIndianTheatre" SelectionfromTheDiscoveryof India "TheSecretofWork" "Religion in a Changing World" Dr.Radhakrisnanfrom Religion,ScienceandCulture PassagesfromTheAutobiographyofanUnknowIndianNirad C.Chaudhuri(PicadorBookofModernIndianLiterature–Amit Chaudhuri)	
Unit 3	III Drama 3.1DanceLikeaMan	MaheshDattani

Unit 4	ShortFiction "UndertheBanyan Tree" "TheNightTrainatDeoli" "UnaccustomedEarth" "LaburnumformyHead"	R.K Narayan Ruskin Bond Jhumpa Lahiri TemsulaAo

Course Objectives	
Title	**BACKGROUND TO ENGLISH LITERATURE-II**
Course Code	**AG32A**
CO-1	To get knowledge of History of Language.
CO-2	To know about poetry forms
CO-3	To know about Drama forms.
CO-4	To get idea about various of prose.
CO-5	To help them to understand about vocabulary development.

Course Outcome	
Title	**BACKGROUND TO ENGLISH LITERATURE-II**
Course Code	**AG32A**
CO-1	To get knowledge of History of Language.
CO-2	To know about poetry forms
CO-3	To know about Drama forms.
CO-4	To get idea about various of prose.
CO-5	To help them to understand about vocabulary development.

Syllabus	
Title	**BACKGROUND TO ENGLISH LITERATURE-II**
Course Code	**AG32A**
Unit 1	I. Literary Forms 1.1 Poetry: Ode [Pindaric, Horatian, English], Elegy, Pastoral 1.2 Epic and Mock Epic, Dramatic Monologue 1.3 Drama: Comedy, Romantic Comedy, Comedy of Manners, Farce 1.4 Drama: Sentimental Comedy, Melodrama, Comedy of Humours, Tragi- Comedy 1.5 Prose: Novel -– Gothic, Picaresque, Sentimental, Epistolary, Domestic, Historical II. Literary Devices 1.6 Poetry - Alliteration, Assonance, Metaphysical Conceit, [Epic] similes, Metaphor, Hyperbole. 1.7 Drama – Irony [Verbal, Dramatic, Situational, Cosmic], Pun, Metonymy, Malapropism, Anachronism 1.8 Fiction- Cliché, Paradox, Connotation, Epigram, Euphemism, Allusion [Text - A Glossary of Literary Terms by M.H. Abrams & Geoffrey Galt Harpham. Eleventh Edition. Cengage,2019 (Indian Reprint)]
Unit 2	Impact of the History of Language on Literature 2.1 The Renaissance and After – pages 68-81 2.2 The Growth of Vocabulary – pages 82-113 2.3 Change of Meaning – pages 114-147 [Text. History of English Language by F.T. Wood. Trinity Press. Revised edition, 2016.]
Unit 3	Impact of Socio-Political History on Literature

	3.1 Restoration England - Charles II – pages 351- 365. James II and William III& the Glorious Revolution [1685-88] – pages 366-376. Queen Anne [1702-7] – pages 377 – 389 3.2 The Foundation of the British Empire – pages 411-418. The Industrial Revolution – pages 429-437. Britain and French Revolution – pages 438-445 3.3 Reactionary and Enlightened – pages 454-462. The Reform of Parliament– pages 463- 470. The Whigs and Reform [17th – Mid 19th Century]– pages 471- 481. The Chartists and Robert Peel – pages 482-489 3.4 Victorian England [1854-6] – pages 492-496. Imperialism: The Last Years of Victorian England – pages 515-523 3.5 Britain and the First World War – pages 532-540. Irish Independence, General Strike and the Economic Crisis" – pp. 541-549 [Text Book: A History of England. John Thorn, Roger Lockyer and David Smith. AITBS Publishers, India. 2012]
Unit 4	: Literary History I – 18th and early 19th c 4.1The Restoration – pages 537 – 541; Restoration comedy - pages 541-549; Dryden – page 558; John Bunyan‟s „Pilgrim‟s Progress‟ – pages 587 – 588. The Augustan Age: Defoe, Swift, Pope – pages 590 – 594; Joseph Addison and the Spectator – page 595; Daniel Defoe – pages 598 -599; Jonathan Swift - pages 602 – 603; Alexander Pope‟s „Rape of the Lock‟ – page 628; 4.2 The Novel from Richardson to Jane Austen – pages 700 – 701; Richardson‟s Pamela – page 703; Henry Fielding‟s Tom Jones – page 720; Laurence Sterne‟sTristramShandy– page 733; Gothic novel – page 741; Jane Austen‟s Pride and Prejudice – pages 750 – 754 4.3 Eighteenth Century Prose – pages 768 – 769; George Berkeley – page 772; David Hume – page 772; Dr. Johnson‟s „Preface to Shakespeare‟ – pages 782- 783; „Life of Dr. Johnson‟ by Boswell – page 795; Goldsmith – page 796; Edmund Burke‟s „Reflections on the revolution in France‟ – page 799; Thomas Paine – „The

	Rights of man‟ – page 803; Gibbon‟s „Decline and Fall of the Roman Empire‟ – page 807. 4.4 Scottish Literature&The Romantic Poets – page 809; Robert Burns – page 817; Walter Scott and his attitude to Scotland – page 836. Period of transition – pages 856-857; The Romantic Movement – page 860; William Blake‟s „Songs of Innocence and Experience‟ – page 863; Wordsworth‟s „Lyrical Ballads‟ – page 875; Coleridge‟s „Ancient Mariner‟ – page 893.Shelley‟s „Prometheus Unbound‟ – page 909; Keats‟ „Endymion‟ – page 917; Byron‟s „Childe Harold‟ – page 923 4.5 Prose of early and Middle 19th century – autobiographical creative works of TheRomantic writers – page 935; Charles Lamb‟s „Essays of Elia‟ and „Tales from Shakespeare‟ – page 937; Hazlitt – page 939 [Text - A Critical History of English Literature- Volume II– The Restoration to the Present Day by David Daiches. Revised. Indian Edition 2010. Supernova Publishers.]
Unit 5	Literary History II -Victorian Age 5.1Victorian Prose – Macaulay‟s „History of England‟ – page 949; Thomas Carlyle‟s „French Revolution‟ – page 955; “Victorian Prose” - Ruskin‟s „Modern Painters‟ – page 968; Mathew Arnold‟s; Arnold‟s „Essays in Criticism‟ – p. 977 5.2 Victorian Poets:An introduction to the age – page 993; Tennyson‟s „In Memoriam‟ – page 1001; Robert Browning‟s dramatic monologue – page 1003; Browning‟s optimism – page 1007; Elizabeth Barrett Browning – page 1007; Mathew Arnold‟s „Scholar Gypsy‟ – page 1013; Pre-Raphaelite Brotherhood – page 1017 5.3 Edward Fitzgerald‟s „Omar Khayyam‟ – page 1027; George Meredith‟s „Poems and Lyrics‟ – page 1028; Algernon Charles Swinburne‟s choruses – page 1030; Thomas Hardy‟s poetry – page 1037; Gerard Manley Hopkins‟ „God‟s Grandeur‟ – page

1045

5.4 Victorian Novels: An introduction – page 1049; Charles Dickens‟ Pickwick Papers – page 1051; William Makepeace Thackeray‟s Vanity Fair – page 1060; Charlotte Bronte‟s Jane Eyre – page 1065; George Eliot‟s Mill on the Floss- page 1069; Thomas Hardy‟s Mayor of Casterbridge– page 1076;

5.5 Victorian Drama: Oscar Wilde‟s Importance of being Earnest – page 1104; Bernard Shaw‟s well-made play – page 1105;

[Text - A Critical History of English Literature- Volume II– The Restoration to the Present Day by David Daiches. Revised. Indian Edition 2010. Supernova Publishers.]

Course Objectives	
Title	AN APPROACH TO LITERARY APPRECIATION
Course Code	**LZ1C3**
CO-1	To understand the significance of Literature in the modern context.
CO-2	To express the knowledge of different literature in English around the world.
CO-3	To demonstrate the knowledge of styles, devices and elements.
CO-4	To enhance the knowledge of literary terms.
CO-5	To acquire the literary tools to critical works of literature.

Course Outcome	
Title	AN APPROACH TO LITERARY APPRECIATION
Course Code	**LZ1C3**
CO-1	Understand the various concepts of literary criticism.
CO-2	Scrutinize and interpret poetry, prose and fiction.
CO-3	Learn and write conventions in prose, poetry, drama and narrative.
CO-4	Analyze the distinct features and critical appreciation of mainstream writers.
CO-5	Understand the notable progress in the study of literature.

Syllabus	
Title	AN APPROACH TO LITERARY APPRECIATION
Course Code	**: LZ1C3**
Unit 1	1.1 Studying Literature 1.2 Value of Humanities in the Present Times 1.3 Brief Survey of Literatures in English 1.4 Genres and Forms 1.4.1 Poetic Forms 1.4.2 Prose Forms 1.4.3 Dramatic Forms 1.4.4 Narrative Forms 1.5 Glossary of important terms in Genres and Forms 1.6 Unit – end Assessment and Assignment
Unit 2	2.1 Understanding Poetic Devices Syllable, Metre, Rhyme, Stanza, Verse, Imagery, Symbols, Figures of Speech. 2.2 Text-1 William Wordsworth The World is Too Much With Us Sonnet 2.3 Text-2 W.H.Auden Funeral Blues Elegy 2.4 Critical Analysis of Text I Critical Appreciation based of Form and Devices Critical Appreciation based on themes and Structure 2.5 Critical Analysis of Text 2 Critical Appreciation based of Form and Devices Critical Appreciation based on themes and Structure 2.6 Glossary of Poetic Terms 2.7 Unit end Assessment/ Assignment
Unit 3	3.1 Understanding Non-Fiction Writing Writing Styles, Devices Themes and Structure of Essays 3.2 My Lost Dollar Stephen Leacock 3.3 Kindly Adjust to our English ShashiTharoor 3.4 Critical Appreciation of Text 1 Critical Appreciation based of Form and Devices Critical Appreciation based on themes and Structure 3.5 Critical Appreciation of Text 2 Critical Appreciation based of Form and Devices Critical Appreciation based on themes and Structure 3.6 Glossary of Prose Terms 3.7 Unit end Assessment & Assignment
Unit 4	4.1 Understanding Dramatic Devices Elements of Drama, Dramatic Conventions

	4.2 G.B. Shaw's Arms& The Man Excerpts from ACT I 4.3 Critical Appreciation of Text 1 Critical Appreciation based of Form and Devices Critical Appreciation based on themes and Structure 4.4 Neil Simon's The Defenseless Creature One-Act Play 4.5 Critical Appreciation of Text 2 Critical Appreciation based of Form and Devices Critical Appreciation based on themes and Structure 4.6 Glossary of Dramatic Terms 4.7 Unit-end Assessment & Assignment
Unit 5	5.1 Understanding Fiction Devices Narrative Types, Narrative Elements and Techniques 5.2 Anton Chekhov's "The Bet" Short story 5.3 Excerpts from Paulo Coelho's The Alchemist Novella 5.4 Short Story Critical Appreciation based of Form and Devices Critical Appreciation based on themes and Structure 5.5 Novella Critical Appreciation based of Form and Devices Critical Appreciation based on themes and Structure 5.6 Glossary of Fiction terms 5.7 Unit end Assessment & Assignment

Course Objectives	
Title	**BRITISH LITERATURE- PAPER III**
Course Code	**AG22A**
CO-1	To develop a thorough understanding of the various eras in the history of English literature including the Renaissance, Restoration and Neo classical periods through the perusal of representative works of the time.
CO-2	To investigate the way volatile socio-political scenario influenced the literary production of the era.
CO-3	To introduce the works and writers to the students and make them understand the literary works of the period.
CO-4	To make the students read the poems of the period and also make them analyze and interpret those poems.
CO-5	To enhance the knowledge of the students about the important works from Victorian age and twentieth century.

Course Outcome	
Title	**BRITISH LITERATURE- PAPER III**
Course Code	**AG22A**
CO-1	Understand the various concepts, theories and terms in literature.
CO-2	Scrutinize and interpret poetry of the period with close ready.
CO-3	Learn and write detailed essays about the specialities of important works of writers of the era.
CO-4	Analyze the distinct features of mainstream writers from Victorian Age and Twentieth century.
CO-5	Understand the notable progress in the history of English Literature.

Syllabus		
Title	**BRITISH LITERATURE- PAPER III**	
Course Code	**AG22A**	
Unit 1	UNIT–IPoetry "Ulyssess" "MyLast Duchess" "DoverBeach" "Easter1916" "JourneyoftheMagi" "God"sGrandeur "TheUnknownCitizen" "TheThought-Fox"	Alfred Tennyson RobertBrowning Mathew Arnold W.B.Yeats T.S.Eliot G.M. Hopkins W.H.Auden TedHughes
Unit 2	UNIT–IIProse "AnApologyfor Idlers" "On Heroes, Hero Worship and the HeroicinHistory-LectureIII-Shakespeare" PickwickPapers –Chapters1&2 "YouandtheAtomBomb"	R.L.Stevenson Thomas Carlyle CharlesDickens George Orwell
Unit 3	UNIT–III Drama 3.1ImportanceofBeingErnest	OscarWilde

Unit 4	UNITIVShort Fiction "TheDead" "AHaunted House" "TheFactsofLife"	 James Joyce VirginiaWoolf SomersetMaugham
Unit 5	UNITVFiction 5.1FarfromtheMaddingCrowd	 ThomasHardy

Course Objectives	
Title	**ASPECTS OF ENGLISH LANGUAGE - PAPER I**
Course Code	**AG23B**
CO-1	To help the students revise and strengthen the knowledge in English grammar.
CO-2	To make the students understand and make them find the difference between correct and incorrect use of the language.
CO-3	To expose the understanding of the students about language and its features.
CO-4	To enhance the English language of the students correctly.
CO-5	To develop the writing skills of the students by giving several tasks based on Rebus writing, pictographic writing etc.

Course Outcome	
Title	**ASPECTS OF ENGLISH LANGUAGE - PAPER I**
Course Code	**AG23B**
CO-1	Develop the understanding of English grammar.
CO-2	Find the difference between correct and incorrect use of the language.
CO-3	Know the correct use of English language in suitable situation.
CO-4	Students can show their understanding of language and its features.
CO-5	Students can recall and test their basic knowledge of English grammar.

Syllabus	
Title	**ASPECTS OF ENGLISH LANGUAGE - PAPER I**
Course Code	**AG23B**
Unit 1	Introduction Language-Definition–Usesoflanguage - Phaticcommunion (Language and Linguistics- J.F.Wallwork1-13) Properties of language– Species specific and species uniform, Symbolic system, Arbitrariness,DualityofStructure,Productivity,Displacement,Cultural Transmission, discreteness, Inter changeability, Specialization, Non directionality (The Study of Language – George Yule Chapter 2) OriginofLanguage– DivineSource,Naturalsoundsource,OralGesture,GlassoGenetics DevelopmentofWriting– Pictographic,Ideographic,Logographic,RebusWriting, SyllabicWriting,AlphabeticWriting
Unit 2	-EnglishLanguageandItsStructureI-WordClasses–ContentWords (Lexemes) Naming Words (Noun) –Types, Nominal Cases – Functional Categories - Subject,Complement,ObjectandpartofPrepositionalPhrase,Pronoun types. ActionWords(Verb),WeakandStrongVerbs,RegularandIrregular, TransitiveandIntransitive,Reflexive,„Be“,„Have“,„Do“asMain Verbs., Auxiliaries–PrimaryandSecondaryModal,TimeandTense –simple continuous, perfect. Describingwords(Adjectives) -Kinds,Functions-Attributiveand Predicative, Degree of comparison, Order of adjectives Describingwords(Adverbs)- Formation,PositionofAdverbs,Comparison of Adverbs, Sentence Adverb LanguageinUse–Errorcorrections,Rewritechangingtenses,number, substituting with pronouns.
Unit	EnglishLanguageandItsStructureII

3	David Green - Contemporary English Grammar Structures and Composition Randolph Quirk and Sidney Greenbaum- A University Grammar of English S.K.VermaandN.Krishnaswamy"WordClasses–FormWords(Functors)"-ModernLinguistics:AnIntroduction73-78 Articles,Determiners(A.J.ThomsonandA.V.Martinet-APractical English Grammar 1-9) Prepositions,Inflections Conjunctions–Co-OrdinatingandSubordinatingConjunctions Linkers Interjections LanguageinUse–Errorcorrections,Rewritechanging tenseandnumbers
Unit 4	4EnglishLanguageAndItsStructureIII-Phrases. NominalPhrase,itsstructure–Modifier,QualifierHead,(ModernEnglish-A Book of Grammar, Usage and Composition – Chapter 3) Gerund(A.J.ThomsonandA.V.Martinet -APractical EnglishGrammar pg.no.228)VerbalPhrases,VerbalPatterns,PhrasalVerbs(A.J.Thomson and A.V. Martinet- A Practical English Grammar pg.no.315) Adjectival,AdverbialPhrasesandPrepositionalPhrases,(RandolpQuirk and Sidney Greenbaum- A University Grammar of English 155-177) Clauses. IndependentandDependentClausesConditionalClauses(ModernEnglish - A Book of Grammar, Usage and Composition – Chapter 4) Sentences - Pattern -Types of sentences - Simple, Compound and Complex sentences-(DavidGreen-ContemporaryEnglishGrammarStructuresand Composition 143-144) Kindsofsentences–Statement(Declarative),Interrogative,Imperative, Exclamatory Voice ReportedSpeech LanguageinUse–Conversion,Transformation,Rearrange(jumbledword sentences) Sequencing
Unit 5	EnglishLanguageAndItsStructureIV-Spelling Commonrules-„i"before„e",droppingthefinal„e",changingfinal„y"to „I".Doublingofthefinalconsonant.

Spelling–pronunciationdifferences
- singleletterwithmultiplepronunciation
- singlesoundwithmultiplespelling

Onewordsubstitutions(forclassworkonly.Notfortesting)

IdiomsandPhrases(forclassworkonly.Notfortesting)

Dictionary referencing (using Dictionaries to understand how words are entered in a Dictionary)

LanguageinUse– Errorcorrection,unscramblingletters,commonlyconfused words

Note–5.3,5.4&5.5arenotfortestingintheEndsemester Exam.

Course Objectives	
Title	**BACKGROUND TO ENGLISH LITERATURE-III**
Course Code	**AG33A**
CO-1	To make the students thorough about the basic terms as well as the concepts that is needed for any advanced courses.
CO-2	To introduce the basic concepts about English history, literary forms and literary periods with linguistic, historical background to enable students understand the contexts of British Literature of twentieth century.
CO-3	To give a detailed description about the distinct periods of British literature.
CO-4	To write brief essays on the historical background of the period and make the students very clear about it.
CO-5	To make the students know more about the seminal writers from Britain in the Twentieth century and know about the works and its specialties.

Course Outcome	
Title	**BACKGROUND TO ENGLISH LITERATURE-III**
Course Code	**AG33A**
CO-1	Know and understand the definition of basic terms and concepts that is important for the advanced courses in British literature.
CO-2	Understand the basic terms in literary forms.
CO-3	Know the description and specialities of the well defined periods of British literature.
CO-4	Understand the specialization of seminal writers from Britain in the twentieth century.
CO-5	Know more about various works and historical background of the era.

Syllabus	
Title	**BACKGROUND TO ENGLISH LITERATURE-III**
Course Code	**AG33A**
Unit 1	**LiteraryForms** ➢ POETRY DramaticMonologue,Confessional,Imagism-Haiku,War-Georgian, Slam/Spoken Word Poetry ➢ DRAMA Poetic Drama, Problem Play, Cup- and -Saucer drama, Well- made Play,ExpressionistTheatre,Epictheatre,TheatreofCruelty,Absurd Drama, Kitchen- Sink Drama, Bread and Puppet Theatre ➢ NOVEL Detective,Regional,Social,Regional,Psychological,Streamof Consciousness, Sci -Fi, Anti- Novel, Bildungsroman
Unit 2	**ImpactoftheHistoryoflanguageon Literature** ➢ TheEvolutionofStandardEnglish–pages148-157 ➢ IdiomandMetaphor-pages158-171 ➢ TheForeignContribution–pages–172-193 [Text.HistoryofEnglishLanguagebyF.T.Wood.TrinityPress. Revised edition, 2016.]

Unit 3	**LiteraryHistory** **TwentiethCentury** ➢ Twentieth Century poetry influenced by French symbolism – page 1123; W.B.Yeats'"SailingtoByzantium"– page1131;T.S.Eliot's"Wasteland"– page 1133; poets of the 1930s – page 1136; Ted Hughes – page 1151 ➢ Twentiethcenturynovel–anintroduction-pages1152-1153;E.M. Forster's'PassagetoIndia'– page1158;VirginiaWoolf's'Mrs.Dalloway' –page1160;JamesJoyce's'Ulysses'– page1163;D.H.Lawrence's'Sons and Lovers' – page 1164; George Orwell's 'Animal Farm' - page 1169 ➢ T.S.Eliot'spoeticdrama–'MurderintheCathedral'–page1111;John Osborne's 'Look Back in Anger' – page 1112 [Text-*ACriticalHistoryofEnglishLiterature-VolumeII– TheRestoration to the Present Day* by David Daiches. Revised. Indian Edition 2010. SupernovaPublishers.]
Unit 4	**WORLDWARS WORLD WAR I** CAUSES AssassinationofAustrianArchDuke[June1914],DeclarationsofWarby Austria, Germany, Britain, France, Montenegro, Japan. EVENTS TrenchwarfarebeginsatMarnesinFrance[Sep.1914]/ChemicalWarfare[April1915]/ Failed attempt to recapture Constantinople by ANZAC and British troops [April 1915]/ Sinking of Lusitania [May 1915],/ Battle of Verdun, France [Feb.1916]/ Battle of Somme launched by Britain [July 1916], VladimirLeninandtheBolshevikRebellioninRussia/ RussianCivilWar America enters War [April 1917] Tank Warfare at Cambrai [1917] RESULT**S** RussiasurrendersclaimtoUkraine,PolandandBalticterritories[Mar.1918],Armistice [11 Nov. 1918] **IMPACTOFWWI** AmericabecomesSuperPower,CollapseofGermany,Russia,Turkey, Austrialeading to WW II, Woodrow Wilson and the League of Nations

Unit 5	**WORLDWARII** Introduction ➢ AxisPowers[Germany,Italy,Japan] ➢ AlliedPowers[Britain,France,Russia,U.S.A.] ➢ CausesOfWorldWarII ➢ TheRiseofAdolfHitlerandtNazismandTHIRD REICH/RiseofFascisminItaly, ➢ Events ➢ BlitzkriegandtheBattleofBritain ➢ Battleofthe Atlantic ➢ TheHolocaust ➢ OperationBarbarossa-TheGermanInvasionoftheSovietUnion ➢ AttackonPearlHarbour -AmericaEnterstheWar ➢ D-Day-AlliedInvasionofEurope ➢ HiroshimaandNagasaki-Japan Surrenders ➢ LifeDuringWorldWarII ➢ **RESULTS** ➢ EndofWorldWar II ➢ KeyFiguresofWorldWarII ➢ ResultsandAftermathofWorldWarII

Course Objectives	
Title	An Introduction to Academic Writing
Course Code	**: LZ14C**
CO-1	The course Introduction to Academic Writing focuses on the academic skills and basic elements of academic writing.
CO-2	The aim of this paper is to increase students potential as writers by acquiring both the theoretical knowledge and practical skills.
CO-3	Specifically students will have an opportunity to practice critical reading and writing through summarizing, analyzing, evaluating and synthesizing ideas.
CO-4	Students will also learn how to engage with scholarly sources effectively and incorporate them into their own texts.
CO-5	It introduces basic research writing skills like, note taking, paraphrase, summary, direct quotation and MLA style citation

Course Outcome	
Title	An Introduction to Academic Writing
Course Code	**LZ14C**
CO-1	It helps students to understand and avoid the plagiarism
CO-2	This paper gives equal importance to macro-level composition skills such as essay structure, paragraph structure, coherence, unity and micro-level skills like sentence structure, grammar, vocabulary, spelling and mechanics.
CO-3	By the end this paper enlightens students' basic skills of research paper and thesis writing.
CO-4	To acquire LSRW skills.
CO-5	To explore the language skills.

Syllabus	
Title	An Introduction to Academic Writing
Course Code	**LZ14C**
Unit 1	WRITER'S RESOURCES 1.1 Recall and Write 1.2 Observe and Write 1.3 Read and Write 1.4 Converse and Write 1.5 Imagine and Write 1.6 Assignments
Unit 2	THINKING AND WRITING 2.1 Critical Thinking – Asking Questions 2.2 Comparing and Contrasting 2.3 Analysing and Evaluating Evidence 2.4 Arguing and Interpreting, arriving at a thesis 2.5 Establishing Cause and Effect 2.6 Assignments
Unit 3	WRITTEN LANGUAGE AND ACCURACY 3.1 Fundamentals of Language I 3.2 Fundamentals of Language II

	3.3 Punctuation and Mechanics of Writing 3.4 Cohesion and Coherence in Writing 3.5 Common Errors in Writing and how to avoid them 3.6 Assignments
Unit 4	RESEARCH AND WRITING 4.1 Writing from References 4.2 Literary Research Writing I 4.3 Literary Research Writing II 4.4 Documentation 4.5 Plagiarism 4.6 Assignments
Unit 5	WRITING PROCESS 5.1 Generating Ideas 5.2 Outlining a draft 5.3 Revising a draft 5.4 Completing the draft 5.5 Peer reviewing drafts 5.6 Assignments

Course Objectives	
Title	**AMERICAN LITERATURE - PAPER I**
Course Code	**AG24A**
CO-1	To develop the ability to recognize and identify significant achievements in American literature.
CO-2	To understand the relevant social, historical, and aesthetic contexts of these literary works.
CO-3	To develop enhanced cultural awareness and analytical skills.
CO-4	To Improve writing skills in both content and mechanics
CO-5	To Improve literary analysis and interpretation skills.

Course Outcome	
Title	**AMERICAN LITERATURE - PAPER I**
Course Code	**AG24A**
CO-1	Understand literary movements
CO-2	Understand about development and progression of American literature.
CO-3	Understand the historical and cultural contexts of major American authors and works.
CO-4	Understand literary movements and trends in American literature
CO-5	Develop the ability to recognize and identify significant achievements in American literature.

Syllabus		
Title	**AMERICAN LITERATURE - PAPER I**	
Course Code	**AG24A**	
Unit 1	UNIT1:Poetry	
	1.1 “Prologue”	AnneBradstreet
	1.2 “Brahma”	R.W. Emerson
	1.3“TheBrokenOar”	HenryW Longfellow
	1.4“BecauseIcouldnotstopforDeath	EmilyDickinson
	1.5"VigilStrangeIKeptontheFieldOne Night"	WaltWhitman
	1.6 “Sparrow”	PaulLaurenceDunbar
	1.7“TheRaggedyMan”	JamesWhitcombRiley
	1.8“TheAnti-Suffragists”	CharlottePerkinsGilman
Unit 2	UNIT2:Prose	
	2.1“WhereILived,andWhatILivedFor”	H.D.Thoreau
	2.2“ThePhilosophyof Composition”	EdgarAllanPoe
	2.3“TheAmerican Scholar”	R.W. Emerson
	[Excerpt:Paragraphbeginning„InthisviewofhimasManThinking…“tothelines ending…„popularjudgmentsandmodeofaction.“–EducationoftheAmericanwriter bynature,booksandaction]	
	2.4“TheSlaves'NewYear'sDay”	HarrietJacobs
Unit 3	UNIT3:Drama	
	3.1 Trifles	SusanKeatingGlaspell
Unit 4	UNIT4:ShortStory	
	4.1“TheMurdersattheRue Morgue”	EdgarAllenPoe

	4.2“JimBaker‟sBlueJay‟sYarn”	MarkTwain
	4.3“TheLuckofRoaringCamp”	Bret Harte
	4.4 “Regret”	KateChopin
Unit 5	UNIT5:Fiction	
	5.1AdventuresofHuckleberryFinn	MarkTwain

Course Objectives	
Title	**ASPECTS OF ENGLISH LANGUAGE – PAPER II**
Course Code	**AG24B**
CO-1	**To** recall, reinforce and test knowledge of phonetics.
CO-2	To sensitise on correct use of pronunciation to introduce manner of articulation.
CO-3	To introduce place of articulation .
CO-4	To understand a language in the aspects of Phonology.
CO-5	To enhance transcription skills.

Course Outcome	
Title	**ASPECTS OF ENGLISH LANGUAGE – PAPER II**
Course Code	**AG24B**
CO-1	Provide learnersthefundamentalsofEnglish Linguistics
CO-2	Sensitive learnersonthenuancesofEnglish Language
CO-3	Make themuseEnglishwithathoroughknowledgeofthe Language
CO-4	Analysethe Sound system and differentiate them.
CO-5	Use English words with a thorough understanding of their structure and meaning

Syllabus	
Title	**ASPECTS OF ENGLISH LANGUAGE – PAPER II**
Course Code	**AG24B**
Unit 1	1 Introduction 1.1WhatisLinguistics?–Linguisticsasascience 1.2Nature and scope of Linguistics SynchronicandDiachronicapproaches Branchesofstudy

	KindsofLinguistics-Descriptive,ComparativeandHistorical
Unit 2	2EnglishPhoneticsandPhonologyI Introduction to Phonetics and Phonology – The unphonetic character of English Orthographyandtheneedforaphoneticscript – phonetics,phonemics,phonics(A Textbook of Phonetics for Indian Students – T.Balasubramaniam chapter 1) OrgansofSpeech-RespiratoryRegion,PhonatoryRegionandArticulatoryRegion ,AirStreamMechanisms(ATextbookofPhoneticsforIndianStudents – T.Balasubramaniam chapter 4) SegmentalPhonemes-Consonants–Definition–Articulationofindividual Consonants Three term Label (A Textbook of Phonetics for Indian Students – T.Balasubramaniam chapter 5) FIVE point Description – Position of the Vocal Cords, Position of the Soft Palate, Place of Articulation, Manner of Articulation – Active and Passive Articulators (A TextbookofPhoneticsforIndianStudents –T.Balasubramaniamchapter6,TheStudy of Language – George Yule- Chapter 3) MinimalPairs-ContrastiveDistribution,PhoneticEnvironment– Allophones– ComplementarydistributionandFreeVariation(TheStudyofLanguage – George Yule- Chapter 4 45,46 A Textbook of Phonetics for Indian Students – T.Balasubramaniam chapter 8 72-86)
Unit 3	3EnglishPhoneticsandPhonologyII Vowels–Definiton,Cardinalvowels,VowelChart DescriptionofVowels–Purevowels,Diphthongs,Triphthongs – ThreeTermlabel, Description of individual Vowels (The Study of Language – George Yule- Chapter 3, English Phonetics and Phonology – Peter Roach 8-18)

	Syllable,Syllabicdivision,SyllabicStructure,Consonantclusters,A rrestingand Releasing consonants (A Textbook of Phonetics for Indian Students – T.Balasubramaniam87-96; The Study of Language – George Yule- 47,48; English Phonetics and Phonology – Peter Roach 56-60) Stress-WordStress,SentenceStress,RhythmicStress/StresstimedRhythm(A Textbook of Phonetics for Indian Students – T.BalasubramaniamChapter 14, 15) Intonation – Tone group, Tonic syllable, Tone (Static and Kinetic) (A Textbook of PhoneticsforIndianStudents– T.BalasubramaniamChapter16; EnglishPhoneticsand Phonology – Peter Roach 119-143) Suprasegmentalfeatures–Assimilation,Elision,LinkingandIntrusive „r“ (ATextbookofPhoneticsforIndianStudents – T.BalasubramaniamChapter17; English Phonetics and Phonology – Peter Roach 107-115) GlossaryofPhonologicalTermsI LanguageinUse–Transcription–wordsandsinglesentences,ReverseTranscription, UsingaDictionarytonoteIPAsymbolsandstressmarkers (ExercisesinspokenEnglish– Consonants,Vowels,Accent,RhythmandIntonation– CIEFL ATextbookofPhoneticsforIndianStudents –T.Balasubramaniam)
Unit 4	MorphologyandWordFormation Morphemes–FreeandboundMorphemes(TheStudyofLanguage –George Yule- Chapter 6, 73-76) Affixes-Prefix,SuffixandInfix(ModernLinguistics:AnIntroduction-S.K.Verma and N.Krishnaswamy 64-67) Allomorphs-ZeromorphemesEmptyMorphemes CompoundWords,BackformationPortmanteauwords,Clippingof Words-(The Study of Language – George Yule- Chapter 5) Morphophonemics-

	PhoneticRealizationofPlural,Past,ThirdPersonSingular morphemes (pronunciation of – ed, -s &-es) (Modern Linguistics: An Introduction- S.K.VermaandN.Krishnaswamy 69-73) Glossary of Morphological Terms I LanguageinUse–Morphologicalanalysisofwordsinsentences,separating portmanteau words
Unit 5	5Semantics(Semantics -GeoffreyLeech1-10;TheStudyofLanguage– George Yule- Chapter 9) WordMeaning–AssociativeandDenotativeMeaning SevenTypesofMeaning(logicalorConceptual,Connotative,social ,affective, reflected, collective and thematic) LexicalRelations- Collocation,Homonymy,homophony,Hyponymy,Polysemy, Synonymy, Antonymy) SemanticRoles SemanticField(J.F.Wallwork- LanguageandLinguistics-96-98) Glossary of Semantic Terms I LanguageinUse –testingalltypesofmeaningincontext

Course Objectives	
Title	**BACKGROUND TO EUROPEAN AND AMERICAN LITERATURE-IV**
Course Code	**AG34A**
CO-1	To know about Ancient Greek and making of Roman World.
CO-2	To know North American colonies and American Revolution.
CO-3	To get knowledge about the history and culture of the United States of America.
CO-4	To know about American and World War - I.
CO-5	To know Harlem Renaissance and Hippie culture.

Course Outcome	
Title	**BACKGROUND TO EUROPEAN AND AMERICAN LITERATURE-IV**
Course Code	**AG34A**
CO-1	Understand about Ancient Greek and making of Roman World.
CO-2	Understand about North American colonies and American Revolution.
CO-3	Develop knowledge about the history and culture of the United States of America.
CO-4	Understand about American and World War - I.
CO-5	Understand about Harlem Renaissance and Hippie culture.

Syllabus	
Title	**BACKGROUND TO EUROPEAN AND AMERICAN LITERATURE-IV**
Course Cod	**AG34A**
Unit 1	AncientGreece–pages22-43 MakingoftheRomanWorld–pages44-64 [Text–*ThePENG-uinHistoryofEurope*byJ.M.Roberts, 1996.]
Unit 2	➢ Western Christendom, Papacy, Charlemagne, Carolingian heritage, MediterraneanEurope,Vikings,Anglo-SaxonENG-land–pages120- 138 ➢ Thecrusades–pages167-171 ➢ Europe‟semergingshape–pages178-179 ➢ TheOttomans,theendofByzantium,OttomanEurope–pages209 213 ➢ RenaissanceandPrinting–pages218-221 ➢ Modernityandmodernhistory–pages233-238 ➢ Enlightenment–pages267-271 [Text–*ThePENG-uinHistoryofEurope*byJ.M.Roberts, 1996.]
Unit 3	➢ TheDiscoveryofAmerica–EuropeanEnterprise–anewWorld– 224 - 230 ➢ TheAmericas–pages319-321 ➢ NorthAmericanColonies–pages324-326 ➢ AmericanRevolution–firstoverseasEuropeannation,United States and European opinion – pages 344- 348 [Text–*ThePENG-uinHistoryofEurope*byJ.M.Roberts,1996.]
Unit 4	**AMERICA**

TheHistoryandcultureoftheUnitedStatesofAmerica–

- Chapter1Europeansettlersinanewcontinent;ColonialAmerica –13colonies;[pp.1-28]
- Plantation Slaves in the South[1641-1865], the Westward Movement, the Gold Rush[1807-1910], the Declaration and American War of Independence[1775-83]; the framing of the Constitution,LincolnandtheCivilwar;Reconstruction;[pp.1-15] [Text–*AShortHistoryofAmericanLiterature*byKrishnaSen and Ashok SENG-upta. Orient Blackswan, 2017.]
  America and WorldWar I[1914-18], The League of Nations; ProhibitionuptoThebreakdownofTrusts(Sherman/Clayton Anti -Trust Acts-1890/1914)and the Mafia [1920-], Great Depression[1929] America‟s role in World War II[1939-45], Martin Luther King Jr. and the Civil Rights Movement[late1940s-1968]

American Foreign Policy-The Cold War [1945-89] and McCarthyism [late 1940s-1950s], J.F. Kennedy‟s Foreign and Blackrightspolicy,WarwithVietnam[1954-73],Cubaandthe Bay of Pigs Invasion [1961]

Unit 5

- Chapter1ThenarrativeofAmericanliterature;TheNewworld;Puritanmyth ; American exceptionalism; Myth of the frontier; American Dream; American Pastoralism; Multiculturalism– pages 1-28
- From the Early narratives to the Colonial Era – Chapter 2 – Puritan literature; histories and journals; Conversion narratives; Sermons; Captivity narratives; poetry;Literatureofthe18thcentury;LiteratureandtheRevolution;Emergence of the American novel; Fenimore Cooper– pages 29-58,
- HarlemRenaissanceandHippieculture
- [Text–*AShortHistoryofAmericanLiterature* byKrishnaSenandAshok SENG-upta. Orient Blackswan, 2017.]

PeriodsofAmericanliterature –pages273-278[Text-*AGlossaryofLiterary Terms* by M.H.Abrams

Course Objectives	
Title	**AMERICAN LITERATURE – PAPER II**
Course Code	**AG25A**
CO-1	To understand the background of civil war
CO-2	To know about transcendentalism
CO-3	To comprehend the effects of racism
CO-4	To study a brief history of American lit
CO-5	To know about the life, culture, language and society through literature.

Course Outcome	
Title	**AMERICAN LITERATURE – PAPER II**
Course Code	**AG25A**
CO-1	Understand literary themes, connections and allusions.
CO-2	Evaluate new forms of space, identity and writing that transformed canonical English literary structures.
CO-3	Analyzes and evaluates different short stories.
CO-4	Identity and apply techniques of short fiction.
CO-5	Learns the skill of genre analysis.

Syllabus		
Title	**AMERICAN LITERATURE – PAPER II**	
Course Code	**AG25A**	
Unit 1	UNIT1:Poetry “AHillsideThaw” “Chicago” “Poetry” “SkunkHour” “Runagate,Runagate” “Mirror” “Harlem” “PerhapstheWorldEndsHere”	Robert Frost Carl Sandburg Marianne Moore Robert Lowell Robert Hayden Sylvia Plath LangstonHughes JoyHarjo
Unit 2	:Prose “TheFigureaPoemMakes”	RobertFrost

	"TheManofLettersintheModernWorld" AllenTate "IHaveaDream" MartinLutherKingJr "TheBlack writer and the Southern Experience" AliceWalker from *In Search of our Mother's Garden*	
Unit 3	UNIT3:Drama TheGlassMenagerie	TennesseeWilliams
Unit 4	UNIT4:ShortStory "AJourney" "TheSnowsof Kilimanjaro" "TheWorld'sGreatestFisherman" "AllSummerinaDay"	Edith Wharton ErnestHemingway Louise Erdrich RayBradbury
Unit 5	UNIT5:Fiction ToKillaMocking Bird	HarperLee

Course Objectives	
Title	**WORLD CLASSICS IN TRANSLATION**
Course Code	**AG25B**
CO-1	Thispaperaimsatintroducingstudentstoafewseminalclassicsoftheworld.
CO-2	To acquirehistoricalandculturalknowledgeofthepast.
CO-3	To introduce few seminal classics of the world.
CO-4	To discuss critically and in a socio- historical context some of their texts and forms.
CO-5	To demonstrate familiarity with the primary forms of classical literature.

Course Outcome	
Title	**WORLD CLASSICS IN TRANSLATION**
Course Code	**AG25B**
CO-1	Learn about life through human history.
CO-2	Acquire historical and cultural knowledge of the past.
CO-3	Develop critical thinking by being exposed to brilliant minds.
CO-4	Write few essays on a few writers and their works.
CO-5	Develop an understanding on some of the key challenges involved in reading world literature.

Syllabus	
Title	**WORLD CLASSICS IN TRANSLATION**
Course Code	**AG25B**
Unit 1	Odyssey–Homer(8th c.BCE) LifeandWorksofHomer(fromanyencyclopedia)
Unit 2	TheGateofHell:Canto III(*Inferno*)-DanteAlighieri Ithaca-ConstantinePetrouCavafy TheBurningoftheBooks- BertoltBrecht Lot‟sWife-AnnaAkhmatova TheEndandthe Beginning-WislavaSzymborska
Unit 3	*OedipusRex*–Sophocles
Unit 4	TheBlizzard-Alexander Pushkin TheDiamondNecklace-Guyde Maupassant OneAutumnNight-MaximGorky AChristmasTreeandaWedding-FyodorDostoyevsky 4.5TheGuest-AlbertCamus
Unit 5	*Warand Peace* -LeoTolstoy(VintageClassics AbridgedVersion) The*CountofMonteCristo*– AlexanderDumas(McMillanAbridgedVersion)

Course Objectives	
Title	**ASPECTS OF ENGLISH LANGUAGE –III**
Course Code	**AG25C**
CO-1	To in interpret text with attention to ambiguity, complexity, and aesthetic value.
CO-2	To develop writing skill
CO-3	To genre and rhetorical situation
CO-4	To heighten the awareness of correct usage of English grammar in writing and speaking
CO-5	To improve their speaking ability.

Course Outcome	
Title	**ASPECTS OF ENGLISH LANGUAGE –III**
Course Code	**AG25C**
CO-1	To introduce learners to the different ways in which language is used
CO-2	To sensitize learners to the different ways in which English is spoken in India
CO-3	To sensitize learners to the differences between American and British English
CO-4	To enhance writing skills of learners
CO-5	Touselanguageinthetechnologicalworld

Syllabus	
Title	**ASPECTS OF ENGLISH LANGUAGE –III**
Course Code	**AG25C**
Unit 1	Introduction Langue,Parole,Language(ModernLinguistics:AnIntroduction-S.K.Verma and N.Krishnaswamy ; Modern Applied Linguistics-S.K.Verma, N.Krishnaswamy and Nagarajan) Regional Varieties of Language – Dialect, Standard and Non – Standard, Isoglasses , Dialect Boundaries,Bidialectal, Dialectology, Idiolect, Register,Bilingual(TheStudyofLanguage–GeorgeYule-chapter18) Internationalvarieties–accent,style,slang,jargon,LinguaFranca,Pidgin, Creole, Creolisation, The Post Creole Continuum (The Study of Language – George Yule- chapter 18) IndianEnglish,(pronunciation,mothertongueinfluence,wordsinEnglish of Indian Origin) American vs British English (vocabulary, spelling, pronunciation, meaning of commonly used words) (A Textbook of Phonetics for Indian Students – T.Balasubramaniam) LanguageChange–Protos–Familyrelationship-Cognates–Comparative- Reconstruction LanguageinUse–

	IndianEnglish,AmericanvsBritishEnglish(TheStudyof Language – George Yule- chapter 17
Unit 2	-Syntax(Grammar–Palmer7-34andTheStudyofLanguage– GeorgeYule- chapter 7) WhatisGrammar?Misconceptionsregardinggrammar The development of English grammar and Issues in traditional approach – Nominative Rules -Latinate Fallacy – Logical Fallacy – Historical Fallacy, Descriptive and Prescriptive approaches – Concept of correctnessandsocialacceptability–Formandsubstance-Speechand Writing StructuralGrammar–ICAnalysis-LabelledTreediagram-DemeritsofIC Analysis (ModernLinguistics:AnIntroduction-S.K.VermaandN.Krishnaswamy 79-87; Grammar – Palmer 124-134) PhraseStructureRules(TheStudyofLanguage –GeorgeYule-chapter8) Transformation-GenerativeGrammar–CompetenceandPerformance,Deep Structure and Surface Structure, Kernals andTransforms (Grammar – Palmer chapter 4) LanguageinUse-Disambiguation
Unit 3	-WritinginTheory–AcademicWriting Pre-Writing,PostWritingandRevision UseofTransitionalphrases Coherenceandcohesion WritingVoice–Formalvsinformal,tone Copyediting/languageeditingwitheditingsymbols
Unit 4	WritinginPractice Paraphrasing ReviewWriting–Books,films,sport ReportWriting-Project-status,progress,completion ContentWriting Creative Writing LanguageinUse–writingpractice
Unit 5	EvolutionofInternetEnglish-DavidCrystalLanguageandtheInternet

	Internetvocabulary OnlineResourcesandauthenticityofcontent WritingfortheInternetandPlagiarism Emails,Blogging(Blogwriting),Microblogging(twitter) Abstracting,synopsiswriting,scriptwriting LanguageinUse– blogwriting,sendingassignmentsasattachmentsthroughemails

Course Objectives	
Title	**INTRODUCTION TO JOURNALISM**
Course Code	**AG35A**
CO-1	To introduce the basic concepts in journalism and sensitize them to the latest developments in the world of journalism.
CO-2	To introduce basic concepts of communication and its role in society.
CO-3	To introduce students to various processes and theories of communication.
CO-4	To introduce different types of media their characteristics, merits and demerits.
CO-5	To develop accurate note-taking skills.

Course Outcome	
Title	**INTRODUCTION TO JOURNALISM**
Course Code	**AG35A**
CO-1	tracethehistoryofjournalisminIndia
CO-2	discusstheaspectsofPressanditsgoverningprinciples
CO-3	analyse the importance of news agencies, advertisements, Photographic Journalism, and News Media
CO-4	assessthevariouscomponentsofanewspaper
CO-5	evaluatetheelementsofreportingintheprint,radio,television,andonline platforms

Syllabus	
Title	**INTRODUCTION TO JOURNALISM**
Course Code	**AG35A**
Unit 1	Introduction HistoryofJournalism PrinciplesandEthicsofJournalism FreedomofPress andthreatstoPressFreedom
Unit 2	Press PressLaws– Defamation,Libel,ContemptofCourt,Slander,CopyrightLaws, Press Regulation Act, Press Registration Act, Law of Privileges News Agencies PressCouncilofIndia
Unit 3	ReportingNewsandLayout 3.1Reporting, Editing Roleof a Reporter TypesofReporting Dutiesofan Editor Headlines,Editorial,Feature,PersonalColumn,Reviews,Interviewsand Press Conferences Make-upofanewspaper,Layoutofthe Newspaper Advertisement-Types,TechniquesandSocialResponsibility
Unit 4	ElectronicandNewMedia ElectronicMedia Television,Radio SocialMedia,ImportanceofMedia TypesofSocialMediallikeBlog,Twitteretc EthicsandSocialResponsibilitiesofNewMedia
Unit 5	ApplicationOrientedProject(ForInternalEvaluationonly) EditingusingProof-readingmarks(Exercises) FeatureWriting (AnyNewsworthyissue) NewsReportWriting(AnyTopicalissue) PlanningandConductingInterviews(Anyonetypeof interview) ReviewWriting(Books,Films,Play)

Course Objectives	
Title	**INTRODUCTION TO LITERARY THEORY AND CRITICISM**
Course Code	**AG25D**
CO-1	To get the basic knowledge of literary criticism.
CO-2	To widens the knowledge of literary and focus on their importance .
CO-3	Helps to write a critical appreciation.
CO-4	To accentuates expressions of thoughts and views of critical appreciations judgemental reviews.
CO-5	To enhance fluency of language, presentations skills and creative writing.

Course Outcome	
Title	**INTRODUCTION TO LITERARY THEORY AND CRITICISM**
Course Code	**AG25D**
CO-1	To get the basic knowledge of literary criticism.
CO-2	To widens the knowledge of literary and focus on their importance .
CO-3	Helps to write a critical appreciation.
CO-4	To accentuates expressions of thoughts and views of critical appreciations judgemental reviews.
CO-5	To enhance fluency of language, presentations skills and creative writing.

Syllabus	
Title	**INTRODUCTION TO LITERARY THEORY AND CRITICISM**
Course Code	**AG25D**
Unit 1	1.1 Literary theorizing from Aristotle to F.R. Leavis, some key moments, the transition to „theory“, some recurrent ideas in critical theory(Pages20–35of the prescribed text)
Unit 2	Structuralism

	TheScopeofStructuralists,WhatStructuralistCriticsdo (Pages38–58oftheprescribedtext-Excluding„StopandThink‟portions) Post-structuralism and Deconstruction (Pages59–65;68-70oftheprescribedtext)
Unit 3	Post-ModernismandPsychoanalyticCriticism PostModernism:Pages78-88UptoWhatpostmodernistcriticsdo (Excluding „Stop and Think‟ portions) PsychoanalyticCriticism:92-97and100-[WhatFreudian Psychoanalytic criticsdo]oftheprescribedtext(Excluding„StopandThink‟portions)
Unit 4	FeministandMarxist Criticism FeministCriticism:Pages118-124oftheprescribedtext MarxistCriticism:Pages150-154oftheprescribedtext
Unit 5	Post-ColonialCriticism NewHistoricismandCulturalMaterialism(Pages172-184oftheprescribed text) PostColonialCriticism:Pages185-192oftheprescribedtext-Excluding StopandThink‟portionsEcocriticism:Pages239248oftheprescribedtext

Course Objectives	
Title	**POSTCOLONIAL LITERATURES IN ENGLISH**
Course Code	**AG26A**
CO-1	To create an understanding of the post colonial literature which address the problem and consequences of the decolonization of a country.
CO-2	To identify colonial languages and major writers and trends.
CO-3	To enhance about post colonial methodology to interpret its own history.
CO-4	To think critically and engage with the post colonial times.
CO-5	To carry out research in the field of post colonial literature

Course Outcome	
Title	**POSTCOLONIAL LITERATURES IN ENGLISH**
Course Code	**AG26A**
CO-1	Gain a post colonial perspective on literature written in India and other colonies.
CO-2	Identify major post colonial writer and its trends.
CO-3	Carry out knowledge in the field of post colonial literature.
CO-4	Apply post colonial methodology to interpret literature.
CO-5	Have an awareness of post-colonalism as a both a body of theory and a study of political and cultural change.

Syllabus	
Title	**POSTCOLONIAL LITERATURES IN ENGLISH**
Course Code	**AG26A**
Unit 1	**1Prose:***DecolonisingtheMind:ThePoliticsofLanguageinAfrican Literature* (ArnoldAnthology-pages79-83)NgugiwaThiong'o **1.2Poetry:**i)"AnAfricanElegy" BenOkri ii)"AnAfricaThunderstorm" DavidRubadiri **1.3Drama:***TheLionandthe Jewel* WoleSoyinka **1.4Fiction:***ThingsFallApart* ChinuaAchebe
Unit 2	**Australia** **MythsandLegends:**"TheAboriginalSongCycle-TheDjanggawulSongCycle" **Poetry:**i)"Australia" A.D.Hope ii) "ASongof Hope" Oodgeroo(KathWalker) iii) "WaltzingMathilda" BanjoPatterson iv) "ForNewENG-land" JudithWright **ShortFiction:**i)"Drover"sWife" HenryLawson

	"OneSundayinFebruary1942"ThomasKeneally
Unit 3	**Canada** **Prose:***Godzillavs.Post-colonial* ThomasKing **Poetry:i)"**FirstNeighbours" PKPage **ii)**"IndianReservation:Caughnawaga" AM Klein **ShortFiction:** **i**)"Face" AliceMunro **ii)** "The Hostelry of Mr.Smith"StephenLeacock (Sunshine Sketches of a Little Town)
Unit 4	**NewZealand,andSouthPacific** **Poetry:** i) "House and Land" AllenCurnow (Arnold Anthology: Pages 603-604) ii)"SteppingStones" AlbertWendt **Short Fiction:** i) "The Garden Party" KatherineMansfield (Arnold Anthology: Pages 588-598) ii)"FromSouthPacific"(ArnoldAnthology:669-675)BillManhire
Unit 5	**Carribean** **Poetry**: "Ruins of a Great House" DerekWalcott (Arnold Anthology: Pages 498-499) **ShortFiction**: "TheDayTheyBurnedtheBooks" Jean Rhys (ArnoldAnthology:Pages457-461)

Course Objectives	
Title	**CONTEMPORARY LITERATURE**
Course Code	**AG26B**
CO-1	To introduce a selection of modern and contemporary writings that represents the 20th century.
CO-2	To illuminate the strength or weakness of the society.
CO-3	To develop their rational thinking.
CO-4	To identify and describe distinct literary characteristics of contemporary literature.
CO-5	To reflect a society' social or political view points.

Course Outcome	
Title	**CONTEMPORARY LITERATURE**
Course Code	**AG26B**
CO-1	Introduceaselectionofmodernandcontemporarywritings,thatrepresents.
CO-2	Identifytheinfluenceofmulticulturalism.
CO-3	To know about globalization.
CO-4	Understand abouthybridityoncontemporary literature.
CO-5	Evaluate the thematic concerns and writing styles in contemporary literature.

Syllabus	
Title	**CONTEMPORARY LITERATURE**
Course Code	**AG26B**
Unit 1	**UNIT1:**POETRY 1.1"ADoghas Died" Pablo Neruda 1.2"Talkingto Myself" KishwarNaheed 1.3"Dedication(forMoremi)" Wole Soyinka 1.4 "Home" ArundhatiSubramaniam 1.5"Wordsfor Father" Shirley Lim 1.6"BlackberryPicking" SeamusHeaney 1.7"AGreat Number" WislawaSzymborska 1.8"IKnowWhytheCagedBirdSings"MayaAngelou
Unit 2	**UNIT2: PROSE** 2.1"TheJoysandDangersof Exploring AfricaontheBackofanElephant" PaulTheroux 2.2"ThatCraftyFeeling" (fromChangingMyMind:OccasionalEssays) ZadieSmith 2.3"TheBombandI"by ArundathiRoy 2.4"FreedomFromtheKnown"-Chapter 6 J.Krishnamurti (LinesBeginning-Fear,Pleasure,Sorrow,thoughtandViolenceareall interconnected…Whenthehouseisonfire,doyouargueaboutthecolourofthehairof

	themanwhobringsthewater?)
Unit 3	**DRAMA** *Harvest* ManjulaPadmanabhan UNIT4:SHORTSTORY "ATigerinthe House" RuskinBond "BirthDayGirl" HarukiMurakami "DistantRelations" OrhanPamuk "UnaccustomedEarth" JhumpaLahiri
Unit 4	**FICTION** *The Night*ElieWiesel PadleySteve,*KeyConceptsinContemporaryLiterature,PalgraveKey ConceotsSeries,*Palgrave MacMillan
Unit 5	**FICTION** *The Night*ElieWiesel PadleySteve,*KeyConceptsinContemporaryLiterature,PalgraveKey ConceotsSeries,*Palgrave MacMillan

Course Objectives	
Title	INDIANLITERATURESINENGLISH
Course Code	**AG26C**
CO-1	To explore the evolution of Indian literary tradition from the classical age to the contemporary age.
CO-2	To analyse the characteristics of Indian literature in English.
CO-3	To understand the nature and scope.
CO-4	To associate with the works of member of the Indian Diaspora.
CO-5	To identify, analyze, interpret and describe the critical ideas, values and themes.

Course Outcome	
Title	INDIANLITERATURESINENGLISH
Course Code	**AG26C**
CO-1	An understanding of the Indian Literature aspect.
CO-2	By the end of the course the students would have gained knowledge about the masterpieces in Indian English Literature.
CO-3	Gain an insight into the society, politics and art.
CO-4	The background reading of East and West state, culture and language would have widened their idea and thoughts.
CO-5	Reading of autobiographies would have helped them to refine their life.

Syllabus	
Title	INDIANLITERATURESINENGLISH
Course Code	**AG26C**
Unit 1	Poetry "IsPoetryalwaysworthywhenit'sold?"Kalidasa (Malavikagnimitra) "WhatSheSaid"- Tevakulattar,Kurunthokai3(Tamil)"WhatSheSaidtoher Girlfriend" - Kapilar, Akanaanooru 82 (Tamil)(Prescribed for topics 2 and 3: Translation of Sangam Age Poetry by A.K.Ramanaujan) Gitanjali–(1-5) -RabindranathTagore SixRubaiiyats -MirzaArif(Urdu) "CreativeProcess"-AmritaPritam "TheBuddha"-DayaPawar "Hiroshima"-Agyeya "DesertLandscape"-AghaShahidAli
Unit 2	Prose " A Popular Literaturefor Bengal" BankimChandraChatterjee from The PicadorBook of Modern Indian Literature Amit Chaudhuri " Gandhiji as a SchoolMaster" MahatmaGandhifromThe Story of My Experiments with Truth

	"WhatisDalitLiterature?" SharathchanraMukthibodh (Selection from PoisonedBread– Arjun Dangle) "IntroductiontoModernIndianDrama" G.P.Deshpande
Unit 3	Drama 3.1 Tughlaq GirishKarnad
Unit 4	.ShortFiction "Roots" IsmatChugtai(Urdu) "TheShroud" MunshiPremchand(Hindi) "Poovan Banana" VaikomMohammadBasheer Prescribed: Poovan Banana and Other Stories (Malayalam) "TobaTekSingh" SadatHasanManto(Urdu) "The Empty Chest" IndiraGoswami[UdangBakacha: Assamese Translation: Prodipta Birgohain
Unit 5	Fiction 5.1 Chemeen ThakazhiSivaShankaraPillai (Translated by AnitaNair)

Course Objectives	
Title	**WOMEN'SWRITING**
Course Code	**AG36A**
CO-1	To provide an effective educational program that will equip students to utilize the frameworks of various disciplines in order to analyse women, gender, and sexuality in meaningful ways.
CO-2	To conduct research using feminist methodologies.
CO-3	To apply acquired knowledge toward academic professional and personal development.
CO-4	To understand the importance of women's studies and incorporate women's studies with the fields.
CO-5	To understand the way women centric ideas, values, and themes and its impact on culture and society.

Course Outcome	
Title	**WOMEN'SWRITING**
Course Code	**AG36A**
CO-1	Understand interrelatedness of gender, race, ethnicity, class, disability, age, religion and other social categories.
CO-2	Apply theoretical frameworks of feminism, women studies, queer studies and sexuality studies.
CO-3	Apply methods and methodologies in attempting to write women literature.
CO-4	Gain knowledge of multiple forms of oppression and marginalization and thus to help people in need.
CO-5	Translate feminist and social injustice theories and use them into service and activism.

Syllabus	
Title	**WOMEN'SWRITING**
Course Code	**AG36A**
Unit 1	Understand interrelatedness of gender, race, ethnicity, class, disability, age, religion and other social categories. Apply theoretical frameworks of feminism, women studies, queer studies and sexuality studies. Apply methods and methodologies in attempting to write women literature. Gain knowledge of multiple forms of oppression and marginalization and thus to help people in need. • Translate feminist and social injustice theories and use them into service and activism.Subadra(2009)
Unit 2	**:Prose** *ProfessionsforWomen*–VirginiaWoolf(1931) *LinksintheChain*–MahadeviVarma(1941) *TheSpectacleisVulnerable:MissWorld,1970*[Excerptsfrom,*Visual and Other Pleasures*]– Laura Mulvey(1989) *WeShouldAllBeFeminists*-ChimamandaNgoziAdichie.(2014) [pp 26-34 (problematic bringing up ofboys and girls) pp38-46(unlearningofpreconceivednotions,whyproblemofgenderis always overlooked)]

Unit 3	**ShortStories** 3.1TheYellowWallpaper-CharlottePerkinsGilman(1892) 3.2Boys and Girls – Alice Munro (1968) 3.3AdmissionofGuilt–LalithambikaAntharjanam(1970) 3.4Yellow Woman – Leslie Marmon Silko (1993)
Unit 4	**:Drama** 4.1Sons*Mustdie*-UmaParameswaran(1962)
Unit 5	*1Fasting,Feasting*-AnitaDesai (1999)

Course Objectives	
Title	**INTRODUCTIONTOTRANSLATIONSTUDIES**
Course Code	**AG36B**
CO-1	To introduce the key concepts in Translation studies.
CO-2	To trace the history and evolution of Translation studies.
CO-3	To understand the complex concepts and issues in Translation studies.
CO-4	To apply the theoretical concepts in analysing translated texts.
CO-5	To understand a translation activities.

Course Outcome	
Title	**INTRODUCTIONTOTRANSLATIONSTUDIES**
Course Code	**AG36B**
CO-1	Understand the skills required to become a professional translator.
CO-2	Have an awareness of what it means to be an professional translator.
CO-3	Understand in independent research activity.
CO-4	Evaluate personal language skills.
CO-5	Understand a translation activity.

Syllabus	
Title	**INTRODUCTIONTOTRANSLATIONSTUDIES**
Course Code	**AG36B**
Unit 1	IntroductiontoTranslationStudies DefinitionandscopeofTranslation HistoryofTranslation TypesofTranslation Decodingand Recoding ProblemsofEquivalenceandUntranslatability GenderandTranslation Lossand Gain FormalandDynamicEquivalence
Unit 2	IIPoetry "WhatHerGirlFriendSaid"-Kovatattan,Kurunthokai66(Tamil) "WhatHerGirlFriendSaid"-Anon,Narrinnai172(Tamil) (Translation of Sangam Age Poetry by A.K.Ramanaujan) AComparativeStudyofselectcoupletsfromTwoTranslationsof Thirukkural by G .U Pope and Rajaji
Unit 3	Drama 3.1KomalSwaminathan-Water!Water!
Unit 4	Short Stories 4.1PudumaiPithan"Teaching" Chudamani- "Herself" FromTheSolitary SproutKi.Rajanaryanan–"TheChair"fromPlacetoLive Ambai -"*Squirel*"
Unit 5	Novel 5.1C.SChellappa-Vaadivaasal

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF HISTORICAL STUDIES

Program: B.A . HISTORICAL STUDIES

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	Capacity to explain how and why important events happen
PO-2	Understanding of the historical methods of study
PO-3	A clear understanding of evidence from historical sources
PO-4	Critical understanding of developments in historiography
PO-5	Knowledge of the history of the India and 20th Century Modern World

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Understand the basic themes, concepts, chronology and the Scope of Indian History.
PSO-2	Acquaint with range of issues related to Indian History that span distinct eras.
PSO-3	Understand the history of countries other than India with comparative approach.
PSO-4	Think and argue historically and critically in writing and discussion.
PSO-5	Prepare for various types of Competitive Examinations.

Course Objectives	
Title	**HISTORY OF ANCIENT INDIA UPTO 1206 CE**
Course Code	BHS-DSC01
CO-1	To know about the political history of ancient India.
CO-2	To critically evaluate the socio-cultural ethos of Indian society.
CO-3	To understand the culture and civilization of ancient Indians.
CO-4	To know the contributions of Indian kings to ancient India.

Course Outcome	
Title	**HISTORY OF ANCIENT INDIA UPTO 1206 CE**
Course Code	BHS-DSC01
CO-1	The course will create awareness towards our rich natural and cultural heritage.
CO-2	The course inculcates the knowledge of social developments in ancient India.
CO-3	The course familiarizes the students with the economic developments and intends to analyze it by reinterpreting the existing primary and secondary sources.
CO-4	The course will impart the knowledge of the political developments and develop the skills of the students by giving new arguments and interpretations.
CO-5	This course give a knowledge of Janapathas and Mahajanapathas

Syllabus	
Title	**HISTORY OF ANCIENT INDIA UPTO 1206 CE**
Course Code	BHS-DSC01
Unit 1	Influence of Geography on Indian History – Sources for the study of Indian History – Archaeological – Epigraphically – Numismatics – Literary – Harappan Civilization – Vedic Civilization.
Unit 2	State formation in the second millennium B.C – Janapadas and Mahajanapadas – Rise of Buddhism and Jainism – Invasion of Alexander- Cultural contacts between Macedonia and India.
Unit 3	Rise and Consolidation of the Mauryan Empire – Asoka and his Administration – The Sungas and Satavahanas.
Unit 4	Kanishka – Mahayanism – Gandhara Art – Rise and Consolidation of the Gupta Empire: Samudra Gupta and Chandra Gupta II – Administration – Social and Economic life – Brahmadeya land grants – Art and Culture.
Unit 5	Harsha's career and achievements — Accounts of Fahien and Hiuen Tsang and Itsing– Rise of Regional Kingdoms in North India – Rashtrakutas, Prathiharas and Palas – Arab Conquest of Sind.

Course Objectives	
Title	**HISTORY OF TAMIL NADU UPTO 850 CE**
Course Code	BHS-DSC02
CO-1	To provide an understanding about the importance of Tamil history, culture and civilization.
CO-2	To inculcate the importance of administration of the ancient Tamil society
CO-3	To understand the contributions of Pallavas, Cholas and Pandyas.
CO-4	To get acquainted with the Muslim invasions and the establishment of Madurai Sultanate.

Course Outcome	
Title	**HISTORY OF TAMIL NADU UPTO 850 CE**
Course Code	BHS-DSC02
CO-1	This course will provide an understanding of the cultural heritage of Tamil Nadu.
CO-2	Will give an understanding about the socio-political and cultural conditions from *Sangam Age* to A.D.1336.
CO-3	They will get an acquaintance about the invasions in Tamil Nadu.
CO-4	The Pallavas architecture a model of art in Tamil Nadu
CO-5	This course give a detail of Cholas and there imperial system

Syllabus	
Title	**HISTORY OF TAMIL NADU UPTO 850 CE**
Course Code	BHS-DSC02
Unit 1	Geographical features of Tamil Nadu – Sources for the study of Ancient Tamilagam – New Excavations: Adichchanallur, Keezhadi – Sangam Age – The Cheras – Cholas – Pandyas – Sangam Polity – Society – Economy – Religion.
Unit 2	The Kalabhras – The Pallavas of Kanchi – Origin – Pallava Administration – Society – Economy – Religion – Bhakthi Movement – Art and Architecture – The First Pandyan Empire.
Unit 3	The Imperial Cholas – Vijayalaya – Rajaraja I – Rajendra I – Kulotunga I – Chola Administration-– Local Self Government – Uttiramerur Inscription – State – Society – Economy – Religion – Literature – Art and Architecture.
Unit 4	The Second Pandyan Empire – Maravarman Sundara Pandya – Jatavarma Sundara Pandya – Pandya Administration – Art and Architecture – Political, Social and Economic Conditions – Fall of Second Pandyan Empire.
Unit 5	The Muslim Invasions – Malik Kafur's Invasion – Establishment of Madurai Sultanate – The Impact of the Muslim Invasion – Fall of Madurai Sultanate.

Course Objectives	
Title	**Geography of India**
Course Code	BHS-DSA02
CO-1	To know about the political history of Indian Geography.
CO-2	To critically evaluate the socio-cultural ethos of Indian People.
CO-3	To understand the culture and civilization of Indian Agriculture.
CO-4	To know the contributions of Natural Resources for India.

Course Outcome	
Title	**Geography of India**
Course Code	BHS-DSA02
CO-1	The course will create awareness towards our rich natural and cultural heritage.
CO-2	The course inculcates the knowledge of social developments in Indian Geography
CO-3	The course familiarizes Indian Agriculture among students.
CO-4	The course will impart the knowledge of the Infrastructure development in Tamil nadu.
CO-5	This course gives knowledge about Natural Resources of India.

Syllabus	
Title	**Geography of India**
Course Code	BHS-DSA02
Unit 1	Introduction to Indian Geography – Geological Development – Political Geography – Physiographic Regions – Climate – Rainfall – Rivers – Flora and Fauna.
Unit 2	Indian People – Races – Castes and Tribes – Religions – Fairs and Festivals – Languages – Unity in Diversity.
Unit 3	Indian Agriculture: Soils – Irrigation – Cropping Pattern – Horticulture – Animal Husbandry – Dairy Development – Fisheries.
Unit 4	Natural Resources: Mineral Resources – Industries – Locational Factors – Distribution of Iron and Steel, Cement, Paper, Aluminium, Engineering – Thermal, Atomic and Hydel Power Stations – Ship building, Aircraft – Electrical Equipments.
Unit 5	Infrastructure: Transport and Communication – Modes of Transportation – Communication, Postal Services, Telecommunications, Communication Satellite.

Course Objectives	
Title	**HISTORY OF EARLY MEDIEVAL INDIA 1206–1526 CE**
Course Code	BHS-DSC03
CO-1	To enable students to learn the developments in India during the Muslim Rule.
CO-2	To understand the administrative organization and structure of Delhi Sultanate.
CO-3	To study the features of Islamic art and architecture.
CO-4	To get acquainted with the contributions of Vijayanagar and Bahmini Kingdoms.

Course Outcome	
Title	**HISTORY OF EARLY MEDIEVAL INDIA 1206–1526 CE**
Course Code	BHS-DSC03
CO-1	The course enlightens the students on the social developments in India from the Gupta to the early medieval periods.
CO-2	The course inculcates to the students, the political and cultural development of the period.
CO-3	The course introduced to the students, the elements of change and continuity over time and space, particularly from the period of Gupta to Sultanate.
CO-4	It would ensure that what History of Medieval India was made by the Rising of Rajputs, the Emergence of the Provincial Kingdom, the Delhi Sultanate and the Mughal empire.
CO-5	The course enlightens the students on Economic Conditions and Art and Architecture during Delhi Sultanate

Syllabus	
Title	**HISTORY OF EARLY MEDIEVAL INDIA 1206–1526 CE**
Course Code	BHS-DSC03
Unit 1	Sources for the study of Medieval Indian History – Impact of the Arab Conquest of Sind – Cultural Contacts – Regional Kingdoms in Sind – Conquests of Mahmud of Ghazni – Mohammed Ghor.
Unit 2	Beginning of the Sultanate Period – Qutb-ud-din Aibak – Iltutmish – Raziya Sultan – Balban – Consolidation of the Sultanate Period – Mongol Invasions.
Unit 3	Khilji Dynasty – Alauddin Khilji – Malik Kafur's invasion into South India – Its Impact – Beginning of Tughlak dynasty – Mohammed-bin Tughlak – Firoz Shah Tughlak – Timur's Invasion – Sayyids and Lodi dynasty.
Unit 4	Administration under the Delhi Sultanate – Socio-economic conditions in the Sultanate period – Iqtas – Jagir system – Decline of the Sultanate – Art and Architecture under the Sultanate – Rise of the Bhakti Movement – Sufism.
Unit 5	Rise of Regional Kingdoms in South India – Vijayanagar Empire and Bahmini Kingdoms – Social and Economic life of people in South India – Art and Architecture under Vijayanagar Empire.

Course Objectives	
Title	**HISTORY OF TAMIL NADU 850 – 1565 CE**
Course Code	BHS-DSC04
CO-1	To understand the condition of medieval Tamilagam.
CO-2	To know about the contributions of Vijayanagar, Nayak and Maratha rule in Tamilagam.
CO-3	To understand the advent of the Europeans in Tamil Nadu and how trade and commerce developed in Tamil Nadu.
CO-4	To familiarize the students about the early resistance to the British by Tamilagam.

Course Outcome	
Title	**HISTORY OF TAMIL NADU 850 – 1565 CE**
Course Code	BHS-DSC04
CO-1	This course will make the students understand the political scenario of Medieval Tamil Nadu.
CO-2	It will make them know about the political and economic conditions of Tamilagam.
CO-3	This course will enhance the knowledge of the establishment of British rule in Tamil Nadu.
CO-4	It would ensure that what the early resistances were made by the Tamils against the British.
CO-5	The course introduced to the students, the development of Trade and Commerce in the 19th century Tamilnadu.

Syllabus	
Title	**HISTORY OF TAMIL NADU 850 – 1565 CE**
Course Code	BHS-DSC04
Unit 1	Sources for the study of Medieval Tamilagam – Literary - Foreign Accounts - Inscriptions - Establishment of the Vijayanagar Empire and its Impact in Tamilagam.
Unit 2	Tamilagam under the Nayaks - Nayaks of Madurai, Nayaks of Thanjavur, Nayaks of Senji – Political, Social, Economic and Cultural conditions – Contribution of Nayaks to Art and Architecture
Unit 3	Marathas in Thanjavur – Development of Art and Literature under the Marathas – Civil War in Arcot – Battle of Tiruchirappalli – Rebellion of Khan Sahib - Sethupatis of Ramnad.
Unit 4	Advent of the Europeans – Portuguese, Dutch, French and the British – The Anglo-French Conflict – The Carnatic Wars - The Expansion of the British Rule – Development of Trade and Commerce in the 19th century Tamil Nadu.
Unit 5	The Revolt of Poligar – Pulithevan – Kattabomman – Velu Nachiar and Maruthu Brothers – South Indian Confederacy and Rebellion – Fall of Poligars.

Course Objectives	
Title	**HISTORY OF LATER MEDIEVAL INDIA 1526–1707 CE**
Course Code	BHS-DSC05
CO-1	To learn about the formation, expansion and consolidation of the Mughal Empire.
CO-2	To examine various processes in the Mughal Empire and their role in shaping state and society in India.
CO-3	To understand the transformations in the administration of colonial India.

Course Outcome	
Title	**HISTORY OF LATER MEDIEVAL INDIA 1526–1707 CE**
Course Code	BHS-DSC05
CO-1	The course provides an overview of the main trends and developments in India during the Mughal period.
CO-2	The course will make the students understand the knowledge of socio-economic and political history, focusing on the continuity and change from the Hindu to the Muslim period.
CO-3	The course acquainted the students with the British policy, stressing on the positive and negative effects.
CO-4	Understand that what the early resistances were made by The Advent of the Europe.
CO-5	The course introduced the English administration and its reforms.

Syllabus	
Title	**HISTORY OF LATER MEDIEVAL INDIA 1526–1707 CE**
Course Code	BHS-DSC05
Unit 1	Sources for the study of the Mughal Empire – India on the eve of Babur's Invasion – Babur and His Conquests - Humayun - Sher Shah's Administration.
Unit 2	Akbar the Great – His Conquests – Rajput Policy - Religious Policy - Din-Ilahi - Jehangir – Nurjahan Junta - Shahjahan - Contribution to Art and Architecture.
Unit 3	Aurangazeb - Deccan Policy - Religious Policy - Mughal Administration – Shivaji and his Administration.
Unit 4	The Advent of the Europeans - Anglo-French Rivalry in the Carnatic – Robert Clive, Dual Government - Lord Warren Hastings - Administrative Reforms - Lord Cornwallis - Reforms - Permanent Revenue Settlement.
Unit 5	Lord Wellesley - Subsidiary Alliance System - English and the Peshwas - Anglo-Maratha Wars - Lord William Bentinck and his Reforms - Anglo-Sikh Wars - Lord Dalhousie - Doctrine of Lapse -The Rising of 1857- Nature - Causes – Results.

Course Objectives	
Title	**HISTORY OF TAMIL NADU 1565 – 1858 CE**
Course Code	BHS-DSC06
CO-1	To understand the history and the contributions of Vijayanagar, Nayak and Maratha rule in Tamilagam.
CO-2	To know the advent of the Europeans in Tamil Nadu and how trade and commerce developed in Tamil Nadu.
CO-3	To familiarize the students about the early resistance to the British by Tamilagam.

Course Outcome	
Title	**HISTORY OF TAMIL NADU 1565 – 1858 CE**
Course Code	BHS-DSC06
CO-1	To make the students understand the political scenario of Tamil Nadu between 16th and 19th centuries.
CO-2	It will make them know about the political and economic conditions of Tamilagam.
CO-3	Enhance the knowledge of the establishment of British rule in Tamil Nadu.
CO-4	Understand that what the early resistances were made by the Tamils against the British.
CO-5	Enhance the knowledge of the British Administrative System.

Syllabus	
Title	**HISTORY OF TAMIL NADU 1565 – 1858 CE**
Course Code	BHS-DSC06
Unit 1	Tamil Nadu under Vijayanagar – Origin and Expansion – South Indian Invasions of Kumara Kampana – Administrative Systems of Vijayanagar in Tamil Nadu – Soci, Economic and Cultural Conditions.
Unit 2	Tamil Nadu under the Nayaks - Nayaks of Madurai: Tirumalai Nayak, Rani Mangammal, Nayaks of Thanjavur: Raghunatha Nayak, Vijayaragava Nayak, Nayaks of Senji: Krishnappa Nayak – Political, Social, Economic and Cultural conditions – Contribution of Nayaks to Art and Architecture.
Unit 3	Rule of Marathas in Tamil Nadu – Marathas of Thanjavur – Development of Art and Literature under the Marathas – Civil War in Arcot – Battle of Tiruchirappalli – Rebellion of Khan Sahib - Sethupatis of Ramnad.
Unit 4	Advent of the Europeans – Portuguese, Dutch, French and the British – The Anglo-French Conflict – The Carnatic Wars - The Expansion of the British Rule – Development of Trade and Commerce in the 19th century Tamil Nadu.
Unit 5	The Revolt of Poligar – Pulithevan – Kattabomman – Velu Nachiar and Maruthu Brothers – South Indian Confederacy and Rebellion – Fall of Poligars – The British Administrative System.

Course Objectives	
Title	**HISTORY OF MODERN INDIA 1707 – 1857 CE**
Course Code	BHS-DSC07
CO-1	To learn about the formation, expansion and consolidation of the Mughal Empire.
CO-2	To examine various processes in the Mughal Empire and their role in shaping state and society in India.
CO-3	To understand the transformations in the administration of colonial India.

Course Outcome	
Title	**HISTORY OF MODERN INDIA 1707 – 1857 CE**
Course Code	BHS-DSC07
CO-1	Provides an overview of the main trends and developments in India during the Mughal period.
CO-2	To make the students understand the knowledge of socio-economic and political history, focusing on the continuity and change from the Hindu to the Muslim period.
CO-3	The course acquainted the students with the British policy, stressing on the positive and negative effects.
CO-4	This course will impart knowledge on the Reforms of Lord Dalhousie.
CO-5	It also focuses on Causes , Course and Results of The British

Syllabus	
Title	**HISTORY OF MODERN INDIA 1707 – 1857 CE**
Course Code	BHS-DSC07
Unit 1	Later Mughals – Disintegration of the Mughal Empire – Rise of the Peshwas: Balaji Vishwanath – Balaji Baji Rao – Invasion of Nadir Shah – Third Battle of Panipat – Administration of Peshwas.
Unit 2	Advent of the Europeans – Anglo-French Rivalry in the Carnatic – Establishment of British Power in Bengal – Battle of Plassey – Battle of Buxar – Robert Clive – Dual Government.
Unit 3	Lord Warren Hastings and Administrative Reforms – Lord Cornwallis Reforms – Permanent Revenue Settlement – Lord Wellesley – Subsidiary Alliance System – Anglo-Mysore Wars.
Unit 4	Lord Minto I – Career and Achievements of Ranjit Singh – Lord Hastings and his Reforms – Anglo-Maratha Wars – Lord William Bentick – Administrative and Social Reforms – Lord Metcalfe – Lord Auckland – Lord Ellenborough – Lord Hardinge.
Unit 5	Lord Dalhousie – Doctrine of Lapse – Annexation Policy – Anglo-Sikh Wars – Reforms of Lord Dalhousie – Great Revolt of 1857: Causes, Course and Results.

Course Objectives	
Title	**FREEDOM MOVEMENT IN TAMIL NADU 1858 – 1947 CE**
Course Code	BHS-DSC08
CO-1	To know about the early resistance against the British from Tamil Nadu.
CO-2	To learn about the various associations before the emergence of the Indian National Movement in Tamil Nadu.
CO-3	To study the vibrant role of Tamil people towards the nationalist upsurge.
CO-4	To inspire students to appreciate and respect the Tamil leaders and instill patriotism.

Course Outcome	
Title	**FREEDOM MOVEMENT IN TAMIL NADU 1858 – 1947 CE**
Course Code	BHS-DSC08
CO-1	This course will impart knowledge on the origin of freedom movement in Tamil society.
CO-2	It inculcates the knowledge about India's fought for independence with special reference to Tamil Nadu and the roles of the different sections of the society to the students.
CO-3	It provides an overview of the development of Tamil Nadu Politics.
CO-4	Enhance the knowledge of respect for the Tamil leaders and instil patriotism.
CO-5	It inculcates the knowledge about the nationalist upsurge and Tamil people.

Syllabus	
Title	**FREEDOM MOVEMENT IN TAMIL NADU 1858 – 1947 CE**
Course Code	BHS-DSC08
Unit 1	British Expansion – Establishment of Madras Presidency – Resistance Movements in Tamil Nadu – Poligar System – Vellore Mutiny of 1806 A.D – The British Land Revenue Administration - Ryotwari system – Judicial reorganization.
Unit 2	Introduction of Western Education – Christian Missionary Activities – Political Awakening – Formation of Madras Native Association – Madras Mahajana Sabha – Emergence of Indian National Congress.
Unit 3	The Early Phase of Indian National Congress – Swadeshi Movement and V. O. Chidambaram – Extremist Politics - Vanchinathan – Subramania Siva - Role of the Press- Subramaniya Bharathi.
Unit 4	Home Rule Movement – Justice Party in Power - Communal G.O. – Achievements of Justice Party - Temple Entry Movement - The Self Respect Movement.
Unit 5	Civil Disobedience Movement - Congress in Power – Anti-Hindi agitation - Quit India Movement – Rise of Dravidian Identity Politics.

Course Objectives	
Title	**INDIAN NATIONAL MOVEMENT 1858 – 1947 CE**
Course Code	BHS-DSC09
CO-1	Identify the causes that led to the rise of nationalism in India and trace the emergence of Indian National Congress.
CO-2	Discuss the various stages of the National Movement in India and enlist the names of prominent leaders of the Indian National Movement.

Course Outcome	
Title	**INDIAN NATIONAL MOVEMENT 1858 – 1947 CE**
Course Code	BHS-DSC09
CO-1	This course will provide an understanding about the historical sense of Indian freedom struggle and its various ideologies.
CO-2	Evaluate the role of Gandhi towards Indian independence and recognize his involvements in social movements
CO-3	It provides an overview of the development of Gandhi's thoughts.
CO-4	To understand the importance of struggle for freedom movement in India.
CO-5	It also focuses on the development of Indian Independence Act. 1947.

Syllabus	
Title	**INDIAN NATIONAL MOVEMENT 1858 – 1947 CE**
Course Code	BHS-DSC09
Unit 1	Queen's Proclamation - Impact of Western Education - Socio-Religious Reform Movements of the 19th Century – Indian National Congress – Moderate Phase.
Unit 2	Extremist Phase: Partition of Bengal and Swadeshi Movement – Formation of Muslim League - Indian Council Act of 1909 – The Ghadar Party – Home Rule Movement of Tilak and Annie Besant – Congress League Scheme – Rowlatt Act – Jallianwala Bagh Massacre – Government of India Act of 1919.
Unit 3	Khilafat – Non-Cooperation Movement – Chauri Chaura Incident – The Swarajya Party – Simon Commission – Nehru Report – Jinnah's Fourteen Points – Civil Disobedience Movement – Round Table Conferences – Poona Pact –The Government of India Act of 1935.
Unit 4	The Congress Ministry, 1937-39 - Quit India Movement - Cripps Proposal – The Muslim League -Rise of Communalism – Peasant and Labour Movements - Role of Press, Theatre and Cinema in the National Movement.
Unit 5	Subash Chandra Bose and INA - Cabinet Mission Plan – Mountbatten Plan – Indian Independence Act, 1947.

Course Objectives	
Title	**CONTEMPORARY TAMIL NADU 1947 – 2016 CE**
Course Code	BHS-DSC10
CO-1	To enhance the students' knowledge about the administration of Tamil Nadu since independence.
CO-2	To gain a deeper understanding about the various determinants of Tamil Nadu's developments and its contribution to the national economy.

Course Outcome	
Title	**CONTEMPORARY TAMIL NADU 1947 – 2016 CE**
Course Code	BHS-DSC10
CO-1	This course will impart knowledge to the students about the political history of the Tamil Nadu
CO-2	To understand the importance of struggle for social justice in Tamil Nadu.
CO-3	It also focuses on the development of education, science and technology and examining contemporary issues related to religion, caste and politics in Tamil Nadu.
CO-4	This course will impart knowledge to The Congress Rule in Tamil Nadu.
CO-5	This course helps the students to understand of Development of Mass Communication.

Syllabus	
Title	**CONTEMPORARY TAMIL NADU 1947 – 2016 CE**
Course Code	BHS-DSC10
Unit 1	The Congress Rule in Tamil Nadu – Administration of C. Rajagopalachari – State Reorganisation - Kamaraj and his administrative reforms – M. Baktavatsalam – Anti-Hindi Agitation of 1965.
Unit 2	The rise of DMK – Administration of C. N. Annadurai - M. Karunanidhi - Welfare policies and programmes - the Split of the DMK - Administration of M.G. Ramachandran and J.Jayalalitha – Policies and Programmes.
Unit 3	Development of Tamil Nadu – Infrastructure - Means of Transport - Development of Education - Elementary, Secondary, University – Development of Agriculture, Industry and Commerce.
Unit 4	Development of Mass Communication – Press – Cinema and Politics – Reservation Policy – Self Help Groups and Women Empowerment.
Unit 5	Centre-State Relations - Finance Commission - Inter- State water disputes - Ethnic crisis in Sri Lanka and its impact on Tamil Nadu– Conflicts over Katchatheevu.

Course Objectives	
Title	**HISTORY OF CIVILIZATION (EXCLUDING INDIA)**
Course Code	BHS-DSC11
CO-1	To make students aware of the Great Civilizations of the world.
CO-2	To give a critical understanding of the contributions made by the significant Civilizations of the world.
CO-3	To study various aspects of Civilizations like Polity, Literature, Philosophy, Science and Arts of these Civilizations.

Syllabus	
Title	**HISTORY OF CIVILIZATION (EXCLUDING INDIA)**
Course Code	BHS-DSC11
Unit 1	Introduction: Definition of Civilization – Comparison between Culture and Civilization – Origin and Growth of Civilization – Toynbee and D.D. Kosambi's views on Civilization.
Unit 2	Egyptian Civilization: Society, Religion, Culture and Art – Mesopotamian Civilization: Sumerian, Babylonian – Code of Hammurabi, Religion, Art and Architecture – Persian Civilization and its important features.
Unit 3	Ancient Greek Civilization: City States, Legacy in the fields of Science and Philosophy – Roman Civilization: Society, Government, Law and Architecture – Chinese Civilization and its important features.
Unit 4	Middle Ages: Byzantine and Saracenic Civilization – Feudalism – Origin, Merits and Demerits – Crusades – Growth of Cities and Progress of Education.
Unit 5	Transition to Modern Age: Geographical Discoveries – Renaissance: Causes and Results – Reformation and Counter Reformation – Industrial and Agrarian Revolutions.

Course Outcomes	
Title	**HISTORY OF CIVILIZATION (EXCLUDING INDIA)**
Course Code	BHS-DSC11
CO-1	It provides an overview of the development of Origin and Growth of Civilization
CO-2	To enhance the student's knowledge about world civilizations.
CO-3	To gain a deeper understanding about Ancient Greek Civilization.
CO-4	To analyze the importance of the Unification of Origin, (Merits and Demerits – Crusades) Growth of Cities and Progress of Education.
CO-5	This course helps the students to understand of Transition to Modern Age.

Course Objectives	
Title	**HISTORY OF MODERN EUROPE 1789–1919 CE**
Course Code	BHS-DSC12
CO-1	To enhance the students' knowledge about the French revolution and its impact on Europe.
CO-2	To gain a deeper understanding about the rise of Nationalism and formation of nation state.
CO-3	To analyze the importance of the Unification of Italy and role of Mazzini and Cavour.

Course Outcomes	
Title	**HISTORY OF MODERN EUROPE 1789–1919 CE**
Course Code	BHS-DSC12
CO-1	This course helps the students to understand the rise of nationalism and formation of nation state in Europe and to have an understanding on the balance of power and diplomacy.
CO-2	To know the repercussions of the Unification of Italy and Germany and the revolutions in Europe.
CO-3	This course will impart knowledge to the students about The Congress of Vienna and Concert of Europe
CO-4	To understand the importance of struggle for social justice in Modern Europe.
CO-5	It also focuses on the development of Reforms of Russia and War.

Syllabus	
Title	**HISTORY OF MODERN EUROPE 1789–1919 CE**
Course Code	BHS-DSC12
Unit 1	Ancient Regime of France – The French Revolution - Causes, Course and Results - Rise of Napoleon Bonaparte – Consulate - Constitution of 1799 - Napoleon as Emperor – Napoleonic Wars - Reforms of Napoleon – Downfall of Napoleon.
Unit 2	The Congress of Vienna - Concert of Europe - Metternich – Charles X - Revolution of 1830 and its results – Greek War of Independence - Louis Philippe – Causes for the Revolution of 1848 – Course and Results.
Unit 3	Napoleon III – His Foreign Policy - Unification of Italy – Risorgimento – Rise of Mazzini – Cavour – Garibaldi – Victor Immanuel.
Unit 4	Unification of Germany – Zollverein – Germany and Italy – Austro-Prussian War – Franco-Prussian War
Unit 5	Russia – Reforms of Alexander I – Eastern Question – The Crimean War – Results of War – Mehmet Ali and Turkey.

Course Objectives	
Title	**CONTEMPORARY INDIA 1947 – 2019 CE**
Course Code	BHS-DSC13
CO-1	To make the students understand the unprecedented changes since its formal independence.
CO-2	To give an overview of social dimensions of change and political democracy.
CO-3	It creates awareness about the various issues and challenges facing India during the contemporary period.

Course Outcomes	
Title	**CONTEMPORARY INDIA 1947 – 2019 CE**
Course Code	BHS-DSC13
CO-1	This course gives a picture of how India's political and economic agenda and basics of foreign policy were evolved and developed since independence.
CO-2	It also focuses on the development of education, science and technology and dwells on the consolidation of the nation emphasizing the principles of unity and integrity.
CO-3	This course declaring that the security of India or any part of the territory by war or external aggression or by armed rebellion may be made before the actual occurrence
CO-4	To know the three types of emergencies – National, State and Financial emergency in a state.
CO-5	To know the National Front was a coalition of political parties lead by Government.

Syllabus	
Title	**CONTEMPORARY INDIA 1947 – 2019 CE**
Course Code	BHS-DSC13
Unit 1	Independence and Partition of India – Integration of Princely States – Republican Constitution of India – First General Elections – Constitutional Amendment.
Unit 2	Nehruvian Era - Planning for India - Linguistic Reorganization of Indian States – Nehru's Foreign Policy - Indo-China War of 1952.
Unit 3	Lal Bahadur Shastri - Indo-Pakistan War - Indira Gandhi - Nationalization of Banks – Abolition of Privy purses - Green Revolution - Indo-Pakistan War and Creation of Bangladesh – Declaration of Emergency.
Unit 4	Formation of Janata Party and Coalition government at the Centre – Rajiv Gandhi – New Education Policy – Information Technology – Panchayati Raj.
Unit 5	National Front Government: V.P. Singh – Mandal Commission – P.V. Narashima Rao – New Economic Policies - United Front Government.– Vajpayee Administration – Pokhran II Tests.

Course Objectives	
Title	**INDIAN CONSTITUTION**
Course Code	BHS-DSC14
CO-1	To provide an in depth knowledge on Indian citizen's Rights and Duties.
CO-2	To make them aware of the constitutional laws and its implications.
CO-3	To make the learner's proficient regarding the functioning of Government in India.

Course Outcomes	
Title	**INDIAN CONSTITUTION**
Course Code	BHS-DSC14
CO-1	This course explains the role of Constitution in a democratic society and it will ensure a complete knowledge about the Indian Constitution.
CO-2	To create an awareness of framing, drafting and implementation of Indian Constitutional Laws in the Parliament.
CO-3	To know the powers and functions of the Rajya Sabha and Lok Sabha
CO-4	To know the powers and functions of the State Cabinet and High Court
CO-5	It declared that the Constitutional laws and implications

Syllabus	
Title	**INDIAN CONSTITUTION**
Course Code	BHS-DSC14
Unit 1	The Historical Background and the Making of the Constitution – Preamble – Main Features of the Indian Constitution – Fundamental Rights – Fundamental Duties – Directive Principles of State Policy.
Unit 2	The Union Executive: President – Election of the President – Powers and Functions – Vice-President – Union Cabinet: Prime Minister – Powers and Functions.
Unit 3	The Union Parliament: Composition, Powers and Functions of Rajya Sabha and Lok Sabha – Judiciary – Public Services – Emergency – Amendments.
Unit 4	State Executive: Governor – Constitutional Status, Powers and Functions – State Cabinet – Legislature: Composition and Functions – Chief Minister: Powers and Functions – High Court.
Unit 5	Indian Federalism: Centre and State Relations – Legislative Aspects – Union List, State List, Concurrent List - Political Parties – Election Commission: Powers and Functions.

Course Objectives	
Title	**HISTORY OF USA 1900 – 2000 CE**
Course Code	BHS-DSC15
CO-1	This subject will generate the interest of the students in American History.
CO-2	It help them to comprehend the developments that are taking place in the contemporary United States in a broad historical prospective.
CO-3	To know the Status of the Comtemporary United States

Course Outcomes	
Title	**HISTORY OF USA 1900 – 2000 CE**
Course Code	BHS-DSC15
CO-1	This course will improve the content knowledge of the students about the history of USA.
CO-2	Provide an understanding of the critic past of USA and its governmental policies.
CO-3	They will be articulate the foreign policy of USA in light of Global wars.
CO-4	To demonstrate an understanding of the rise of America as a super power.
CO-5	To declared the Ping Pong Diplomacy and the Domestic and Foreign Policy of USA

Syllabus	
Title	**HISTORY OF USA 1900 – 2000 CE**
Course Code	BHS-DSC15
Unit 1	The Cold War: Strategy of "Containment" – Harry S. Truman – Fair Deal – Truman Doctrine – Marshall Plan – Point Four Programme – Eisenhower – Suez Canal Crisis – Anti-Communist Crusade - Korean War - Cuban Crisis.
Unit 2	John F. Kennedy – New Frontier Policy - Civil Rights Movement – Martin Luther King - L.B. Johnson – Great Society - Foreign Policy.
Unit 3	Richard Nixon – Watergate Scandal - Ping Pong Diplomacy – Man on the Moon – Super Power Rivalry – Vietnam War.
Unit 4	America under Jimmy Carter – Domestic and Foreign Policy – Détente: Strategic Arms Limitation Treaty [SALT-II] – Ronald Reagan, Escalation of the Cold War – US-Soviet Relations.
Unit 5	George Bush Senior – End of Cold War – Bill Clinton – USA as a Super Power – Domestic and Foreign Policy – George Bush Junior.

Course Objectives	
Title	**PRINCIPLES OF POLITICAL SCIENCE**
Course Code	BHS-DSA01
CO-1	To understand the principles of Political Science.
CO-2	To get acquainted with the concept of state, nation and civil society.
CO-3	To demonstrate knowledge of key thinkers and their concepts.
CO-4	To understand the nature, methods and significance of political thought.

Course Outcomes	
Title	**PRINCIPLES OF POLITICAL SCIENCE**
Course Code	BHS-DSA01
CO-1	To make the students understand the basic concepts, principles and dynamics of political science.
CO-2	Understand the basic concept and ideological orientations of political science discipline.
CO-3	Understand the various perspective of government and its administration.
CO-4	To demonstrate Liberalism, Communism, Socialism, Nationalism, Fascism, Nazism, etc…
CO-5	To know the common Rights and Duties of the Citizen

Syllabus	
Title	**PRINCIPLES OF POLITICAL SCIENCE**
Course Code	BHS-DSA01
Unit 1	Meaning and Definition of State – Essential Elements of State – Society, State and Government – Organs and Functions of Government – Legislature, Executive and Judiciary – Functions of Modern State – Concept of Welfare State.
Unit 2	Sovereignty – Equality – Liberty – Law – Citizenship: Meaning – Process of acquiring – Loss of citizenship – Rights and Duties of the citizen – Fundamental Rights.
Unit 3	Definition and Types of Democracy – Theories of Democracy – Achievements of Indian Democracy – Challenges to Indian Democracy – Forms of Government: Unitary, Federal, Parliamentary and Presidential – Concept of Governance.
Unit 4	Political Ideologies: Liberalism, Communism, Socialism, Nationalism, Fascism, Nazism, Dravidian Ideology – Political Parties: Formation and Functions – Role of Political Parties in a Democracy – Nature of Franchise and Representation – Electoral Reforms and Anti-Defection Law.
Unit 5	Meaning, Nature and Importance of Local Government – Classification of Local Government Institutions – Origin and Development of Local Government in India – Concept of Social Justice – Just Distribution – Socio-Cultural Equality.

Syllabus	
Title	**GEOGRAPHY OF INDIA**
Course Code	BHS-DSA02
Unit 1	Introduction to Indian Geography – Geological Development – Political Geography – Physiographic Regions – Climate – Rainfall – Rivers – Flora and Fauna.
Unit 2	Indian People – Races – Castes and Tribes – Religions – Fairs and Festivals – Languages – Unity in Diversity.
Unit 3	Indian Agriculture: Soils – Irrigation – Cropping Pattern – Horticulture – Animal Husbandry – Dairy Development – Fisheries.
Unit 4	Natural Resources: Mineral Resources – Industries – Locational Factors – Distribution of Iron and Steel, Cement, Paper, Aluminium, Engineering – Thermal, Atomic and Hydel Power Stations – Ship building, Aircraft – Electrical Equipments.
Unit 5	Infrastructure: Transport and Communication – Modes of Transportation – Communication, Postal Services, Telecommunications, Communication Satellite.

Course Objectives	
Title	**BASICS OF ARCHAEOLOGY**
Course Code	BHS-DSA03
CO-1	To understand the meaning and scope of the study of Archaeology.
CO-2	To trace and evaluate archaeology as a source for history.
CO-3	To involve the student in understanding the Methods of Exploration and Excavation.
CO-4	To get acquainted with the meaning and importance of Epigraphy and Numismatics.

Course Outcomes	
Title	**BASICS OF ARCHAEOLOGY**
Course Code	BHS-DSA03
CO-1	This course will make the students understand how evolutionary and historical processes have shaped primates and human ancestors and lead to the biological, behavioural, and cultural diversity seen in the present.
CO-2	To describe how varying types of data are collected, analyzed, synthesized and interpreted to achieve these first two goals.
CO-3	To know the Language and types of inscriptions with special reference to South India.
CO-4	To declares the Epigraphy and its importances in world
CO-5	To understand that the Megalithic and Black and Red ware cultures of South India.

Syllabus	
Title	**BASICS OF ARCHAEOLOGY**
Course Code	BHS-DSA03
Unit 1	Scope and Nature of Archaeology – Aims and Methods of Excavation – Exploration – Kinds of Excavations – Pottery types and their importance – Stone Age cultures – Paleolithic, Megalithic and Neolithic cultures of India.
Unit 2	Harappan Culture – Chalcolithic culture of Western and Central India and the Deccan - Early Iron Age cultures – Painted Grey ware and Northern Black Polished ware cultures.
Unit 3	Megalithic and Black and Red ware cultures of South India – Archaeology of Tamil Nadu – Adhichchanallur – Arikkamedu – Paiyam Palli – Kaveripoompattinam.
Unit 4	Epigraphy and its importance – Brahmi Script – Language and types of inscriptions with special reference to South India.
Unit 5	Numismatics –Types of Coins – Coins of Satavahanas – Guptas, Cholas, Pandyas and Vijayanagar.

Course Objectives	
Title	**OUTLINES OF INDIAN PHILOSOPHY**
Course Code	BHS-DSA04
CO-1	To develop the philosophical ideas which enriches the values of action.
CO-2	It would help the students to understand the concepts of idealism, naturalism, pragmatism, realism and spiritualism.
CO-3	To know the Characteristics of Contemporary Indian Philosopy

Course Outcomes	
Title	**OUTLINES OF INDIAN PHILOSOPHY**
Course Code	BHS-DSA04
CO-1	Understand the morality which is the base of human life.
CO-2	To know the ideas and thoughts of Indian philosophers.
CO-3	Will understand how ethics is used in several ways in life.
CO-4	To understand the Doctrine of Maya. Practical Vedanta, Universal Religion of the Swami Vivekananda
CO-5	To know the impact of the Self-respect movement, Women's rights, Anti-caste views of Religion

Syllabus	
Title	**OUTLINES OF INDIAN PHILOSOPHY**
Course Code	BHS-DSA04
Unit 1	Introduction to Indian Philosophy: Vedas, Upanishads, Bhagavad Gita – Jainism Principles – Buddhism and Noble Truths – Concept of Nirvana – Orthodox Systems: Nyaya and Vaisesika.
Unit 2	Sankhya Theory of Causation – The Eight Limbs of Yoga – Two Schools of Mimamsa – Concept of Dharma and Liberation – Vedanta Philosophy: Advaita, Visistadvaita and Dvaita.
Unit 3	Characteristics of Contemporary Indian Philosophy – Modern Indian Thought – Religious Movements – Theosophical Society and Ramakrishna Mission.
Unit 4	Swami Vivekananda: The Doctrine of Maya, Practical Vedanta, Universal Religion – Sri Aurobindo: Integral Advaitism, Triple process of Transformation, Integral Yoga – Dr. S. Radhakrishnan: Idealistic Philosophy.
Unit 5	E.V.Ramasamy: Self-respect Movement, Women's rights, Anti-caste views of Religion, Dravidian Movement – J. Krishnamurti: Concept of Truth, Nature of Self-Psychological Revolution and Creative Awareness – His Conception of New Society.

Course Objectives	
Title	**PRINCIPLES OF PUBLIC ADMINISTRATION**
Course Code	BHS-DSA05
CO-1	To give an overview regarding the principles of organization and administration.
CO-2	To provide a clear understanding regarding the functions of Indian administration.
CO-3	The course gives an opportunity to the students to understand the structure and functions of governmental machinery in India.

Course Outcomes	
Title	**PRINCIPLES OF PUBLIC ADMINISTRACTION**
Course Code	BHS-DSA05
CO-1	Understand the morality which is the Meaning of Public Administration andits relations with Social Sciences
CO-2	To know the ideas of Centralization and Decentralization
CO-3	To declared that the Composition, Structure and Functions of the State Secretariat
CO-4	To know the Civil Services in India , the Recruitment to All India and Central Services
CO-5	To understand the Role of Comptroller and Auditor General and also his duties and power

Syllabus	
Title	**PRINCIPLES OF PUBLIC ADMINISTRACTION**
Course Code	BHS-DSA05
Unit 1	Meaning of Public Administration – Public Administration and its relations with other Social Sciences – Organization: Bases and Principles of Organization – Hierarchy – Span of Control – Unity of Command – Centralization and Decentralization – Nature and Scope of Indian Administration.
Unit 2	Central Secretariat: Composition, Structure and Functions – State Secretariat: Composition, Structure and Functions – Chief Secretary: Powers and Functions
Unit 3	Cabinet Secretariat: Role and Functions – Prime Minister's Office: Composition and Functions – Cabinet Committees – Planning Commission and NITI Aayog – Major Ministries: Home Affairs, External, Finance, Defence.
Unit 4	Civil Services in India: Recruitment to All India and Central Services – Systems of Recruitment – Rationale of All-India Services – Powers and Functions of UPSC – Staff Selection Commission – State Public Service Commission – Training of Civil Servants.
Unit 5	Concept of Budget: Concept and Forms – Formulation and Enactment – Execution of Budget – Accounting and Auditing in India: Role of Comptroller and Auditor General – Duties and Powers – Prevention of Corruption – Institution of Lok Pal.

Course Obectives	
Title	**ARCHIVES KEEPING**
Course Code	BHS-DSA06
CO-1	To know the history of the archives.
CO-2	To study the activities of various archives.
CO-3	To understand the importance of archives keeping.

Course Outcomes	
Title	**ARCHIVES KEEPING**
Course Code	BHS-DSA06
CO-1	Understand the morality which is SWARBICA and ARBICA
CO-2	To know the Administration of Archives
CO-3	To understand the functions and uses of Archives
CO-4	Categories of Private Archives like Indian Historical Records Commission and Indian Counicl of Archives
CO-5	Establishment of Registry, Racking, Shelves and other materials

Syllabus	
Title	**ARCHIVES KEEPING**
Course Code	BHS-DSA06
Unit 1	Introduction: History of Archives – Archives Keeping through the Ages – International Archives – Archives in India: Growth and Development.
Unit 2	Creation of Archives: Establishment of Registry – Racking – Shelves and other materials – Archives and Libraries – Organisation of Archives in India – Structure and Classification.
Unit 3	Preservation in Archives: Methods of Preservation – Preliminary and Precautionary Measures – Preventive Measures – Factors of Deterioration – Methods of Preservation and Repair of Archival material – Problems in Archives Keeping.
Unit 4	Administration of Archives: National Archive – Tamil Nadu Archive – Functions of Archives – Uses of Archives.
Unit 5	Private Archives: Categories of Private Archives – Indian Historical Records Commission (IHRC) – Indian Council of Archives (ICA) – SWARBICA and ARBICA.

Course Objectives	
Title	**TOURISM AND TRAVEL MANAGEMENT**
Course Code	BHS-DSE01
CO-1	To get acquainted with the importance of tourism and travel business.
CO-2	To provide an understanding of the historical perspective and recent developments in tourism.
Co-3	To make the students to know the various organizations that promote tourism and the strategies of tourism marketing.

Course Outcomes	
Title	**TOURISM AND TRAVEL MANAGEMENT**
Course Code	BHS-DSE01
CO-1	To know the Historical Perspective and Recent Development of India
CO-2	To understand the National Tourism Organisations: ITDC, TTDC, ASI and TFCI and International Tourism Organisation
CO-3	To find the Booming Tourism Industry in India and Modes of Travelling
CO-4	To find the impact of Tourism, Corporate Social Responsibility in the Tourism Industry
CO-5	To know the Marketing Plans and Consumer behavior for Tourism and Hospitality

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF BUSINESS ECONOMICS

Program : BA., Business Economics

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	**Employment:** To produce young economists, create Employability
PO-2	**Higher Education:** Enables the students to go for higher studies - M.A Eco, M.Phil, Econometrics, Applied Research, take up Civil Service Examinations like IAS & IPS
PO-3	**Scope of Economics:** Graduates of the program can get job opportunities in the corporate sector, banking sector, insurance sector, teaching field, Statistical Investigators.
PO-4	**Critical Thinking:** The curriculum made for the betterment of the students; enhance the ability and thinking power of the students.
PO-5	**Effective Communication:** The complete medium of program is learning in English so students will communicate well in the English. There is Short term course soft skill development for F.Y. Students. Which helps in effective Communication.
PO-6	**Ethics:** The subject teaches students about the ethical approach, not to waste electricity..
PO-7	**Environment and Sustainability:** Conservation practices are studied for sustainable development
PO-8	**Effective Citizenship:** Being the students of Physics they have to communicate with people, They have developed skills in Interactions among themselves in PPT Competition under curiosity programme.
PO-9	**Social Interaction:** Due to continuous interaction with students in terms of various programme run by department i.e. Curiosity Thirsty For Knowledge programme, Celebration of 'Birth Day' of Teaching Staff and Students , Extension activity , "Cyber Security Awareness Programme". Helps to increase Social Interaction.

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	To develop the opportunities in analyzing the problems of society and finding a solution
PSO-2	To make them good citizens and to discharge their social responsibility.
PSO-3	To meet the challenges of the ever changing economic environment.
PSO-4	Understand basic concepts of economics
PSO-5	To able to analyze economic behaviour in practice
PSO-6	Understand the economic way of thinking
PSO-7	The ability to analyze historical and current events from an economic perspective.
PSO-8	The ability to write clearly expressing an economic point of view
PSO-9	Be exposed to alternative approaches to economic problems through exposure to coursework in allied fields
PSO-10	To create students ability to suggest of the various economic problems

Course Objectives	
Title	**: Principles of Economics-I**
Course Code	**AB21A**
CO-1	Knowledge of the basic concepts of economics
CO-2	Information about utility concepts of consumer surplus
CO-3	Idea about demand, law of demand and elasticity concepts
CO-4	Insights pertaining to production, production function and producers equilibrium Knowledge related to supply, law of supply and its elasticity
CO-5	It helps to know about the theory of costs and revenues and their relationships in different markets

Course Outcome	
Title	**Principles of Economics-I**
Course Code	**AB21A**
CO-1	To understand the use of models in economics.
CO-2	Outline the factors of production in different economic system.
CO-3	Explain the basic economic concerns of scarcity, choice and opportunity.
CO-4	understand the economic benefits and cost.
CO-5	Identify the consumer choice and related to the demand theory.

Syllabus	
Title	**: Principles of Economics-I**
Course Code	**AB21A**
Unit 1	Economic problems–Scarcity and choice- Definition of Economics–Adam Smith, Alfred Marshall, Lionel Robbins and Samuelson
Unit 2	Basic concepts of Microeconomics- Concept of utility –Utility analysis–Total and Marginal Utility - Demand analysis–Indifference curve analysis–Revealed Preference hypothesis (concept only)
Unit 3	Supply and production decisions–Supply and Law of Supply –Production function- Short and Long run production function–Traditional and modern approach–Leontief- Cobb-Douglas production function
Unit 4	Theory of cost – Cost functions and its derivation from Production function–Short and long run costs
Unit 5	Revenue concepts–Total Revenue, Average revenue and Marginal Revenue–Relationship between AR, MR and elasticity-Nature of AR and MR under different Market structures

Course Objectives	
Title	**ECONOMICS OF MONEY AND BANKING – I**
Course Code	**AB21B**
CO-1	It enables the students to understand the nature, basic concepts, scope and importance of money. It capacitates the students to have a thorough understanding of the various functions of money.
CO-2	The students get an insight in to the different schools of thought regarding the demand for money and supply of money.
CO-3	It explains the linkages between real and monetary sector through monetary theories.
CO-4	It throws light on the components of money supply and also system of note issue
CO-5	It enables the students to gets awareness of the different types, causes and effects of inflation and deflation

Course Outcome	
Title	**ECONOMICS OF MONEY AND BANKING – I**
Course Code	**AB21B**
CO-1	To understand basic knowledge of money and bank.
CO-2	Understand the nature of money, how money circulates and its impact to the economy.
CO-3	To understand how financial system works.
CO-4	To understanding investment and saving.
CO-5	To introduce students to recent developments and timely policy debates about financial markets and the role of central banks.

Syllabus	
Title	**ECONOMICS OF MONEY AND BANKING – I**
Course Code	**AB21B**
Unit 1	Introduction to Money–Evolution and functions of money– Forms of money–Value of money – Determination of relationship between Value of money and prices
Unit 2	Quantity theory of money–Fisher's Equation of Exchange – Cash Balance approach -Keynes Saving–Investment theory-Keynes' theory of Money and Prices - Re-statement of Quantity Theory of Money– Milton Friedman
Unit 3	Real and monetary sectors–Linkages between Real and

	monetary sector–Dichotomy between Real and monetary sectors– Neutrality of money– Real Balance effect
Unit 4	Money supply– Components of money supply–Money Multiplier – System of Note issue – Money supply in India
Unit 5	Inflation and deflation–Recent trends in inflation Causes, effects and remedies-Trade Cycles– Theories of Trade cycles.

Course Objectives	
Title	Basic Financial Accounting
Course Code	**AB3AA**
CO-1	The basic concepts in accounting
CO-2	Complete knowledge about single ownership business
CO-3	Prepare various accounting statements
CO-4	Prepare company accounts
CO-5	Understand the basic concepts of tally

Course Outcome	
Title	Basic Financial Accounting
Course Code	**AB3AA**
CO-1	Students would familiarize the concept branch account and its system.
CO-2	Students would understand the scope of departmental accounting.
CO-3	To enable the students to understand the scope of departmental accounting.
CO-4	Students would understand the dissolution partnership firm, dissolution accounts insolvency of partners.
CO-5	Students would prepare Indian accounting standard. IFRS-International financial reporting standards.

Syllabus	
Title	Basic Financial Accounting
Course Code	**AB3AA**
Unit 1	Accounting– Principles– Concepts and conventions -Double entry system of accounting
Unit 2	Introduction to basic books of accounts of sole-proprietary concern– Closing of books of accounts and preparation of Trial Balance
Unit 3	Preparation of Financial accounts: Trading, Profit and Loss Account–Balance sheet
Unit 4	Introduction to Company Final Accounts- Preparation of Profit and Loss Accounts, Balance Sheet, Managerial Remuneration
Unit 5	Introduction to Computerized accounting – Tally

Course Objectives	
Title	**Principles of Economics- II**
Course Code	**AB22A**
CO-1	The basic Idea about the Business Economics in terms of its nature and scope and also helps to understand the concepts of demand forecasting and demand distinctions.
CO-2	Knowledge of producer's equilibrium in terms of is oquants.
CO-3	It provides the knowledge on firm's strategy and Policy, its objectives and goals.
CO-4	It helps the students to know about fundamental pricing strategies and policy in different markets structures.
CO-5	Insight into social responsibility of Indian Businessmen along with explaining the problems and remedial measures in fulfillment of social responsibility and also throws light on SWOT analysis of a firm.

Course Outcome	
Title	**Principles of Economics- II**
Course Code	**AB22A**
CO-1	Describe the functions of prices in market such as supply and demand.
CO-2	Differentiate between goods and services.
CO-3	Apply the concept and theory of economics in the real economic situation.
CO-4	Identify the consumer choice and related to the demand theory.
CO-5	To make students understand the fundamentals of consumer behaviour.

Syllabus	
Title	**Principles of Economics- II**
Course Code	**AB22A**
Unit 1	Definition of Business Economics- nature and scope- Demand forecasting (only Concept) and Demand distinctions
Unit 2	Producer's equilibrium- Iso-quants –Iso-cost- Least cost combination–Multi-product firm and equilibrium
Unit 3	Firm's strategy and Policy- Strategy–Missions–Objectives and goals–Profit maximization– Baumol's Sales Maximization theory–Utility Maximization theory–Entry preventing theory (Limit Pricing Theory of Baines)
Unit 4	Fundamental of Pricing strategies and Policy- Price and output decisions of firms under Perfect competition, Monopoly, Monopolistic and Oligopoly market structures
Unit 5	SWOT analysis of a firm - Social responsibility of Indian businessmen – Hurdles in the fulfillment of social responsibility– Remedial measures for improving the image of business.

Course Objectives	
Title	**ECONOMICS OF MONEY AND BANKING- II**
Course Code	**AB22B**
CO-1	It explains the structure of money market in general and Indian Money Market.
CO-2	To familiarize the students with the different classification of banks and the evolution of central banking and also through its functions understand working & operation of RBI.
CO-3	To know the types and functions of commercial banking.
CO-4	It helps to know about the Banking sector Reforms since1991
CO-5	The students would acquire knowledge pertaining to financial services in the financial markets

Course Outcome	
Title	**ECONOMICS OF MONEY AND BANKING- II**
Course Code	**AB22B**
CO-1	How a bank can create money through granting loans.
CO-2	Develop an understanding of inflation, monetary control and economic stabilization.
CO-3	How the equilibrium interest rate is determined in the market for money.
CO-4	Be well-informed on how to finance a business and the best source of money to start a business.
CO-5	It provides an insight into the banking system.

Syllabus	
Title	**ECONOMICS OF MONEY AND BANKING- II**
Course Code	**AB22B**
Unit 1	Money market– Structure of the Money Market- Organized and unorganized market- Indian Money Market
Unit 2	Central Banking – Evolution of Central banking –Functions – Methods of Credit control- Monetary planning and policy with reference to India- e banking, UPI.
Unit 3	Commercial Banking–Types of banking–Functions– Liquidity creation of Money by banks– Balance Sheet of Commercial Banks– Portfolio of Commercial Banks
Unit 4	Banking sector Reforms since 1991 – NarasimhaCommittee Securitization Act Capital Adequacy norms, Basel Norms,Demonetisation.
Unit 5	Financial Services–Merchant banking– Mergers and Acquisitions– Mutual Funds- Capital Markets- {Primary and Secondary Market–Stock Exchange indices–Demat of Securities– SEBI

Course Objectives	
Title	**BUSINESS ETHICS AND VALUES**
Course Code	**AB2AD**
CO-1	Impart knowledge on business ethics
CO-2	Understand the immoral practices to be avoided
CO-3	Inculcate the good business practices in an organization
CO-4	Aware of significance of pollution free environment
CO-5	Realize the corporate responsibility towards national building.

Course Outcome	
Title	**BUSINESS ETHICS AND VALUES**
Course Code	**AB2AD**
CO-1	Students will be able to understand the business ethics.
CO-2	The student will be able to Analyze corporate social Responsibility
CO-3	The student will be able to analyze various ethical codes in corporate governance
CO-4	Student will be able to Analyze the Employees conditions and Business Ethics
CO-5	Analyze the Role of values for managers

Syllabus	
Title	**BUSINESS ETHICS AND VALUES**
Course Code	**AB2AD**
Unit 1	Role and importance of Business Ethics and Values in Business- Definition of Business Ethics- Impact on business policy and business strategy–Role of CEO -Impact on the business culture
Unit 2	Types of Ethical issues- Bribes – Coercion– Deception– Theft – Unfair Discrimination
Unit 3	Ethics Internal – Hiring employees – Promotions – Discipline – Wages – Job Description – Exploitation of employees - Ethics External – Consumers – Fair Prices – False Claim Advertisements
Unit 4	External–Environment protection-Natural–Physical–Society-pollution control– Relationship of Values and Ethics - Indian Ethos–Impact on the performance
Unit 5	Social Responsibilities of Business towards Shareholders-Employees–Customers–Dealer- Vendors –government–Social Audit

Course Objectives	
Title	**STATISTICS FOR BUSINESS ANALYSIS-I**
Course Code	**AB23A**
CO-1	Understand the significance of statistics
CO-2	Acquire knowledge on diagrammatic and graphic representation of data
CO-3	Compute the various measures of averages
CO-4	Measure the deviation in the dataset
CO-5	Estimate the values of skewness and kurtosis.

Course Outcome	
Title	**STATISTICS FOR BUSINESS ANALYSIS-I**
Course Code	**AB23A**
CO-1	Understand the significance of statistics
CO-2	Acquire knowledge on diagrammatic and graphic representation of data
CO-3	Compute the various measures of averages
CO-4	Measure the deviation in the dataset
CO-5	Analyze Statistical data using MS-Excel.

Syllabus	
Title	**STATISTICS FOR BUSINESS ANALYSIS-I**
Course Code	**AB23A**
Unit 1	Nature, significance and limitations of statistics–Collection, Classification and Tabulation of data.
Unit 2	Diagrammatic and graphic representation – Bar diagrams–
Unit 3	Measures of central tendency– Arithmetic Mean, Median and Mode.
Unit 4	Measures of Dispersion–Absolute and relative dispersion– Range–Quartile deviation–Mean deviation – Standard deviation– Co-efficient of variation– Percentiles and Deciles.
Unit 5	Skewness and Kurtosis–Pearsonian measure of skewness – Bowley's measure of skewness– Kurtosis

Course Objectives	
Title	**ENTREPRENEURIAL DEVELOPMENT-I**
Course Code	**AB23B**
CO-1	Students will be able to understand the basic concepts and theories on Entrepreneurship
CO-2	Realize the role, characteristics and major functions of Entrepreneurs
CO-3	Gain knowledge about the role of Entrepreneur towards economic development
CO-4	Students can correlate the business ideas from theoretical framework to practical/ prepare project work.
CO-5	To understand the merits and demerits of becoming an entrepreneur.

Course Outcome	
Title	**ENTREPRENEURIAL DEVELOPMENT-I**
Course Code	**AB23B**
CO-1	Students will be able to understand the basic concepts and theories on Entrepreneurship
CO-2	Realize the role, characteristics and major functions of Entrepreneurs
CO-3	Gain knowledge about the role of Entrepreneur towards economic development
CO-4	Students can correlate the business ideas from theoretical framework to practical/ prepare project work.
CO-5	Understand the importance of the marketing plan to obtaining, maintaing and expanding an entrepreneur's reach to its target market.

Syllabus	
Title	**ENTREPRENEURIAL DEVELOPMENT-I**
Course Code	**AB23B**
Unit 1	Meaning of entrepreneur – theories – Classical – Schumpeter's innovations Theory – Other Modern Theories – Uncertainty Theory of Knight – Leibenstein's theory of 'X' efficiency .
Unit 2	Evolution of Indian Entrepreneurship – Role of Entrepreneurship in Economic Development and Regional Development – Role of Government and Non Government Organization – Policies and Programmes of Entrepreneur Development.
Unit 3	Role and importance of Entrepreneurship – Characteristics of an Entrepreneur – Relationship among Entrepreneur, Entrepreneurship and Intrapreneur –Functions of entrepreneur – Types of Entrepreneurs – Classification of entrepreneurs.
Unit 4	Small Scale Entrepreneur – Small Scale Industries and Indian Economic Development – Start ups, Venture Capital – Concessions – Incentives and subsidies to small scale industries – SIDBI, MSME.
Unit 5	Formation of Business Idea- Classification of Project – Project Appraisal and feasibility report – Contents of Project Report.

Course Objectives	
Title	**MANAGERIAL ECONOMICS**
Course Code	**AB3AF**
CO-1	To acquire knowledge of scope, basic concepts and principles of managerial economics.
CO-2	To acquire insights into cost analysis
CO-3	To understand the price and output determination under market structures
CO-4	To acquire knowledge of pricing methods
CO-5	To acquire idea of capital budgeting, project profitability and methods of appraising project profitability.

Course Outcome	
Title	**MANAGERIAL ECONOMICS**
Course Code	**AB3AF**
CO-1	Apply the knowledge of the mechanics of supply and demand to explain working of markets
CO-2	Describe how changes in demand and supply affect markets
CO-3	Understand the choices made by a rational consumer
CO-4	Explain relationships between production and costs
CO-5	Define key characteristics and consequences of different forms of markets

Syllabus	
Title	**MANAGERIAL ECONOMICS**
Course Code	**AB3AF**
Unit 1	Nature and scope of managerial economics- Role and responsibilities of Managerial economists – Demand Analysis–Elasticity of demand- Demand Forecasting: meaning and methods.
Unit 2	Cost Analysis-Cost-output relationship- Economies of scale -Cost control– Cost reduction– Production function
Unit 3	Market structures–Price and output determination under perfect competition, Monopoly, Monopolistic Competition, Oligopoly –Price Leadership–Models–Price Rigidity (Kinked Demand Curve).
Unit 4	Pricing methods–pricing of new product–Price regulation–Profit and profit management–Profit planning and Profit forecasting –Break-even analysis.
Unit 5	Capital budgeting – Cost of capital–Capital management–Project profitability–Methods of appraising project profitability.

Course Objectives	
Title	**STATISTICS FOR BUSINESSANALYSIS-II**
Course Code	**AB24B**
CO-1	Have independent knowledge on sampling techniques
CO-2	Gain insight of the degree of relationship or correlation among variables
CO-3	Estimate the values of unknown variables
CO-4	Have an understanding of the relevance of index numbers and its types
CO-5	Analyse the components of time series an interpret the values

Course Outcome	
Title	**STATISTICS FOR BUSINESSANALYSIS-II**
Course Code	**AB24B**
CO-1	Derive the probability density function of transformation of random variables.
CO-2	Calculate probabilities, and derive the marginal and conditional distributions of vicariate random variables
CO-3	Analyze Statistical data using MS-Excel.
CO-4	Solve a range of problems using the techniques covered.
CO-5	To analyse the sampling techniques

Syllabus	
Title	**STATISTICS FOR BUSINESSANALYSIS-II**
Course Code	**AB24B**
Unit 1	Sampling–population and sample- Types of sampling -Simple, random and stratified random sampling– Sampling errors– Sampling design–Design of questionnaire.
Unit 2	Correlation–Limits of co-efficient of correlation–Calculation of co-efficient of correlation–Rank correlation co-efficient.
Unit 3	Regression–Two variable linear regression – Meaning – Regression lines and regression coefficient.
Unit 4	Index numbers–Simple and weighted index numbers–Laspeyer's and Paasche's index numbers – Fisher's Ideal index number – Marshall–Edgeworth's index numbers–Construction–Tests to be satisfied by an ideal index number–Uses of index number–Whole sale price index and consumer price index.
Unit 5	Analysis of time series–Four components of time series– Measurement of secular trend–Moving average method and Method of least squares– Uses of Time series analysis.

Course Objectives	
Title	**ENTREPRENEURIALDEVELOPMENT-II**
Course Code	**AB24B**
CO-1	The students can realize the significance of women entrepreneur
CO-2	Students can analyses the scope of marketing, decide on the choice financial strategies
CO-3	Students can gain knowledge on sources of finances and various schemes open to entrepreneurship
CO-4	Evaluate various national and state level ED programmes
CO-5	Be aware of various entrepreneurship programmes with special reference to Tamil Nadu state.

Course Outcome	
Title	**ENTREPRENEURIALDEVELOPMENT-II**
Course Code	**AB24B**
CO-1	How to utilize a feasibility analysis to develop a business plan.
CO-2	The student will learn that a business needs a well constructed marketing plan to succeed.
CO-3	Focus on revenue maximization, Effectively tackle growth challenges of the venture.
CO-4	To improve standard of living.
CO-5	Understand the basic concepts about the intrepreneurship.

Syllabus	
Title	**ENTREPRENEURIALDEVELOPMENT-II**
Course Code	**AB24B**
Unit 1	Women Entrepreneurs – Definition – Problems of Women Entrepreneurs-Opportunities of Women Entrepreneurs-Future of Women Entrepreneurs-Rural Entrepreneurship -Definition-Problems-remedies-marketing-future of rural enterprises.
Unit 2	Management – Business Analysis - forecasting techniques - Break-even Analysis – evaluation of Marketing-market Structure-Classification of goods and services –Inventory Management.
Unit 3	Sources of Finance-Financial Institutions- Problems and remedies-Role of Commercial Banks, IDBI.
Unit 4	Entrepreneurial Development Programmes in India –ED Cell, DICs, KVIC, DRPA, JRY, SISI, SIDCs-Other national, State and District Level Development Programmes.
Unit 5	Entrepreneurial Development in Tamil Nadu- State Financial Corporation- SIPCOT-ITCOT- SIDC's SIETI Etc.-State Industrial Policies and Entrepreneurial Development-Tamil Nadu Economic

Course Objectives	
Title	**FINANCIAL MARKETS**
Course Code	**AB3AE**
CO-1	Understand about venture capital and credit rating agencies.
CO-2	To acquire more knowledge on Indian Financial Systems.
CO-3	It provides the knowledge on working of stock exchanges and the instruments of stock exchanges and also SEBI regulations related regulations
CO-4	An insight into Mutual funds its concepts and investment pattern and performance of mutual funds.
CO-5	To get knowledge about international as well as national money market.

Course Outcome	
Title	**FINANCIAL MARKETS**
Course Code	**AB3AE**
CO-1	To study the functioning of various financial markets and their contribution in economic development.
CO-2	To acquire more knowledge on Indian Financial Systems.
CO-3	It provides the knowledge on working of stock exchanges and the instruments of stock exchanges and also SEBI regulations related regulations
CO-4	An insight into Mutual funds its concepts and investment pattern and performance of mutual funds.
CO-5	To demonstrate about primary and secondary money market.

Syllabus	
Title	**FINANCIAL MARKETS**
Course Code	**AB3AE**
Unit 1	Structure of Indian Capital market–Primary market–Secondary market- Financial institutions – basic infrastructure- Types of Financial markets- Non banking Financial companies–new financial institutions– Mutual funds – Venture capital– Credit rating agencies.
Unit 2	Working of Stock exchanges- Bombay stock exchange– national stock exchange–Types of issue– Debt instruments– Short-term–Innovative instruments–Derivatives–Global Depository Receipts– Intermediaries – SEBI regulations.
Unit 3	Regulatory environment in India-Securities market regulation– Capital issues control Act1947 - Securities Contracts Regulation Act1956 – SEBI Act, 1992- - National Depositories ordinance.
Unit 4	Indian Financial system–Capital formation–Hindrances–need for financial intermediaries- Direct versus Indirect finance– Evolution of Indian Financial System.
Unit 5	Mutual funds–concept and nature–Types of schemes–Asset management companies- SEBI Guidelines on mutual funds– Investment pattern and performance of mutual funds.

Course Objectives	
Title	**MACRO ECONOMICS–I**
Course Code	**AKA5A**
CO-1	Knowledge about the working of macro-economic parameters of an economy
CO-2	An understanding and measurement of national income and social accounting concepts and their importance
CO-3	An insight into the basic tenets of classical and Keynesian theory of output and employment in understanding economic fluctuations
CO-4	An idea about the implication of consumption theories in enhancing growth
CO-5	To appreciate the impact of changing interest rates on investment.

Course Outcome	
Title	**MACRO ECONOMICS–I**
Course Code	**AKA5A**
CO-1	Demonstrate the meaning and function of money, high powered money, monetary and paper system, illustrate various version of quantity theory of money.
CO-2	Identify types of banks, explain the meaning and function of commercial banks, illustrate how banks create credit, and suggest the instruments to control credit.
CO-3	Analyze different phases of trade cycle, demonstrate various trade cycle theories, understand the impact of cyclical fluctuation on the growth of business, and lay policies to control trade cycle.
CO-4	Illustrate the meaning of inflation, deflation, stagflation and reflation, identify different kinds of inflation, causes and effects of inflation on different sectors of the economy, describe different measures to control inflation.
CO-5	Demonstrate the meaning and function of money, high powered money, monetary and paper system, illustrate various version of quantity theory of money.

Syllabus	
Title	**MACRO ECONOMICS–I**
Course Code	**AKA5A**
Unit 1	Nature of Macro Economics - Difference between Micro and Macro Economics- Macro Statics and macro dynamics – transition from micro economics to macro economics.
Unit 2	National Income – concepts of national income – methods of measuring of national income – Difficulties in measurement of national income – importance of national income analysis – social accounting – components and importance of social accounting.
Unit 3	Classical theory of output and employment – J.B Say's Law of Markets- Keynesian Theory of output and employment – Wage rigidity – Derivation of aggregate Supply curve – Aggregate Expenditure function – Effective demand
Unit 4	The consumption function – meaning of consumption function – technical attributes of consumption function – determinants of the consumption function - Keynesian Consumption function –Relative Income hypothesis – Permanent Income Hypothesis - Life Cycle Hypothesis.
Unit 5	Investment function – definition – induced and autonomous investment – determinants of investment – MEC and MEI and rate of interest – factors other than the interest rate affecting inducement to invest.

Course Objectives	
Title	**PUBLIC ECONOMICS-I**
Course Code	**AKA5E**
CO-1	To understand the importance of public finance in economic development and able to differentiate private and public in terms of finance and goods.
CO-2	In depth knowledge in public expenditure especially the significance and effects of increase in public expenditure. Also to study the economic views of public expenditure.
CO-3	Insight knowledge on various sources of public revenue and to understand the ways inwhich direct and indirect taxes are levied for augmenting financial resources towards economic development.
CO-4	An understanding of individual taxes with reference to India
CO-5	To understand the concept of taxable capacity with its importance, types and measurements.

Course Outcome	
Title	**PUBLIC ECONOMICS-I**
Course Code	**AKA5A**
CO-1	Understand the sources of finance both public and private, demonstrate the role of government to correct market failures and possible advantage of public financing.
CO-2	Attain the advantages and knowledge of public investments and other government expenditures. Understand the causes of growing public expenditures for various programmes and policies within and outside the country.
CO-3	Understand the possible burden, benefits and distribution of various types of taxes among various classes of people, know the general trend and impact on general welfare and arouse them to suggest good and bad tax system.
CO-4	Understand the needs of public borrowing from all possible sources to meet necessary public investment/expenditures. Also be alerted to find sources for repayment.
CO-5	Understand the sources of finance both public and private, demonstrate the role of government to correct market failures and possible advantage of public financing.

Syllabus	
Title	**PUBLIC ECONOMICS-I**
Course Code	**AKA5A**
Unit 1	Meaning and scope of public finance – Distinction between private and public finance-Role of government– Need for Government activity-Principle of maximum social advantage.
Unit 2	Principles of public expenditure-Classification-Causes and effects of public expenditure with reference to India.
Unit 3	Public revenue sources-Distinction between tax revenue and non tax Revenue-Trendsin revenue- Taxation -Meaning-Sources of taxation – Classification of taxes-Canons-Theories of taxation - Impact and incidence of taxation-Effects of taxation.
Unit 4	Individual taxes-(with reference to India) Income Tax Expenditure tax-Wealth tax-Property tax- Estate duty –Gift tax-Death duty-Customs duty-Excise duty –Sales tax-Value added tax– Rationale of Goods and Services Tax(GST).
Unit 5	Characteristics of a good tax system – Taxable capacity-Factors determining taxable capacity- Limits – Measurements of taxable capacity.

Course Objectives	
Title	**INTERNATIONAL ECONOMICS-I**
Course Code	**AKA5G**
CO-1	To understand the fundamental conceptual framework through theories of international trade
CO-2	An awareness of the concept of terms of trade and the various technologies
CO-3	To validate arguments and reassess need for protection or open up trade to assess the effects of tariff and non-tariff barriers
CO-4	To examine the functioning and causes of balance of payments conundrum and to enhance trade flows and design schemes for evaluation

Course Outcome	
Title	**INTERNATIONAL ECONOMICS-I**
Course Code	**AKA5G**
CO-1	To understand the fundamental conceptual framework through theories of international trade
CO-2	An awareness of the concept of terms of trade and the various technologies
CO-3	To validate arguments and reassess need for protection or open up trade to assess the effects of tariff and non-tariff barriers
CO-4	To examine the functioning and causes of balance of payments conundrum and to enhance trade flows and design schemes for evaluation
CO-5	To understand the fundamental conceptual framework through theories of international trade

Syllabus	
Title	**: INTERNATIONAL ECONOMICS-I**
Course Code	**AKA5G**
Unit 1	Foreign Trade –Need, Inter Regional and International Trade, Theories of International Trade– Adam Smith-Ricardo, Heckscher – Ohlin Theory.
Unit 2	Terms of Trade–different Concepts of Terms of trade– Determinants of Terms of trade–static and Dynamic gains from trade–capital saving and labour saving technologies and its impact on terms of trade.
Unit 3	Terms of Trade–different Concepts of Terms of trade– Determinants of Terms of trade–static and Dynamic gains from trade–capital saving and labour saving technologies and its impact on terms of trade.
Unit 4	Tariff: Meaning and types-Effects of Tariff. Quotas: Meaning and Types- Effects of quotas on imports.
Unit 5	Balance of Payment - Meaning -Structure - Balance of Payment and Balance of Trade – Disequilibrium in BOP &BOT-Causes for disequilibrium in BOP-Measures for correcting disequilibrium.

Course Objectives	
Title	**INDIAN ECONOMY AND ECONOMIC REFORMS**
Course Code	**AKA5H**
CO-1	Develop ideas of the basic characteristics of Indian economy, its potential on naturalresources
CO-2	Understand the importance, causes and impact of population growth and its distribution, translate and relate them with economic development.
CO-3	Grasp the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government
CO-4	Understand agriculture as the foundation of economic growth and development, analyse the progress and changing nature of agricultural sector and its contribution to the economy as a whole.

Syllabus	
Title	**: INDIAN ECONOMY AND ECONOMIC REFORMS**
Course Code	**AKA5H**
Unit 1	Transport-Importance of transport (Road, Railways, Shipping and civil Aviation) to Economic growth-Evaluation of Government Policy-Transport Co-ordination-Reforms, Government Programmes.
Unit 2	Agriculture-Its contribution to Economic development Food problems-Methods of solving- Measures to increase agricultural Productivity –Land reforms- Green revolution- Agricultural Inputs and Agricultural Credit-Evaluation of Agricultural Policy during the plan Period- Reforms in Agricultural sector
Unit 3	Role of industries in Economic development-Cottage, small scale and large scale (cotton, iron and steel, jute, sugar and tea)-Assessment of industrial Policy –measuressince1991-PublicSector –Privatization Industrial reforms
Unit 4	Transport-Importance of transport (Road, Railways, Shipping and civil Aviation) to Economic growth-Evaluation of Government Policy-Transport Co-ordination-Reforms, Government Programmes.
Unit 5	Poverty in India – Absolute and Relative poverty measures – Multi-dimensional poverty- Poverty eradication programmes – Regional Development Disparities-Economic development and Social Changes

Course Objectives	
Title	**ENVIRONMENTAL ECONOMICS**
Course Code	**AKAEC**
CO-1	To acquire knowledge regarding the relationship between Economy and Environment.
CO-2	To differentiate different types of resources say renewable and non-renewable etc.
CO-3	To understand the sources of energy and energy scenario in India
CO-4	To acquire in-depth knowledge in the determination of Optimum level of pollution and measures undertaken by the government to control pollution.
CO-5	To Educates the students on various international environmental policies

Course Outcome	
Title	**ENVIRONMENTAL ECONOMICS**
Course Code	**AKAEC**
CO-1	Demonstrate the scientific management of waste materials; realize the role and importance of individuals to keep the environment clean
CO-2	Understand that environmental problem is not the problem of a single country or region but a global problem/issue. Hence, policy formulation may be for all countries
CO-3	Demonstrate the scientific management of waste materials; realize the role and importance of individuals to keep the environment clean
CO-4	Understand the causes and victims of environmental pollution like poverty, population explosion, and over-use of resources, careless or unscientific dump/management of wastes
CO-5	To get a clear cut idea about global warming and green house effect.

Syllabus	
Title	ENVIRONMENTAL ECONOMICS
Cours Code	**AKAEC**
Unit 1	Economics and Environment- Definition and role of Environmental Economics- Scope and significance of Environmental economics–Ecology and Ecosystem–Relationship between the environment and the Economic system– Environment as a Resource -Environmental Quality.
Unit 2	Resources - Concepts and definition- Classification of Resources- Renewable and non- renewable resources- Definition and meaning of Conservation of Resources- Material Substitution-Product Life Extension-Recycling-Wastereduction
Unit 3	Energy- Definition- Sources of Energy and their classification- Renewable and Non- renewable sources of energy- Conventional and non-conventional energy resources- Direct andIndirect energy- Atomic Energy-Energy Scenario inIndia
Unit 4	Pollution as an Economic problem - Pollution control – Optimum Level – Moral suasion - Direct control -Regulation-Fiscal technique - Effluent Charges and subsidies compared.
Unit 5	International Environmental Policy- Transfrontier pollution - International Agreements - Stockholm Conference on Human Environment- Recommendations- United Nations Conference on Environment and Development at Rio-De Janeiro (Agenda21, June,1992) - An assessment

Course Objectives	
Title	**MACRO ECONOMICS–II**
Course Code	**AKA6A**
CO-1	To assess the impact of investment on increasing employment, output and consumption through the concept ofmultiplier
CO-2	To understand the equilibrium between product and factormarkets.
CO-3	Understand several key models and concepts of monetaryeconomics.
CO-4	Demonstrate an understanding of economic fluctuations and policy measures towithstand economic shocks
CO-5	Appreciate the role, value and limitations of monetary and fiscalpoliciesin

Course Outcome	
Title	**MACRO ECONOMICS–II**
Course Code	**AKA6A**
CO-1	Demonstrate the meaning and function of money, high powered money, monetary and paper system, illustrate various version of quantity theory of money.
CO-2	Identify types of banks, explain the meaning and function of commercial banks, illustrate how banks create credit, and suggest the instruments to control credit.
CO-3	Analyze different phases of trade cycle, demonstrate various trade cycle theories, understand the impact of cyclical fluctuation on the growth of business, and lay policies to control trade cycle.
CO-4	Illustrate the meaning of inflation, deflation, stagflation and reflation, identify different kinds of inflation, causes and effects of inflation on different sectors of the economy, describe different measures to control inflation.
CO-5	Explain economic growth and development, illustrate Harrod Domar and Solow's growth model, distinguish between economic growth and technical progress.

Syllabus	
Title	**MACRO ECONOMICS–II**
Course Code	**AKA6A**
Unit 1	Multiplier – employment and investment multiplier – leakages of multiplier – uses and limitations of multiplier – principles of accelerator and supermultiplier.
Unit 2	General Equilibrium – Equilibrium of commodity market (IS) and Money Market (LM) – Simultaneous equilibrium of commodity and money market (IS-LM) Changes in general equilibrium.
Unit 3	Money – Fisher's quantity theory of money – Cambridge equations – Keynesian theory of money – money supply – determinants of money supply – high power money and money multiplier.
Unit 4	Business cycles – types – phases and effects of business cycle – inflation – Philips curve – causes and measures to controlinflation
Unit 5	Macro-Economic policy: objectives – monetary policy – objectives – instruments – effectiveness of monetary policy – fiscal policy – objectives – monetary and fiscal mix to control inflation

Course Objectives	
Title	PUBLIC ECONOMICS -II
Course Code	**AKA6D**
CO-1	Understand the concept of public debt with its causes, effects andmanagement.
CO-2	Depth knowledge in the concept of fiscal federalism, fiancé commission and NITIAYOG
CO-3	Acquire more knowledge on the concept of deficit financing and its causes and effects in an economy.
CO-4	More knowledge in the framework of budget and overview of current UnionBudget.
CO-5	Understand the major functions of local government sources of finance and the problems faced byit.

Course Outcome	
Title	PUBLIC ECONOMICS -II
Course Code	**AKA6D**
CO-1	Understand the sources of finance both public and private, demonstrate the role of government to correct market failures and possible advantage of public financing.
CO-2	Attain the advantages and knowledge of public investments and other government expenditures. Understand the causes of growing public expenditures for various programmes and policies within and outside the country
CO-3	Understand the possible burden, benefits and distribution of various types of taxes among various classes of people, know the general trend and impact on general welfare and arouse them to suggest good and bad tax system
CO-4	Understand the needs of public borrowing from all possible sources to meet necessary public investment/expenditures. Also be alerted to find sources for repayment.
CO-5	To explain the role of public policy in general and fiscal functions.

Syllabus	
Title	**PUBLIC ECONOMICS -II**
Course Code	**AKA6D**
Unit 1	Public Debt-Sources-Effectsofpublicdebt-Publicdebt-RepaymentofPublicdebt- Management of public debt.
Unit 2	Budget-Deficit financing-Meaning -Objectives-Role of deficit financing in India-Effects on prices, production and distribution

Unit 3	Federal finance-Principles-Analysis of division of revenue, expenditure and other powers Between union, State and local Governments-Finance commission-Analysis of latest finance commission recommendation– 14th&15thFinanceCommission
Unit 4	Fiscal policy - Objectives and instruments of fiscal policy– Role of Fiscal Policy in a developing economy with reference to India
Unit 5	Local finance –Functions - Sources of finance to local bodies – Village Panchayat- Municipalities – Corporation– Problems of LocalFinance

Course Objectives	
Title	**INTERNATIONAL ECONOMICS– II**
Course Code	**AKA6E**
CO-1	Enables to learn the functions of foreign exchange market and theories of exchangerate
CO-2	To understand the mechanics of the working of foreign exchangemarkets
CO-3	To visualize the role of foreign capital and investments in enhancinggrowth.
CO-4	To perceive the pros and cons of FDI and the role of multi-national corporations in economic development
CO-5	Functions and working of international financial institutions towards trade anddevelopment

Course Outcome	
Title	**INTERNATIONAL ECONOMICS– II**
Course Code	**AKA6E**
CO-1	To develop the knowledge of balance of trade and balance of payment
CO-2	Attain the knowledge about dumping and anti-dumping
CO-3	Understand the value of exchange rate internationally
CO-4	Attain a good knowledge about customs and duties of other foreign countries
CO-5	understand about the problems in international exchange market

Syllabus	
TITLE	**INTERNATIONAL ECONOMICS– II**
Course Code	**AKA6E**
Unit 1	Exchange rate: Meaning- determination of equilibrium of exchange rate- fixed and flexible exchange rate- managed float.
Unit 2	Foreign Exchange Market: Functions- Transfer function- Credit Function- Hedging Function. Theories of Exchange Rate: Mint theory-Purchasing power parity theory-Balance of Payment Theory
Unit 3	Role of foreign capital in economic development– issues in foreign capital in economic development – theory of direct investment– issues in foreign direct investment– Multinational Corporations- Foreign aid.
Unit 4	International Monetary System – IMF– SDR–International Liquidity.
Unit 5	Trade and Development– Economic Integration, Meaning, Types– World Bank-IBRD,GATT, WTO. Structure, Objectives, Functions and Working

Course Objectives	
Title	**ORGANIZATIONALBEHAVIOUR**
Course Code	**AKAED**
CO-1	Understanding behavioural dynamics to enhance employee performance inorganisations
CO-2	Discuss theories of motivation and strategies to improve motivation in the workplace
CO-3	Explain and explore group dynamics in organisationallife
CO-4	Recognise good and poor leadership and leadershipstyles
CO-5	Identify organisation structures and its change with a view to appreciate the merits and demerits, strategizing for managing conflict and institutingnegotiation

Course Outcome	
Title	ORGANIZATIONALBEHAVIOUR
Course Code	**AKAED**
CO-1	It helps to know more about the organizations and its workings
CO-2	To know more about employees and employers.
CO-3	It helps in improving business profits and motives
CO-4	To understand more about the psychology of employees and employers
CO-5	Understand more about the working skills and attitude of organization.

Syllabus	
TITLE	**ORGANIZATIONALBEHAVIOUR**
Course Code	**AKAED**
Unit 1	Introduction to Organizational Behaviour – Foundations of Individual Behaviour – Personality – Perception –Learning - Values and Attitudes
Unit 2	Motivation – Early Theories – Contemporary Theories – Motivation at work – Designing, Motivating Jobs
Unit 3	Group Dynamics – Group Behaviour – Communication and Group Decision Making – Inter- group Relations
Unit 4	Leadership – Traits – Behavioural and Contingency theories – Power and Politics–Transactional Analysis– Work Stress
Unit 5	Organisational structure and Design– Organisational Change and Development– Organisational Culture and Climate– Organizational Conflict–Causes– Types of Conflict– Management Conflict

Course Objectives	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**AKAEF**
CO-1	Knowledge on evolution of management science to recent trends and challenges in global level
CO-2	Recent trends includes total quality management, risk management and crisis management
CO-3	Decision making is an essence of management. Entire managerial process depends on decisions
CO-4	Career development stages teaches about learning new skills and moving towards higher job¬ responsibilities and also bringing changes in the career within the organization
CO-5	Process of controlling has 3 components 1. Setting standards 2. Measuring actual performance and 3.Taking corrective action

Course Outcome	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**AKAEF**
CO-1	To understand the planning process in the organisation.
CO-2	To understand how to develop a successful leadership style.
CO-3	To learn the application of the principles in an organisation.
CO-4	To able to solve work place problems by making effective decisions.
CO-5	Increase students knowledge about various career option.

Syllabus	
TITLE	**PRINCIPLES OF MANAGEMENT**
Course Code	**AKAEF**
Unit 1	Management defined-basic principles of management. The evolution of management sciencetrends and challenges of management in global scenario.
Unit 2	planning– strategic consideration in planning. Decision making process – Rational Decision Making Planning: planning – first step in the process of management cycle-basic techniques of planningBasic factors involved in planning-Key planning points-psychological hazards to rational
Unit 3	Need of organization– organizational hierarchy in large concerns– top management organization – staff units and committee –factors to be considered in the establishment of an organization Career development – career stages – training and performance appraisal
Unit 4	Process of controlling – types of control – budgetary and non-budgetary – Authority relationship-line function and staff– basics of delegation of responsibility and authority. Centralization and decentralization of authority and the pros and cons of each.
Unit 5	Span of control – Pros and cons of narrow and wide spans of control– optimum spans

JAYA COLLEGE OF ARTS AND SCIENCE
(AFFILIATED TO UNIVERSITY OF MADRAS)
THIRUNINRAVUR – 602024
DEPARTMENT OF BUSINESS ADMINISTRATION

Program :BBA

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	An understanding of business functions
PO-2	Providing global perspectives
PO-3	Developing critical and analytical thinking abilities
PO-4	Interpersonal skill development
PO-5	Creating social sensitivity and understanding CSR ethical and sustainable practices

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Acquiring conceptual clarity of various functional area
PSO-2	Ability to analyse various functional issues affecting the organisation
PSO-3	Demonstrating ability to evolve strategies for organizational benefits
PSO-4	Demonstrate the ability to develop models frameworks to reflect critically on specific business context
PSO-5	Analysis and interpretation of the data which is used in decision making

Course Objectives	
Title	**PRINCIPLES OF MANAGEMENT**

Course Code	**BB21A**
CO-1	To understand the objectives of management
CO-2	To know about the planning and co-coordinating techniques in the firm
CO-3	To learn about the work allotment and efficient duty performances
CO-4	To study the system and process of effective controlling in the organization.
CO-5	To enable the effective and barriers communication in the organization

Course Outcome	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**BB21A**
CO-1	To understand the Classification of the Management by objectives and help for the better management of resources and activities of an organization
CO-2	To study the Effective plans, co-ordinate the organizational work and eliminate unproductive effort
CO-3	To learn the division of work that leads to efficient performance of duties.
CO-4	To ensure successful implementation of the decision making through follow up procedures.
CO-5	Enabling students to assess managerial practices and choices relative to ethical principles and standards

Syllabus	
Title	**PRINCIPLES OF MANAGEMENT**

Course Code	**BB21A**
Unit 1	Management: Importance – Definition – Nature and Scope of Management Process – Role and Functions of a Manager – Levels of Management – Development of Scientific Management and other Schools of thought and approaches.
Unit 2	Planning: Nature – Importance – Forms – Types – Steps in Planning – Objectives – Policies – Procedures and Methods – Natures and Types of Policies – Decision – making – Process of Decision – making – Types of Decision.
Unit 3	Organizing: Types of Organisations – Organisation Structure – Span of Control and Committees – Departmentalisation – Informal Organisation- Authority – Delegation – Decentralisation – Difference between Authority and Power – Responsibility.
Unit 4	Recruitment – Sources, Selection, Training – Direction – Nature and Purpose. Coordination – Need, Type and Techniques and requisites for excellent Co-ordination – Controlling – Meaning and Importance – Control Process.
Unit 5	Definition of Business ethics - Types of Ethical issues -Role and importance of Business Ethics and Values in Business - - Ethics internal - Ethics External - Environment Protection - Responsibilities of Business

Course Objectives

Title	FINANCIAL ACCOUNTING
Course Code	BB21B
CO-1	To know about various accounting tools used in firms
CO-2	To Explore the single-entry system
CO-3	To Illustrate the financial statements of a sole proprietor.
CO-4	To study the concepts of how to make use of depreciation accounting and methods.
CO-5	To Understand the concept of exempted incomes.

Course Outcome

Title	FINANCIAL ACCOUNTING
Course Code	BB21B
CO-1	To Provide the basic understanding of accounting principles & techniques in preparing the final accounts of firms and companies for the users of accounting information
CO-2	To Explore the single-entry system
CO-3	To Illustrate the financial statements of a sole proprietor.
CO-4	To study the concepts of how to make use of depreciation accounting and methods.
CO-5	To Understand the concept of exempted incomes.

Syllabus

Title	FINANCIAL ACCOUNTING
Course Code	**BB21B**
Unit 1	Meaning and scope of Accounting, Basic Accounting Concepts and Conventions – Objectives of Accounting – Accounting Transactions – Double Entry Book Keeping – Journal, Ledger, Preparation of Trial Balance – Preparation of Cash Book.
Unit 2	Preparation of Final Accounts of a Sole Trading Concern – Adjustments Receipts and Payments Account, Income & Expenditure Account and Balance Sheet of Non Trading Organizations
Unit 3	Partnership Accounts-Final accounts of partnership firms – Basic concepts of admission, retirement and death of a partner including treatment of goodwill - rearrangement of capitals. (Simple problems on Partnership Accounts).
Unit 4	Depreciation – Meaning, Causes, Types – Straight Line Method – Written Down Value Method, Insurance Policy Method, Sinking Fund Method & Annuity Method. Insurance claims – Average Clause (Loss of stock & Loss of Profit)
Unit 5	Single Entry – Meaning, Features, Defects, Differences between Single Entry and Double Entry System – Statement of Affairs Method – Conversion Method

Course Objectives	
Title	**MANAGERIAL ECONOMICS**
Course Code	**BB31A**
CO-1	To learn about the economics used at managers level in a firm
CO-2	To know knowledge about demand and forecasting technique
CO-3	To know about the practical knowledge in how to apply in economics
CO-4	To know the differentiate between production and cost functions
CO-5	To make student understand the demand and supply analysis in business applications

Course Outcome	
Title	**MANAGERIAL ECONOMICS**
Course Code	**BB31A**
CO-1	To learn the scope and importance of managerial economics
CO-2	To study how to apply demand theory in consumer behaviour
CO-3	To understand the Value demand forecasting methods.
CO-4	To explore the Differentiate production and cost functions
CO-5	To understand the demands and supply conditions and assess the position of a company

Syllabus	
Title	**MANAGERIAL ECONOMICS**
Course Code	**BB31A**
Unit 1	Nature and scope of managerial economics – definition of economics – important concepts of economics – relationship between micro, macro and managerial economics – nature and scope – objectives of firm
Unit 2	Demand analysis – Theory of consumer behavior – Marginal utility analysis – indifference curve analysis Meaning of demand – Law of demand – Types of demand – Determinants of demand – Elasticity of demand – Demand forecasting
Unit 3	Production and cost analysis – Production – Factors of production – production function – Concept – Law of variable proportion – Law of return to scale and economics of scale – cost analysis – Different cost concepts – Cost output relationship – Short run and long run – Revenue curves of firms – Supply analysis
Unit 4	Pricing methods and strategies – Objectives – Factors – General consideration of pricing – methods of pricing – Dual pricing – Price discrimination
Unit 5	Market classification – Perfect competition – Monopoly – Monopolistic competition – Duopoly – Oligopoly

Course Objectives	
Title	**BUSINESS COMMUNICATION**
Course Code	**BB22A**
CO-1	To learn about the communication skills
CO-2	To know knowledge about drafting business letters
CO-3	To know about the practical knowledge in how to write a report
CO-4	To know how to demonstrate interpersonal communications
CO-5	To make students understand the rigors of various economic models and their applications.

Course Outcome	
Title	**BUSINESS COMMUNICATION**
Course Code	**BB22A**
CO-1	To Enable students to have an effective communication skills
CO-2	To demonstrate the principles in drafting business letters
CO-3	To study and compare business letters
CO-4	To develop skills in report writing
CO-5	To demonstrate effective interpersonal communications.

Syllabus	
Title	**BUSINESS COMMUNICATION**
Course Code	**BB22A**
Unit 1	Definition – Methods – Types – Principles of effective Communication – Barriers to Communication – Business Letter – Layout.
Unit 2	Kinds of Business Letters: Interview – Appointment – Acknowledgement – Promotion – Enquiries – Replies – Orders – Sales – Circular – Complaints.
Unit 3	Bank Correspondence – Insurance Correspondence – Agency Correspondence – Correspondence with Shareholders, Directors
Unit 4	Reports Writing – Agenda, Minutes of Meeting – Memorandum – Office Order – Circular – Notes.
Unit 5	Modern Forms of Communication: Fax – Email – Video Conferencing – Internet – Websites and their use in Business.

Course Objectives	
Title	**:MANAGEMENT ACCOUNTING**
Course Code	**BB22B**
CO-1	To learn about the concept of management
CO-2	To know knowledge about ratios and analysis
CO-3	To know about the practical knowledge cash flow and fund flow statement
CO-4	To know how to analyze the marginal costing and cost volume analysis
CO-5	To impart the correct practices of the strategies of Effective Business writing.

Course Outcome	
Title	**:MANAGEMENT ACCOUNTING**
Course Code	**BB22B**
CO-1	To demonstrate the concept of management accounting and its advantages & disadvantages
CO-2	To classify the ratios and its merits
CO-3	To classify the preparation of fund flow statement
CO-4	To demonstrate the preparation of cash flow statement
CO-5	To identity the concepts of marginal costing and cost volume analysis

Syllabus	
Title	**:MANAGEMENT ACCOUNTING**
Course Code	**BB22B**
Unit 1	Management accounting – Meaning, nature, scope and functions, need, importance and limitations – Management Accounting vs. Cost Accounting. Management Accounting vs. Financial Accounting.
Unit 2	Analysis and Interpretation of financial statements – Nature, objectives, essentials and tools, methods – Comparative Statements, Common Size statement and Trend analysis.
Unit 3	Ratio Analysis – Interpretation, benefits and limitations. Classification of ratios - Liquidity, Profitability, turnover, capital structure and Leverage. \
Unit 4	Funds flow and Cash flow analysis. Budgets and budgetary control – Meaning, objectives, merits and demerits.
Unit 5	Investment decisions; brief introduction of cost of capital; methods of capital budgeting; Average Rate of Returns (ARR),Pay Back Period (PBP), Net present Value (NPV) and Internal Rate of returns (IRR), capital rationing (simple problems on capital budgeting methods).

Course Objectives	
Title	**INTERNATIONAL TRADE**
Course Code	**BB32A**
CO-1	To learn about the conceptinter-regional and international trade
CO-2	To know knowledge about prosperous trade between countries
CO-3	To know about the practical knowledge restrictions to international trade
CO-4	To know how to analyze the scope of international market
CO-5	To earn profits by selling as much as possible products and services to collect the maximum revenue.

Course Outcome	
Title	**INTERNATIONAL TRADE**
Course Code	**BB32A**
CO-1	To identify the basic difference between inter-regional and international trade.
CO-2	To show the benefits of international trade in a way how nations with strong international trade have become prosperous
CO-3	To explain how restrictions to international trade would limit a nation in the services and goods produced within its territories
CO-4	The importance of maintaining equilibrium in the balance of payments
CO-5	To familiarize with market classification and scope

Syllabus	
Title	**INTERNATIONAL TRADE**
Course Code	**BB32A**
Unit 1	Difference between Internal and International Trade – Importance of International Trade in the Global context.
Unit 2	Theories of Foreign Trade: - Absolute, Comparative, equal cost differences (Adam Smith, Ricardo, Haberler's Hechsher-Ohlin theories only)
Unit 3	Balance of Trade, Balance of Payment – Concepts – Causes of Disequilibrium, Methods to Correct Disequilibrium – Fixed and Floating Exchange Rates
Unit 4	International Monetary Fund:- IMF – International Liquidity- IBRD
Unit 5	WTO and its implications with special reference to India

Course Objectives	
Title	**FINANCIAL MANAGEMENT**
Course Code	**BB23A**
CO-1	To learn about the concept and principles of capital structure
CO-2	To know knowledge about working capital management
CO-3	To know about the practical knowledge on sales, production and budget
CO-4	To know how to analyze the budgeting appraisal methods
CO-5	Provide an in-depth view of the process in financial management of the firm

Course Outcome	
Title	**FINANCIAL MANAGEMENT**
Course Code	**BB23A**
CO-1	To Identity the principles of capital structure
CO-2	To learn the working capital management and its techniques of forecasting in working capital
CO-3	To understand the concept of cost of capital and its classifications
CO-4	To Identity the preparation of production, sales, cash budget, flexible budget
CO-5	To Classify the capital budgeting appraisal methods

Syllabus	
Title	**FINANCIAL MANAGEMENT**
Course Code	**BB23A**
Unit 1	Meaning, objectives and Importance of Finance – Sources of finance – Functions of financial management – Role of financial manager in Financial Management.
Unit 2	Meaning, objectives and Importance of Finance – Sources of finance – Functions of financial management – Role of financial manager in Financial Management.
Unit 3	Cost of capital – Cost of equity – cost of preference capital – Cost of debt – Cost of retained earnings – weighted Average (or) composite cost of capital (WACC)
Unit 4	Dividend policies – Factors affecting dividend payment - Company Law provision on dividend payment –Various Dividend Models (Walter's Gordon's – M.M. Hypothesis)
Unit 5	Working capital – components of working capital – working capital operating cycle – Factors influencing working capital – Determining (or) Forecasting of working capital requirements.

Course Objectives	
Title	**ORGANISATIONAL BEHAVIOUR**
Course Code	**BB23B**
CO-1	To learn about the concept of human behavior
CO-2	To know knowledge about group dynamics
CO-3	To know about the practical knowledge in developing communication
CO-4	To know how to analyze the organizational change
CO-5	To help the students to develop cognizance of the importance of human behaviour.

Course Outcome	
Title	**ORGANISATIONAL BEHAVIOUR**
Course Code	**BB23B**
CO-1	To study Human Behavior in an organization
CO-2	To study the group dynamics and demonstrate skills required for working in groups
CO-3	To enable students to face challenges related to group dynamics
CO-4	To study processes used in developing communication and resolving conflicts
CO-5	To learn the organizational change and steps in managing change

Syllabus	
Title	**ORGANISATIONAL BEHAVIOUR**
Course Code	**BB23B**
Unit 1	Need and scope of organizational behaviour - Theories of organization - Individual difference Vs Group intelligence tests -Measurement of intelligence - Personality Tests - Nature – Types and uses of perception.
Unit 2	Motivation - Financial and non -Financial motivational techniques - Job satisfaction - meaning - Factors - Theories -Measurement -Morale - Importance - Employee attitudes and behavior and their significance to employee productivity.
Unit 3	Work environment -Goodhouse keeping practices - Design of work place - Fatigue – Causes and prevention and their importance - Leadership -Types and theories of leadership
Unit 4	Group dynamics -Cohesiveness - Co-operation - Competition - Resolution - Sociometry - Group norms - Role position status
Unit 5	Organizational culture and climate - Organizational Development

Course Objectives	
Title	**COMPUTER APPLICATION IN BUSINESS**
Course Code	**BB23C**
CO-1	To learn about the concept of basic computer
CO-2	To know knowledge about skills in MS office
CO-3	To know about the practical knowledge in problem solving skills
CO-4	To know how to analyze the concepts of EDI
CO-5	To help the students to develop cognizance of the importance of human behaviour.

Course Outcome	
Title	**COMPUTER APPLICATION IN BUSINESS**
Course Code	**BB23C**
CO-1	To understand the basic of computer in internet and business
CO-2	Enabling students to gain knowledge on Microsoft word and Microsoft excel
CO-3	To demonstrate the problem solving skills in MS office
CO-4	To enable the students to know more about the database management environment
CO-5	To understand how to implement the concepts of EDI and Internal Auditing

Syllabus	
Title	**COMPUTER APPLICATION IN BUSINESS**
Course Code	**BB23C**
Unit 1	Word Processing: Meaning and role of work processing in creating of documents, Editing, formatting and printing documents using tools such as spell check, thesaurus, etc., in work processors (MS Word), Electronic Spreadsheet, Structure of Spread sheet and its applications to accounting , finance, and marketing functions of business; Creating a dynamic/ sensitive worksheet; Concept of absolute and relative cell – reference; Using built – in functions; Goal seeking and solver tools; Using graphics and formatting to worksheet; Sharing data with other desktop applications ; Strategies of creating error – free worksheet (MS Excel)
Unit 2	Programming under a DBMS environment: The concept of data base management system; Data field, records, and files, Sorting and Indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding programming environment in DBMS; Developing menu driven applications in query language (MS – Access).

Unit 3	Programming under a DBMS environment: The concept of data base management system; Data field, records, and files, Sorting and Indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding programming environment in DBMS; Developing menu driven applications in query language (MS – Access).
Unit 4	The internet and its basic concepts: Internet concept, History, Development in India: Technological foundation of internet; Distributed computing; Client – server computing; internet protocol suite; Application of distributed computing ; Client server computing; Internet protocol suite in the internet environment ; Domain Name System (DNS); Generic Top – Level Domain (gTLD); Country code Top Level Domain (ccTLD) – India; Allocation of second level domains; IP addresses, Internet protocol; Applications of Internet in business, Education, Governance , etc.
Unit 5	Information System Audit : Basic idea of information audit; - Difference with the traditional concepts of audit; Conduct and applications of IS audit in internet environment

Course Objectives	
Title	**MARKETING MANAGEMENT**
Course Code	**BB23D**
CO-1	To learn about the concept of marketing management
CO-2	To know knowledge about 7 P'S of marketing mix
CO-3	To know about the practical knowledge of physical distribution
CO-4	To know how to analyze the trends
CO-5	To understand the tools used by marketing managers in decision situations

Course Outcome	
Title	**MARKETING MANAGEMENT**
Course Code	**BB23D**
CO-1	To study the principles of marketing management
CO-2	To understand the concept of 7 P's of Marketing mix
CO-3	To enable the students to understand the fundamentals of marketing concept and the role marketing plays in business
CO-4	To understand the aspects of physical distribution
CO-5	To study the recent trends in marketing

Syllabus	
Title	**MARKETING MANAGEMENT**
Course Code	**BB23D**
Unit 1	Fundamentals of marketing - Role of Marketing - Relationship of Marketing with other functional areas - concept of marketing mix-Marketing approaches - Various Environmental factors affecting the marketing functions.
Unit 2	Buyer Behaviour - Consumer goods and Industrial goods - Buying motives - Factors influencing buyer Behaviour Market segmentation - Need and basis of Segmentation - Targeting - positioning.
Unit 3	The Product - Characteristics - benefits - classifications - consumer goods - industrial goods - New Product Development process - Product Life Cycle - Branding -Packaging.
Unit 4	Physical Distribution: Importance - Various kinds of marketing channels - distribution problems. Sales management: Motivation, Compensation and Control of salesmen.
Unit 5	A brief overview of: Advertising - Publicity - Public Relations - personal Selling – Direct selling and Sales promotion.

Course Objectives	
Title	**BUSINESS STATISTICS**
Course Code	**BB33A**
CO-1	To learn about the concept about data
CO-2	To know knowledge about pie chart and graphical
CO-3	To know about the practical knowledge central tendency
CO-4	To know how to analyze the business context
CO-5	To develop the students ability to deal with numerical and quantitative issues in business

Course Outcome	
Title	**BUSINESS STATISTICS**
Course Code	**BB33A**
CO-1	To demonstrate how to organize the data
CO-2	To study how to create graphical representations using pie chart
CO-3	To learn the concepts of Central Tendency and Dispersion
CO-4	To analyze the relationship between the variables and the regressions
CO-5	To learn the probability rules and concepts relating to discrete and continuous random variables to answer questions within a business context

Syllabus	
Title	**BUSINESS STATISTICS**
Course Code	**BB33A**
Unit 1	Introduction – Meaning and Definition of Statistics – Collection and Tabulation of Statistical Data – Presentation of Statistical Data – Graphs and Diagrams- Measures of Central Tendency – Arithmetic Mean, Median and Mode – Harmonic Mean and Geometric Mean.
Unit 2	Measures of Variation – Standard Deviation –Mean deviation – Quartile deviation- Skewness and kurtosis – Lorenz Curve –Simple Correlation – Scatter Diagram – Karl pearson's Correlation – Rand Correlation – Regression.
Unit 3	Analysis of Time Series – Methods of Measuring Trend And Seasonal Variations
Unit 4	Index Numbers – Consumer Price Index – And Cost Of Living Indices- Statistical quality control
Unit 5	Sampling procedures - simple, stratified and systematic.

Course Objectives	
Title	**HUMAN RESOURCE MANAGEMENT**
Course Code	**BB24A**
CO-1	To learn about the concept of HRM
CO-2	To know knowledge about HR concepts
CO-3	To know about the practical knowledge on strategic issues and man power re-sources
CO-4	To know how to analyze the strategies
CO-5	To develop relevant skills necessary for application in HR related issues

Course Outcome	
Title	**HUMAN RESOURCE MANAGEMENT**
Course Code	**BB24A**
CO-1	To learn the functions of HRM and its techniques
CO-2	To integrate the knowledge of HR concepts to take correct business decisions.
CO-3	To develop the necessary skills set for application of various HR issues.
CO-4	To analyze the strategic issues and the strategies required to select and develop manpower resources.
CO-5	To develop the understanding of the concept of human resource management and its relevance in organizations

Syllabus	
Title	**HUMAN RESOURCE MANAGEMENT**
Course Code	**BB24A**
Unit 1	Nature and scope of Human Resources Management – Differences between personnel management and HRM – Environment of HRM – Human resource planning – Recruitment – Selection – Methods of Selection – Uses of various tests – interview techniques in selection and placement
Unit 2	Induction – Training – Methods – Techniques – Identification of the training needs – Training and Development – Performance appraisal – Transfer – Promotion and termination of services – Career development.
Unit 3	Remuneration – Components of remuneration – Incentives – Benefits – Motivation – Welfare and social security measures.
Unit 4	Labour Relation – Functions of Trade Unions – Forms of collective bargaining- Workers' participation in management – Types and effectiveness – Industrial Disputes and Settlements (laws excluded)
Unit 5	Human Resource Audit – Nature – Benefits – Scope – Approaches

Course Objectives	
Title	**BUSINESS REGULATORY FRAME WORK**
Course Code	**BB24B**
CO-1	To learn about the concept of Indian contract act
CO-2	To know knowledge about special contracts
CO-3	To know about the practical knowledge in indemnity and guarantee
CO-4	To know how to analyze the fundamental aspects of Indian contract act
CO-5	To provide exposure to Commerce students about the Business Regulatory frame work of India.

Syllabus	
Title	**BUSINESS REGULATORY FRAME WORK**
Course Code	**BB24B**
Unit 1	Brief outline of Indian Contracts Act - Special contracts Act - Sale of goods Act - Contract of Agency
Unit 2	Brief outline of Indian Companies Act 1956.
Unit 3	Brief outline of FEMA - Consumer Protection Act
Unit 4	The laws of Trade Marks - Copyright - Patents - Designs - Trade related Intellectual Property Rights. (TRIPS) RTP -IDRA -an overview
Unit 5	Brief outline of Cyber Laws

Course Objectives	
Title	**FINANCIAL SERVICES**
Course Code	**BB24C**
CO-1	To learn about the concept of financial services
CO-2	To know knowledge about capital financing
CO-3	To know about the practical knowledge on leasing and factoring services
CO-4	To know how to analyze the merger and acquisition strategies
CO-5	Development of an understanding of the process of interpersonal Communication

Course Outcome	
Title	**FINANCIAL SERVICES**
Course Code	**BB24C**
CO-1	To study the role of financial services.
CO-2	To learn the venture capital financing and securitization process.
CO-3	To understand the classification of leasing and factoring services.
CO-4	To learn the need for credit rating agencies.
CO-5	To study the concepts of the merger and acquisition strategies

Syllabus	
Title	**FINANCIAL SERVICES**
Course Code	**BB24C**
Unit 1	Meaning and importance of financial services – Types of financial services – Financial services and economic environment – Players in Financial Services Sector.
Unit 2	Merchant Banking – Functions – Issue management – Managing of new issues – Underwriting – Capital market – Stock Exchange – Role of SEBI
Unit 3	Leasing and Hire purchase – Concepts and features – Types of lease Accounts. Factoring – Functions of Factor
Unit 4	Venture Capital – Credit Rating – Consumer Finance
Unit 5	Mutual Funds : Meaning – Types – Functions – Advantages – Institutions Involved – UTI

Course Objectives	
Title	**MANAGEMENT INFORMATION SYSTEM**
Course Code	**BB24D**
CO-1	To learn about the concept and technologies of MIS
CO-2	To know knowledge about implementing information system
CO-3	To know about the practical knowledge in strategic information system
CO-4	To know how to analyze the enterprise systems
CO-5	To provide the theoretical models used in database management systems to answer business questions.

Course Outcome	
Title	**MANAGEMENT INFORMATION SYSTEM**
Course Code	**BB24D**
CO-1	To Relate the basic concepts and technologies used in the field of management information systems.
CO-2	To Compare the processes of developing and implementing information system
CO-3	To analyse the relationship between information systems and organizations.
CO-4	To gain expertise to use strategic information system
CO-5	To evaluate the benefits and limitations of enterprise systems and industrial networks

Syllabus	
Title	**MANAGEMENT INFORMATION SYSTEM**
Course Code	**BB24D**
Unit 1	Definition of Management Information System - MIS support for planning, Organizing and controlling - Structure of MIS - Information for decision - making.
Unit 2	Concept of System - Characteristics of System - Systems classification - Categories of Information Systems - Strategic information system and competitive advantage
Unit 3	Computers and Information Processing - Classification of computer - Input Devices – Output devices - Storage devices, - Batch and online processing. Hardware - Software. Database management Systems.
Unit 4	System Analysis and design - SDLC - Role of System Analyst - Functional Information system - Personnel, production, material, marketing.
Unit 5	Decision Support Systems - Definition. Group Decision Support Systems - Business Process Outsourcing - Definition and function

Course Objectives	
Title	**OPERATIONS RESEARCH**
Course Code	**BB34A**
CO-1	To learn about the concept of various decision making
CO-2	To know knowledge about operation research
CO-3	To know about the practical knowledge in optimization problems
CO-4	To know how to analyze the construction of work flow
CO-5	To apply these techniques constructively to make effective business decisions

Course Outcome	
Title	**OPERATIONS RESEARCH**
Course Code	**BB34A**
CO-1	Enabling Students to know about the Operation Research and its Significance in Business.
CO-2	To understands the concept of various decision making tools used in Business.
CO-3	To utilize PERT and CPM in project Management.
CO-4	To makes use of simplex method in optimization problems.
CO-5	Enabling Students to know about the construction of workflow system using Queuing Theory.

Syllabus	
Title	**OPERATIONS RESEARCH**
Course Code	**BB34A**
Unit 1	Introduction to OR – Meaning and scope – Characteristics – models in OR.LPP-Formulation graphical method – Simplex method- Big M Method application in Business – merits and Demerits.
Unit 2	Transportation model – basic feasible solution – formulation, solving a TP. Assignment models – formulation – solution.
Unit 3	Network analysis – work break down analysis – construction – numbering of event. Time Calculation – critical path, slack, float – application.
Unit 4	Queuing models- elements of queuing system – characteristics of queuing model.
Unit 5	Decision theory – statement of Baye's theorem application. Probability – decision trees. Game theory meaning and characteristics – saddle point – Dominance property.

Course Objectives	
Title	**ADVERTISING AND SALES PROMOTION**
Course Code	
CO-1	To learn about the concept of advertising and promotion program
CO-2	To know knowledge about advertising
CO-3	To know about the practical knowledge in research needs
CO-4	To know how to analyze the principles of personal selling
CO-5	To provide students with detailed knowledge of some of the marketing mixes such as Sales and Promotion.

Course Outcome	
Title	**ADVERTISING AND SALES PROMOTION**
Course Code	
CO-1	To examine the importance of market segmentation towards the development of advertising and promotion program
CO-2	To develop creative strategies for advertising.
CO-3	To explicate advertising research needs
CO-4	To discover sales promotion strategies.
CO-5	To associate the process and principles of personal selling and sales promotion

Syllabus	
Title	**ADVERTISING AND SALES PROMOTION**
Course Code	
Unit 1	Advertising: Advertising, objectives, task and process, market segmentation and target audience – Message and copy development.
Unit 2	Media: Mass Media - Selection, Planning and Scheduling – Web Advertising – Integrated programme and budget planning.
Unit 3	Implemenation: Implementing the programme coordination and control – Advertising agencies – Organization and operation.
Unit 4	Sales Promotion: Why and When Sales promotion activities, Consumer and sales channel oriented – planning, budgeting and implementing and controlling campaigns
Unit 5	Control: Measurement of effectiveness – Ethics, Economics and Social Relevance.

Course Objectives	
Title	**RESEARCH METHODOLOGY**
Course Code	
CO-1	To learn about the concept of sampling and data collection
CO-2	To know knowledge about research problem
CO-3	To know about the practical knowledge on data collection techniques
CO-4	To know how to analyse the research reports
CO-5	learn how to use persuasive sales techniques

Course Outcome	
Title	**RESEARCH METHODOLOGY**
Course Code	
CO-1	To identify and discuss the concepts and procedures of sampling, data collection, analysis and reporting
CO-2	To examine the research problem and to study the research process.
CO-3	To evaluate research designs
CO-4	To analyse data collection techniques.
CO-5	To organize the research reports

Syllabus	
Title	**RESEARCH METHODOLOGY**
Course Code	
Unit 1	Introduction to Business Research - Research in Business – Research Process- Research need, formulating the problem, designing, sampling, pilot testing.
Unit 2	Research Design- Exploratory, Descriptive, Casual, Formulation of hypothesis - types. Measurement- characteristics of sound measurement tool, Scaling methods and sampling techniques.
Unit 3	Sources and Collection of Data- : Primary and secondary sources, survey observation, experimentation- details and evaluation. - Questionnaires – schedules, data entry, tabulation & cross tabulation-and Graphic presentation. Data.
Unit 4	Analysis and Preparation: Hypothesis testing – statistical significance, statistical testing procedure. Tests of significance- -Simple Correlation - Regression.
Unit 5	Presenting results and writing the report: - The written research Report.

Course Objectives	
Title	**OPERATIONS MANAGEMENT**
Course Code	
CO-1	To learn about the concept of operations management
CO-2	To know knowledge about control techniques
CO-3	To know about the practical knowledge in operations
CO-4	To know how to analyze the work measurement techniques=
CO-5	To understand the relationship between operations and other business functions.

Course Outcome	
Title	**OPERATIONS MANAGEMENT**
Course Code	
CO-1	To identify the elements of operation management and transformation processes to enhance productivity and competitiveness.
CO-2	To learn the production planning and control techniques to estimate production and operations design
CO-3	To learn the inventory management techniques
CO-4	To study the suitable materials for handling principles and practices in the operations.
CO-5	To enhance the effective use of work measurement techniques

Syllabus	
Title	**OPERATIONS MANAGEMENT**
Course Code	
Unit 1	Introduction: Nature and Scope of Operations Management. Production design &Process planning: Plant location: Factors to be considered in Plant Location – Plant Location Trends.
Unit 2	Layout of manufacturing facilities: Principles of a Good Layout – Layout Factors – Basic Types of Layout – Service Facilities.
Unit 3	Production and Inventory Control: Basic types of production – Basic Inventory Models – Economic Order Quantity, Economic Batch Quantity – Reorder point – Safety stock – Classification and Codification of stock – ABC classification – Procedure for Stock Control, Materials Requirement Planning (MRP). JIT.
Unit 4	Methods Analysis and Work Measurement: Methods Study Procedures – The Purpose of Time Study – Stop Watch Time Study – Performance Rating – Allowance Factors – Standard Time – Work Sampling Technique. Quality Control: Purposes of Inspection and Quality Control – Acceptance Sampling by Variables and Attributes – Control Charts.
Unit 5	Service Operations Management: Introduction – Types of Service – Service Encounter – Service Facility Location – Service Processes and Service Delivery.

Course Objectives	
Title	**MATERIALS MANAGEMENT**
Course Code	
CO-1	To learn about the concept of material management
CO-2	To know knowledge about product and service
CO-3	To know about the practical knowledge on MRP, ERP, PLM
CO-4	To know how to analyze the planning and purchasing of materials
CO-5	To realize the importance of materials both in product and service.

Course Outcome	
Title	**MATERIALS MANAGEMENT**
Course Code	
CO-1	To understand how the knowledge of material management can be an advantageous to logistics and supply chain operations.
CO-2	To realize the importance of materials both in product and service.
CO-3	To learn the concepts of MRP, ERP and PLM in managing materials
CO-4	To understand the issues of ethics in purchasing and negotiating
CO-5	To sensitize students on the material management functions like planning, purchasing, controlling, storing, handling, packaging, shipping, distributing and standardizing.

Syllabus	
Title	**MATERIALS MANAGEMENT**
Course Code	
Unit 1	Materials Management- Definition-Function-Importance of Materials Management.
Unit 2	Integrated materials management- the concept- service function advantages- Inventory Control- Function Of Inventory - Importance-Replenishment Stock- Material demand forecasting- MRP- Basis tools - ABC-VED- FSN Analysis - Inventory Control Of Spares And Slow Moving Items -EOQ-EBQ-Stores Planning.

Unit 3	Integrated materials management- the concept- service function advantages- Inventory Control- Function Of Inventory - Importance-Replenishment Stock- Material demand forecasting- MRP- Basis tools - ABC-VED- FSN Analysis - Inventory Control Of Spares And Slow Moving Items -EOQ-EBQ-Stores Planning.
Unit 4	Store Keeping And Materials Handling- Objectives - Functions - Store Keeping - Stores Responsibilities - Location Of Store House - Centralized Store Room - Equipment – Security Measures - Protection And Prevention Of Stores.
Unit 5	Store Keeping And Materials Handling- Objectives - Functions - Store Keeping - Stores Responsibilities - Location Of Store House - Centralized Store Room - Equipment – Security Measures - Protection And Prevention Of Stores.

Course Objectives	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	
CO-1	To learn about the concept converting idea to a successful entrepreneurial firm
CO-2	To know knowledge about ,commercial application of innovations
CO-3	To know about the practical knowledgeenterprise and design business plans
CO-4	To know how to analyze the studying different case studies.
CO-5	To understanding processes involved in entrepreneurship and business formation and development

Course Outcome	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	
CO-1	To provide conceptual exposure on converting idea to a successful entrepreneurial firm
CO-2	To understand the functions of the entrepreneur in the successful, commercial

	application of innovations
CO-3	To explore entrepreneurial leadership and management style.
CO-4	To learn how to start an enterprise and design business plans, that are suitable for funding by considering all dimensions
CO-5	To Understand entrepreneurial process by way of studying different case studies.

Syllabus	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	
Unit 1	Entrepreneur : Meaning of entrepreneurship – Types of Entrepreneurship – Traits of entrepreneurship – Factors promoting entrepreneurship- Barriers to entrepreneurship- the entrepreneurial culture- Stages in entrepreneurial process – Women entrepreneurship and economic development- SHG
Unit 2	Recognizing opportunities – trend analysis – generating ideas – Brainstorming, Focus Groups, Surveys, Customer advisory boards, Day in the life research – Encouraging focal point for ideas and creativity at a firm level-Protecting ideas from being lost or stolen – Patents and IPR.
Unit 3	Opportunity identification and product/service selection – Generation and screening the project ideas – Market analysis, Technical analysis, Cost benefit analysis and network analysis- Project formulation – Assessment of project feasibility- Dealing with basic and initial problems of setting up of Enterprises.
Unit 4	Meaning of business plan- Business plan process- Advantages of business planning- preparing a model project report for starting a new venture (Team-based project work).
Unit 5	Sources of Finance- Venture capital- Venture capital process- Business angles- Commercial banks- Government Grants and Schemes.

Course Objectives	
Title	**BUSINESS ENVIRONMENT**
Course Code	
CO-1	To learn about the conceptdemonstrate sensitivity towards ethical and moral
CO-2	To know knowledge about economic spheres
CO-3	To know about the practical knowledge nature of business environment
CO-4	To know how to analyse the role of ethical behaviour
CO-5	Introduce to various tools as Six hat techniques, Five S

Course Outcome	
Title	**BUSINESS ENVIRONMENT**
Course Code	
CO-1	To demonstrate sensitivity towards ethical and moral issues and inculcate ability to address them in the course of business.
CO-2	To evaluate the legal, social and economic spheres of business
CO-3	To familiarize with the nature of business environment and its components.
CO-4	To learn the concepts of the political and legal system.
CO-5	To understand the importance and role of ethical behaviour in the business world today.

Syllabus	
Title	**BUSINESS ENVIRONMENT**
Course Code	
Unit 1	The concept of Business Environment – Its nature and significance – Brief overview of political – Cultural – Legal – Economic and social environments and their impact on business and strategic decisions
Unit 2	Political Environment – Government and Business relationships in India
Unit 3	Social environment – Cultural heritage- Social attitudes – Castes and communities – Joint family systems – linguistic and religious groups – Types of social organization
Unit 4	Economic Environment – Economic systems and their impact of business – Fiscal deficit -- Plan investment – Five year planning.
Unit 5	Financial Environment – Financial system – Commercial bank – Financial Institutions – RBI Stock Exchange – IDBI – Non Banking Financial Companies NBFCs

Course Objectives	
Title	**SERVICES MARKETING**
Course Code	
CO-1	To learn about the concept of services
CO-2	To know knowledge about marketing opportunities
CO-3	To know about the practical knowledge on central excise duty
CO-4	To know how to analyse the product based marketing activities
CO-5	To develop an understanding of the "state of the art# service management thinking.

Course Outcome	
Title	**SERVICES MARKETING**
Course Code	
CO-1	To develop an understanding of the state of the art service management thinking.
CO-2	To understand the service marketing opportunities.
CO-3	To understand the service design, its strategies and its development.
CO-4	To acquire knowledge on central excise duty
CO-5	Demonstrate an extended understanding of the similarities and differences in service-based and physical product based marketing activities

Syllabus	
Title	**SERVICES MARKETING**
Course Code	
Unit 1	Marketing Services: Introduction growth of the service sector. The concept of service. Characteristics of service - classification of service designing of the service, blueprinting using technology, developing human resources, building service aspirations.
Unit 2	Marketing Mix in Service Marketing: The seven Ps: product decision, pricing strategies and tactics, promotion of service and distribution methods for services. Additional dimension in services marketing- people, physical evidence and process.
Unit 3	Effective Management of Service Marketing: Marketing demand and supply through capacity planning and segmentation - internal marketing of services - external versus internal Orientation of service strategy.
Unit 4	Delivering Quality Service: Causes of service - quality gaps. The customer expectations versus perceived service gap. Factors and techniques to resolve this gap. Customer relationship management. Gaps in services - quality standards, factors and solutions – the service performance gap - key factors and strategies for closing the gap. External communication to the customers- the promise versus delivery gap - developing appropriate and effective communication about service quality.
Unit 5	Marketing of Service With Special Reference To:1.Financial services, 2.Health services, 3.Hospitality services including travel, hotels and tourism, 4.Professional service, 5. Public utility service, 6.Educational services.

Course Objectives	
Title	**BUSINESS TAXATION**
Course Code	
CO-1	To learn about the concept of principles and rules
CO-2	To know knowledge about awareness of taxes in business
CO-3	To know about the practical knowledge in basics of income tax
CO-4	To know how to analyze the concept of exempted incomes
CO-5	To enable the students to compute the net total taxable income of an individual.

Course Outcome	
Title	**BUSINESS TAXATION**
Course Code	
CO-1	To acquire working knowledge of the fundamental tax principles and rules.
CO-2	To study the awareness of how taxes can and often do constitute significant costs to businesses and households.
CO-3	To understand the provisions of agricultural income.
CO-4	To acquire the complete knowledge of basic concepts of income tax
CO-5	To understand the concept of exempted incomes

Syllabus	
Title	**BUSINESS TAXATION**
Course Code	
Unit 1	Objectives Of Taxation – Canons Of Taxation – Tax System In India – Direct And Indirect Taxes – Meaning And Types.
Unit 2	Central Excise Duty – Classification – Levy and Collection of Excise duty – Clearance of excisable goods- Exemption from excise duty – Excise and Small Scale Industries – Excise and Exports – Demand, Refund, Rebate of Central Excise duty – Offences and Penalties – Settlement – Appellate Provisions.

Unit 3	The Customs duty – Levy and Collection of customs duty – Organisation of the customs department – Officers of the customs – Powers – Appellate machinery – Infringement of the law – offences and penalties – Exemption from duty – customs duty drawback – duties free zones.
Unit 4	Central Sales Tax Act – Levy and Collection of CST - Liability of Tax – Registration of dealers – Goods of Special Importance – Offences and penalties - Value added tax – objectives – Levy of VAT – Arguments in favour of VAT – Difficulties in administering VAT
Unit 5	Definition of GST – Administrative structure of GST – Officers as per CGST Act - Officers as per SGST Act – Jurisdiction – Appointment- Powers- Procedure for Registration – Amendment of registration – Cancellation of registration.

Course Objectives	
Title	**CUSTOMER RELATIONSHIP MANAGEMENT**
Course Code	
CO-1	To learn about the concept of customer relationship management
CO-2	To know knowledge about marketing aspects
CO-3	To know about the practical knowledge of communication skills
CO-4	To know how to analyze the wide understanding on customer relationship management
CO-5	To disseminate knowledge regarding the concept of e-CRM and e-CRM technologies.

Course Outcome	
Title	**CUSTOMER RELATIONSHIP MANAGEMENT**
Course Code	
CO-1	To understand the basic concepts of Customer relationship management.
CO-2	To understand the marketing aspects of Customer relationship management.
CO-3	To enhance business communication skills required to work effectively within a marketing team.
CO-4	To understand basics of operational Customer relationship management.
CO-5	To develop a wide understanding on customer relationship management concepts and frameworks.

Syllabus	
Title	**CUSTOMER RELATIONSHIP MANAGEMENT**
Course Code	
Unit 1	Communication - need/ Mode of communication – barriers, channels of communication - oral - written -listening skill – Verbal skill- interpersonal communication and intra personal communication, Essentials of business letter.
Unit 2	CRM - concept and approach - CR in competitive environment public relation and image building
Unit 3	Banker - customer relationship -retaining and enlarging customer base - customer services - quality circle.
Unit 4	Nature and types of customer - complaint redressal methods Talwar and Goiporia committee report, customer service committee, customer day - Copra Forum - ombudsman.
Unit 5	Market Segment - Customer Data Base - Market Research. Review and Evaluation of Customer Satisfaction.

Course Objectives	
Title	**PROJECT WORK (GROUP)**
Course Code	
CO-1	A group of 3 students will be assigned a project in the beginning of the final year. The project work shall be submitted to the college 20 days before the end of the final year and the college has to certify the same and submit to the university 15 days prior to the commencement of the university examination.
CO-2	The project shall be evaluated externally. The external examiner shall be form the panel of examiners suggested by the board of studies from to time.
CO-3	Those who fail in the project work will have to redo the project work and submit to the college for external examination by the university
CO-4	Through this project they get Industry experience and the chance to LEARN
CO-5	It Increase your network in industrial sector.

Course Outcome	
Title	**PROJECT WORK (GROUP)**
Course Code	
CO-1	To identify the problem and finding the solution.
CO-2	To demonstrates sound technical knowledge of their selected project topic.
CO-3	To identify, analyse, and solve problems creatively Through sustained critical investigation by conducting secondary survey.
CO-4	To give a practical exposure on any emerging managerial area and provide opportunities to the students to apply theoretical and practical knowledge to provide solution.
CO-5	Provides space for creativity.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERCITY OF MADRAS)

THIRUNINRAVUR - 602024

DEPARTMENT OF BANK MANAGEMENT

Program : BBM

Program Outcomes	
	On Completion of Program
PO-1	Acquire knowledge on indian banking system and banking regulation acts pretaining to it.
PO-2	The field of finance administration, tax formalities, frame the agenda & communication with the entire levels focused curriculum offers a number of specializations and practical exposures which would equip the student to face the modern-day challenge in Manager roles in business.
PO-3	Understanding apply key concepts of value-based bank management like deposit and lone pricing
PO-4	Understand key concepts of risk management in banking.
PO-5	Practical exposure in banking, NBFCs and Insurance sector

Program Specific Outcomes	
	On Completion of Program
PSO-1	Students will demonstrate progressive affective domain development of values, the role of accounting in society and business.
PSO-2	Students will learn relevant financial accounting career skills applying both quantitative and qualitative knowledge to their future careers in business.(banking sectors)
PSO-3	Students will learn relevant managerial accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.
PSO-4	Learners will gain through systematic and subject skills within various disciplines of commerce, business accounting, economics, finance, auditing and marketing, entrepreneurial skills

PSO-5	Learners will be able to recognize features and roles of businessman entrepreneur, managers, consultant, company secretary, which will help learners to posses knowledge and other soft skills and to react aptly when confronted with critical decision making.

Course Objectives	
Title	**I FINANCIAL ACCOUNTING**
Course Code	**CZ21A**
CO-1	To enable the students to understand the system of preparing financi statements for various types of organisation
CO-2	To familiarize the students with knowledge about financial reporting standards
CO-3	To familiarize the students with knowledge about financial reporting standards
CO-4	The students will be aware of the various amendments in financial reporting
CO-5	The differences between cash and accrual accounting.

Course Outcome	
Title	**I FINANCIAL ACCOUNTING**
Course Code	**CZ21A**
CO-1	Students would prepare financial statements in accordance with appropriate standards.
CO-2	Students would prepare ledger accounts using double entry book keeping and record journal entries accordingly.
CO-3	Students would interpret the business implications of financial statement information.
CO-4	Students would prepare accounting information for planning and control and for the evaluation of finance, prepare bank reconciliation statement from incomplete statement.

CO-5	Explain the purpose of double entry system to understanding the accounting system properly, preparation of rectification errors.

Syllabus	
Title	**I FINANCIAL ACCOUNTING**
Course Code	**CZ21A**
Unit 1	**Preparation of Financial Statement:** Final accounts of sole trading concern-Adjustments-Receipts and Payments-Income and expenditure-Balance sheet of non-trading organisation
Unit 2	**Depreciation and Insurance Claims:** Depreciation Accounting: Depreciation- Meaning –Causes-Types-Straight Line Method-Written down value method- Concept of useful life under Companies Act 2015 Insurance Accounting: Insurance claims – Calculation of Claim amount -Average clause (Loss of stock only)
Unit 3	**Single entry system:** Meaning and Features of Single entry-Defects-Difference between single entry and double entry system-Methods of calculation of Profit-Statement of Affairs Method-Conversion Method.
Unit 4	**Rectification of Errors and Bank Reconciliation Statement**: Classification of Errors – Rectification of Errors – Preparation of Suspense a/c. Bank Reconciliation Statement – Need and preparation.
Unit 5	**Hire Purchase and Installment System:** Hire Purchase Systen Default and repossession-Hire purchase trading account Instalme System-Calculation of Profit.

Course Objectives	
Title	**BUSINESS COMMUNICATION**
Course Code	**CZ21B**
CO-1	To facilitate the students to understand the concept of Communication.
CO-2	To know the basic techniques of the modern forms of communication.
CO-3	To develop the communication skills among students.
CO-4	To learn how write different types of letter related to business.
CO-5	To understand communication theories and practice in diverse organization and cultures.

Course Outcome	
Title	**BUSINESS COMMUNICATION**
Course Code	**CZ21B**
CO-1	Applying business communication strategies and principles exchange information.
CO-2	Learn to write business letters.
CO-3	Attain oral communication skill for effective oral presentation.
CO-4	Acquire skills to prepare reports.
CO-5	Enrich written communication skill employability.

Syllabus	
Title	**BUSINESS COMMUNICATION**

Course Code	**CZ21B**
Unit 1	**Communication:** Definition – Methods – Types – Principles of effective Communication – Barriers to Communication – Business Letters – Layout.
Unit 2	**Business Letters:** Kinds of Business Letters: Interview – Application for a situation – Interview -Appointment – Acknowledgement – Promotion – Enquiries – Reply letter – Orders – Sales letter – Circular letter – Complaint letter.
Unit 3	**Correspondence:** Bank Correspondence – Insurance Correspondence – gency Correspondence – Correspondence with Shareholders, Directors.
Unit 4	**Reports and Meetings:** Report Writing – Meetings – Agenda - Minutes of Meeting – Memorandum – Office Order – Circular – Notes.
Unit 5	**Forms of Communication:** Modern Forms of Communication: Fax – E-mail – Video Conferencing – Internet – Websites – uses of the various forms of communication.

Course Objectives	
Title	**BUSINESS ECONOMICS**
Course Code	**CZ31A**
CO-1	To facilitate the students to understand the concept of Economics
CO-2	To Know the basic techniques of the modern forms of Economics
CO-3	To introduce students to the basic elements of commerce and economics.
CO-4	To analyse operations of markets under varying competitive conditions and make optimal business decisions.
CO-5	To illustrate what elements are considered while policy and decision making at the level.

Course Outcome	
Title	**BUSINESS ECONOMICS**
Course Code	**CZ31A**
CO-1	Students understand the concept of communication and familiarise with modern form of Economics
CO-2	Gain basic knowledge of the operation of the business economics.
CO-3	To apply marginal analysis to the firm under different market conditions.
CO-4	Apply the different concept of price and output decisions of firms under various market structure.
CO-5	Understand and gain analytical skills for understanding market structures.

Syllabus	
Title	**BUSINESS ECONOMICS**
Course Code	**CZ31A**
Unit 1	Introduction to Economics – Wealth, Welfare and Scarcity Views on Economics - Positive and Normative Economics - Definition – Scope and Importance of Business Economics - Concepts: Production Possibility frontiers – Opportunity Cost – Accounting Profit and Economic Profit – Incremental and Marginal Concepts – Time and Discounting Principles – Concept of Efficiency- **Business Cycle:- Inflation, Depression, Recession, Recovery, Reflation and Deflation**.
Unit 2	Demand and Supply Functions: - Meaning of Demand – eterminants and Distinctions of demand – Law of Demand – lasticity of Demand – Demand Forecasting – Supply concept and quilibrium

Unit 3	Consumer Behaviour : Law of Diminishing Marginal utility – Equimarginal Utility – Indifference Curve – Definition, Properties and equilibrium
Unit 4	Production: Law of Variable Proportion – Laws of Returns to Scale – Producer'sequilibrium – Economies of Scale - Cost Classification– Break Even Analysis.
Unit 5	Product Pricing: Price and Output Determination under Perfect ompetition, Monopoly _ Discriminating monopoly – Monopolistic ompetition – Oligopoly – Pricing objectives and Methods.

Course Objectives	
Title	**BASIS OF RETAIL MARKETING**
Course Code	**CC5AD**
CO-1	To enable the students to understand the concepts of retail marketing.
CO-2	To teach the students on aspects branding and labelling in retailtrade.
CO-3	To analyse and evaluate the fast-changing filed of promotion which affects global marketing, society and economics.
CO-4	To develop positive communication skills by extending the marketing communication approaches and techniques into effective marketing strategy and program which are necessary for communication to target audiences.
CO-5	To develop an understand of the state of the service management thinking.

Course Outcome	
Title	**BASIS OF RETAIL MARKETING**
Course Code	**CC5AD**
CO-1	Equip the students to get the knowledge of retail marketing and its segmentation.
CO-2	Identify core concepts of marketing and the rile of marketing in society.
CO-3	Ability to collect, process, and analyse consumer and market informed decisions.

CO-4	Ability to create branding and integrated marketing communication plan that include value propositions.
CO-5	Ability to formulate and implement traditional and digital marketing and communications strategies.

Syllabus	
Title	**BASIS OF RETAIL MARKETING**
Course Code	**CC5AD**
Unit 1	**RETAILING** Retailing – Definition -Retailing marketing -Growth of organized retailing in indian – importance of retailing .
Unit 2	**FUNCTIONS OF RETAILING** Functions of retailing-Characteristics of retailing – Types of retailing - Store retailing – non -store retailing.
Unit 3	**RETAIL LOCATION FACTORS** Retailing location factors- Branding in retailing -Private labelling-franchising concept.
Unit 4	**COMMUNICATION TOOLS USED IN RETAILING** Communication tools used in retailing- Sales promoting-tailing -Window display.
Unit 5	**SUPPLY CHAIN MANAGEMENT** Supply chain management Definition -Importance – role of information technology in retailing .

Course Objectives	
Title	**ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
CO-1	To enable the students to understand the system of preparing financial statements for various types of organisation
CO-2	To familiarize the students with knowledge about financial reporting standards.
CO-3	To understand the preparation of financial statements for business units other than corporate undertaking and their utility.

CO-4	To understand the importance of preparation branch accounting system under different sector
CO-5	To make familiarize in the concept of partnership terms and conditions

Course Outcome	
Title	**ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
CO-1	Students would familiarize the concept branch account and its system.
CO-2	Students would understand the scope of departmental accounting.
CO-3	Enable the students to understand the scope of departmental accounting.
CO-4	Students would understand the dissolution partnership firm, dissolution accounts insolvency of partners.
CO-5	Students would prepare Indian accounting standard.IFRS-International financial reporting standards.

Syllabus	
Title	**ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
Unit 1	**Branch Accounts:** Dependent Branches - Stock and Debtors system - Distinction between Wholesale Profit and Retail Profit – Independen Branches (Foreign Branches excluded)
Unit 2	**Departmental Accounts:** Basis of Allocation of Expenses Calculation of Profit - Inter-departmental Transfer at cost or Sellin Price.

Unit 3	**Partnership Accounts:** Admission of a Partner – Retirement of a Partner – Death of a Partner.
Unit 4	**Partnership Accounts:** Dissolution of a Partnership Firm – Insolvency of a Partner – Insolvency of all Partners- Piecemeal Distribution of cash in case of Liquidation of Partnership Firm.
Unit 5	**Accounting Standards for financial reporting** Objectives and uses of financial statements for users-Role of accounting standards- Development of accounting standards in India- Requirements of international accounting standards - Role of developing IFRS- IFRS adoption or convergence in India- Implementation plan in India- Ind AS- Difference between Ind AS and IFRS.

Course Objectives	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**CZ22B**
CO-1	To make the students to understand the basic concepts of management.
CO-2	To prepare the students to know about the significance of the management in Business.
CO-3	Learn to take decision making own.
CO-4	To make students to know how management will apply the planning and control concept in the process and projects.
CO-5	To make the students to understand the controlling capacity in different functional areas of the concern

Course Outcome	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**CZ22B**

CO-1	Students able to develop knowledge and evolution of management thoughts.
CO-2	Students would able to better understanding of planning and decision making.
CO-3	Students able to give an idea about organisation structure and different types of organisation.
CO-4	Students would able to provide idea about motivation, importance of communication and leadership.
CO-5	Students would able to understand the principles of co-ordination.

Syllabus	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**CZ22B**
Unit 1	**Introduction** Definition – Importance – Nature and Scope o Management – Process of Management - Role and functions o Managers - Levels of Management Scientific Managemer Contributions to Management by different Schools of thought.
Unit 2	**Planning** Nature – Importance -Types of Planning - Steps in planning - Objectives of Planning – Policies - Decision making Process-Types of Decisions. HRM- Meaning, -Nature and scope of HRM.
Unit 3	**Organization** Meaning and Types of organizations - Principles – Formal and Informal organization - Organisation Structure – Span of Control – Departmentalization – Basis - Meaning and Importance of Departmentalization. Policies - Meaning and Types – Procedures - Forecasting.
Unit 4	**Authority and Responsibility** Authority – Definition – Sources Limitations – Difference between Authority and Responsibility Delegation of Authority – Meaning – Principles and importance Centralization Vs Decentralization- Leadership & Communication.

Unit 5	**Direction Co-ordination & Control** Direction – Nature - Purpose. Co-ordination – Need – Types and Techniques – Requisites for Excellent Co-ordination. Controlling – Meaning – Importance – Control Process.

Course Objectives	
Title	**INDIAN ECONOMY**
Course Code	**CZ32A**
CO-1	To have the fundamental knowledge of Economic Developments.
CO-2	To teach the Economic problems and five year Plans.
CO-3	To provide understanding of core economic terms, concepts and theories.
CO-4	To prompt students to have economic way of thinking.
CO-5	To indue critical thinking skills without the contest of subject matter of economics.

Course Outcome	
Title	**INDIAN ECONOMY**
Course Code	**CZ32A**
CO-1	After completion of the syllabus students well versed with the features of Indian economy and known the five year plans.
CO-2	Understand the aspects of Indian economy.
CO-3	Develop a perspective on the different problems and approaches to economic planning and development of INDIA.
CO-4	Understand the role of the Indian economy in the global context and how different factors have effected this process.
CO-5	Not only be aware of the economy as a whole, sources of revenue, how the state government finance its programmes and projects.

Syllabus	
Title	**INDIAN ECONOMY**
Course Code	**CZ32A**
Unit 1	Economic Growth and Economic Development- Transition on Indian Economy-Indian Economy from 1950 - Indicators of economic development- National Income- Basic Concepts and computation of national income.
Unit 2	Major problems of Indian Economy- Human Development Index. Present Scenarios of population, unemployment, Poverty and inequality. Demographic trends in Population. Measures to control the population-Foreign trade
Unit 3	Agriculture: Contribution to economic development- Green Revolution- Organicfarming- Food policy and Public distribution system.
Unit 4	Industry- Role of industries in economic development-Large scale industries and small scale industries- New Economic Policy 1991- Industrial development before and after globalization in India.
Unit 5	Five year plans in India- Achievement and strategy and failures- Nidhi Aayog.

Course Objectives	
Title	**TREASURY MANAGEMENT**
Course Code	**CB22A**
CO-1	To facilitate the students to know the concept of Treasury Management.
CO-2	To enable the students to understand the mechanism of Treasury Management.
CO-3	Understand what EDI is and issues involved in its implementation.

CO-4	Understand the benefits to applying the internet to e-commerce.
CO-5	Understand how treasury managers use information technology to make better financial decisions.

Course Outcome	
Title	**TREASURY MANAGEMENT**
Course Code	**CB22A**
CO-1	The students will be able to understand the concept of Treasury Management.
CO-2	To consolidation of funds of the national public budget in the TSA.
CO-3	To upgrading of business processes in the State Treasury.
CO-4	Enhancing the process of public funds management.
CO-5	New possibilities in the course of budget execution.

Syllabus	
Title	**TREASURY MANAGEMENT**
Course Code	**CB22A**
Unit 1	**INTRODUCTION** Asset Liability Management – Objective-Concept – Risk Management-interest rate Risk.
Unit 2	**TREASURY MANAGEMENT** Concept of Treasury Management-Deployment of Statutory/Surplus funds-Need for Specialized approach in the Bank-Role and Functions of Treasury Department.
Unit 3	**MONEY MARKET** Domestic Money Market – Source of funds – Capital – Reserves- SLR-CRR-Surplus cash- Market Players.
Unit 4	**SECURITIE** Money Market Instruments and Players – Government Securities – Treasury Bill- CP-CD- Call Money Banks and Specified Institutions.

Unit 5	**FOREIGN TREASURY MANAGEMENT** Foreign Currency Market – Combined Treasury Management-RBI and Regulatory Functions.

Course Objectives	
Title	**CORPORATE ACCOUNTING – I**
Course Code	**CZ23A**
CO-1	To make the students familiarize with corporate accounting procedures
CO-2	To enable the students to acquire conceptual knowledge about the preparation of the company accounts.
CO-3	Learn the accounting procedures of corporate undertaking and their financial statement preparations
CO-4	Learn the entire process of issues of share under different price level
CO-5	To familiarize with the concept and preparation of accounts under insurance company

Course Outcome	
Title	**CORPORATE ACCOUNTING – I**
Course Code	**CZ23A**
CO-1	To provide the knowledge of issue of shares and debentures along with regulation of companies act.
CO-2	To give an exposure to the company final accounting.
CO-3	To understand the methods of valuation of goodwill in corporate sectors.
CO-4	Keep them aware about accounts of insurance company.

CO-5	To provide knowledge regarding how to underwrite shares and debenture along with redemption concept in corporate sector.

Syllabus	
Title	**CORPORATE ACCOUNTING – I**
Course code	
Unit 1	**Share Capital** Issue of Shares - Types of Shares – Forfeiture of Shares- Reissue of Shares- Redemption of Preference Shares.
Unit 2	**Debentures & Underwriting** Issue of Debentures – Redemption of Debentures- Profit prior to incorporation. Underwriting of Shares & Debentures.
Unit 3	**Final Accounts** Final Accounts - Preparation of Profit & Loss account and Balance sheet- Managerial Remuneration.
Unit 4	**Valuation of Goodwill & Shares** Valuation of Goodwill & Shares – Meaning – Methods of valuation.
Unit 5	**Accounting for Insurance Companies** Insurance Accounts- Type inal accounts of Life Insurance- Profit determination of Life Insurance

Course Objectives	
Title	**BUSINESS LAWS**
Course Code	**CZ23B**

CO-1	To highlight the Provisions of Law governing the General Contract and Special Contract.
CO-2	To enable the students to understand the Legal Remedies available in the Law to the Business and other People.
CO-3	To highlights the Contemporary Issues in Business Law as per latest company act.
CO-4	To gain knowledge on sales of goods act
CO-5	To gain knowledge on legal term used in business.

Course Outcome	
Title	**BUSINESS LAWS**
Course Code	**CZ23B**
CO-1	Apply the basic concept of business law.
CO-2	To enable the students to understand the legal forms of offer acceptance and consideration.
CO-3	To conclude about the agreement become enforceable when it fulfills certain condition.
CO-4	am to understand the legal remedies available in the law
CO-5	gaining knowledge about the importance and other people.

Syllabus	
Title	**BUSINESS LAWS**
Course Code	**CZ23B**
Unit 1	Indian Contract Act -Formation-Nature and Elements of Contract – Classification of Contracts- Contract Vs Agreement.
Unit 2	Offer – Definition – Forms of offer – Requirements of a Valid Offer. Acceptance – Meaning - Legal rules as to a Valid Acceptance.

	Consideration – Definition – Types - Essentials. Capacity of Parties – Definition – Persons Competent to contract. Free consent – Coercion – Undue Influence – Fraud – Misrepresentation - Mistake. Legality of object - Void agreements Unlawful Agreements.
Unit 3	**Performance of Contract** Performance of Contracts – Actual Performance – Attempted Performance - Tender. Quasi Contract – Definition and Essentials. Discharge of Contract - Modes of Discharge – Breach of Contract – Remedies available for Breach of Contract.
Unit 4	**Sale of Goods Act** Sale – Contract of Sale – Sale Vs Agreement to Sell – Meaning of Goods – Conditions and Warranty – Caveat Emptor – Exceptions of Caveat Emptor – Buyer and Seller of Goods - Unpaid Seller – Definition – Rights of an Unpaid Seller.
Unit 5	**Contemporary Issues in Business Law** Right to Information Act, 2005 - Meaning of 'Information', 'Right to Information' 35 -Need for Right to Information. Public Information - Request for obtaining information. Grounds for rejection of information. Central Information Commission - Constitution and powers. Information Technology Act - Purpose and significance. Cyber Crimes - Types of crimes, nature and punishment Intellectual Property Law - Patent, trademark, copyright and industrial design and laws of Insurance.

Course Objectives	
Title	**Banking Theory Law and practice**
Course Code	**CZ23C**
CO-1	To facilitate the understanding of the origin and the growth of the Indian Banking System
CO-2	To understand the modern day Developments in Indian Banking Sector.
CO-3	Learn the concept of online transaction and E- banking concept in present scenari
CO-4	To gain knowledge on functioning of RBI
CO-5	To develop skills in banking sector.

Course Outcome	
Title	**Banking Theory Law and practice**
Course Code	**CZ23C**
CO-1	It helps students to know about the importance of saving liquidity and banking rules and it also helps to career in banking field.
CO-2	Helps to know about promoting price stability and also makes money at every cheaper rate.
CO-3	It gives a clear definition about online payment. it helps student to know about the advantages and disadvantages of online payment .
CO-4	Its helps to know about the security which public get from bank and also the regulations of the banks.
CO-5	Throughout the reading endorsement programme its provides all students with a broad scope of reading understanding the importance of it and it helps then to apply practically on their future

Syllabus	
Title	**Banking Theory Law and practice**
Course Code	**CZ23C**
Unit 1	**Introduction to Banking** - History of Banking- Components of Indian banking -Indian Banking System-Phases of development-Banking structure in India-Payment banks and small banks-Commercial Banking-Definition-Classification of banks. Banking System- Universal banking-Commercial Banking-functions-Role of Banks in Economic Development. Central Banking-Definition – Need-Principles- Central Banking Vs Commercial banking-Functions of Central bank.
Unit 2	**RBI** -Establishment-objective-Legal framework-Functions-SBI-Origin and History-Establishment-Indian subsidiaries-Foreign subsidiaries-Non-Banking-Subsidiaries-Personal banking-International banking- Trade Financing-Correspondent banking.Co-operative banks-Meaning and definition-Features- Co-operative banks vsCommercial banks-Structure.-**NBFC-Role of NBFC- RBI Regulations- Financial sector reforms-Sukhmoy committee 1985-Narasimham committee I and II-Prudential norms: capital adequacy norms-classification of assets and provisioning.**
Unit 3	**E-BANKING** - Meaning-Services-e-bankingandFinancialservices-Initiatives-Opportunities-Internet banking-Meaning-InternetbankingVsTraditionalbanking-Services-Drawbacks-Frauds inInternetbanking.Mobilebanking– **Anywhere Banking-Any Time Banking**- Electronic MobileWallets. ATM-Evolution -Concept- Features - Types-. Electronicmoney-Meaning-Categories-Meritsofe-money-ElectronicFunds Transfer (EFT)system - Meaning- Steps–Benefits- Monetary policies- final sector reforms- sakmoy chakrevarthy commmittee 1985-Narasiman Committee I & II- prudential norms capital adequacy norms- classification of assets & provisionary meaning- Structure

	of Interest rates (short and long term)-impacts on saving and borrowings.
Unit 4	**Bank Account** -Opening – Types of Accounts-FDR-Steps in opening Account-Saving vs Current Account- 'Donatio Mortis Causa' - Passbook-Bank Customer Relationship-Special Types of currents-KYC norms. Bank Lending – Lending Sources-Bank Lending Principles-Forms of lending-Loan evaluation process-securities of lending- Factors influencing bank lending – Negotiable Instruments –Meaning –Characteristics-Types. Crossing – Definition –Objectives-Crossing and negotiability-Consequences of Crossing.
Unit 5	**Endorsement** -Meaning-Components-Kinds of Endorsements-Cheques payable to fictitious person- Endorsement by legal representative –Negotiation bank-effect of endorsement-Rules regarding endorsement.Paying banker- Banker's duty-Dishonoring of Cheques-Dischargeof paying banks-Payments of a crossed cheque payment. Collecting bankers-Statutory protection under section 85-Refusal of cheques Payment. Collecting Banker-Statutory protection under section 131- Collecting bankers' duty – RBI instruction –Paying Banker Vs Collecting Banker- Customer grievances-Grievance redressal –Banking Ombudsman.

Course Objectives	
Title	**MARKETING OF BANKING SERVICES**
Course Code	**CB23D**
CO-1	To facilitate the students to understand the importance and the

	relevance of marketing in to- day's Business world
CO-2	To facilitate the students to understand the importance and the relevance of marketing in to- day's Business world
CO-3	To understand the basic concepts of Marketing, Market Segmentation, Marketing Mix and Recent trends in Marketing.
CO-4	To enable the features of the Indian marketing
CO-5	To facilitate understanding relevance and need of e-marketing.

Course Outcome	
Title	**MARKETING OF BANKING SERVICES**
Course Code	**CB23D**
CO-1	Student would able to understand marketing concept and environment.
CO-2	Students acquire knowledge about products and channels of distribution.
CO-3	Learn knowledge about promotion.
CO-4	Learn how to fix the product pricing and product mix.
CO-5	Students would able to know CRM concept.

Syllabus	
Title	**MARKETING OF BANKING SERVICES**
Course Code	**CB23D**
Unit 1	**INTRODUCTION** Marketing concepts and their Application to Banking Industry-Marketing Concepts and elements-Why Marketing?-Special features of Bank Marketing-Product and Service Marketing.

Unit 2	**ENVIRONMENTAL BANKING** Environmental Scanning - Assessment and Management of Competition - Macro and Micro factors influencing the market goods and services - Applicability to Banking - Banking regulation and its impact on Bank marketing strategies - Understanding competition - Identification of competition and their focus - Strategic benefits of Good competition - What makes a good competitor?.
Unit 3	**CONSUMERS ON MODERN BANKING** Customer Need Analysis and Customer Care: Customer Focus-Understanding Customer Need - Customer Care - Consumer motivation and Buying behaviour - Perception *I* behaviour-Other factors affecting buying behaviour-Decision making process-Individual and Organizational Selective exposure-Selective distortion-and effect on consumer behaviour.
Unit 4	**MARKETING & BANKING SERVICES** Market Segmentation (banking) - Product Designing - Marketing - Feedback and Review - Purpose and content of product *I* Market expansion - Mass Marketing and Marketing Segmentation - Definition of Market Segmentation - Characteristics of a Viable Market Segment-BenefitsfromMarketSegmentation-Disadvantages-MarketSegmentation Techniques for personal and corporate customers.
UNIT V:	**MIR** Market information Research- Definition of Marketing Research and Market Research- Differences - Contributions of Marketing Research to a Bank - Types of data - Primary and Secondary-Management Information System and Marketing Research-Need for situation analysis - Steps involved in the development of a Situation Analysis - objective, strategies and tacticssources of information for situation analysis.

Course Objectives	
Title	**BUSINESS STATISTICS**

Course Code	**CZ33A**
CO-1	To Facilitate Understanding Relevance and Need Of Statistics in Current Scenario.
CO-2	To Customize the Importance of Business Statistics for the Commerce Students.
CO-3	To provide students with the skills of drafting research proposal.
CO-4	Develop students skills in data collection, analysis and hypothesis testing.
CO-5	To improve students skills and knowledge in writing and presenting research projects.

Course Outcome	
Title	**BUSINESS STATISTICS**
Course Code	**CZ33A**
CO-1	Enable the students to understand the statistics and its Application.
CO-2	Students would be able to use summary statistics to describe data.
CO-3	Students would be able to use probability theory and probability distributions in decision making.
CO-4	Students would understand the sampling theory and sampling distribution.
CO-5	Students would understand the Chi square analysis and its practical implication.

Syllabus	
Title	**BUSINESS STATISTICS**
Course Code	**CZ33A**
Unit 1	**INTRODUCTION**

	Meaning and Definition of Statistics- Collection and Tabulation of Statistical Data- Presentation of Statistical Data-Graphs and Diagrams .
Unit 2	**MEASURES OF CENTRAL TENDENCY AND MEASURES OF VARIATION** Measures of Central Tendency- Arithmetic Mean, Median, Mode, Harmonic Mean and Geometric Mean. Measures of Variation- Standard Deviation -Mean Deviation- Quartile Deviation- Skeweness and Kurtosis- Lorenz Curve .
Unit 3	**CORRELATION AND REGRESSION ANALYSIS** Simple Correlation-Scatter Diagram- Karl Pearson's Correlation- Spearman's Rank Correlation- Regression- Meaning-Linear Regression.
Unit 4	**TIME SERIES** Analysis of Time Series-Causes of Variation in Time Series Data - Components of Time Series- Additive and Multiplicative Models- Determination of Trend By Semi Average, Moving Average and Least Square(Linear Second Degree And Exponential) Methods- Computation of Seasonal Indices By Simple Average, Ratio to Moving Average, Ratio to Trend and Link Relative Methods
Unit 5	**INDEX NUMBERS** Meaning and Types of Index Numbers-Problems in Construction of Index Numbers- Methods of Construction of Price and Quantity Indices- Test of Adequacy- Errors in Index Numbers- Chain Base Index Numbers- Base Shifting -Splicing -Deflation -Customer Price Index and Its Uses- Statistical Quality Control

Course Objectives	
Title	**ADVANCED CORPORATE ACCOUNTING**

Course Code	**CZ24A**
CO-1	To provide the students with an understanding of accounting procedure for corporate restructuring.
CO-2	TomakethestudentsunderstandtheapplicationsofAccountingTransactions in Corporate Sector.
CO-3	Apply the concept and legal rules of amalgamation, reconstruction and liquidation process of company.

Course Outcome	
Title	**ADVANCED CORPORATE ACCOUNTING**
Course Code	**CZ24A**
CO-1	Student would able to understand amalgamation, absorption and External reconstruction.
CO-2	Student would aware about preparation of final accounts in banking sectors as per schedules.
CO-3	Students would able to families with the liquidation process of company.
CO-4	Students would able to introduce and develop the knowledge of holding company accounts as per schedule.
CO-5	Students would compute the internal reconstruction.

Syllabus	
Title	**ADVANCED CORPORATE ACCOUNTING**
Course Code	**CZ24A**
Unit 1	**Internal Reconstruction** Meaning - Alteration of share capital – Accounting Procedures.
Unit 2	**Amalgamation, Absorption & External Reconstruction** Meaning- Amalgamation in the nature of Merger, Purchase -

	External Reconstruction – Applicability of AS 14- Calculation of Purchase consideration (all methods) – Journal Entries in the books of Transferor and Transferee Companies, Revised Balance Sheet (excluding inter - company holdings)
Unit 3	**Liquidation** Meaning – Preparation of Liquidator's Final Statement of Accounts – Calculation of Liquidator Remuneration.
Unit 4	**Consolidation** Holding Company –Subsidiary company - Meaning – Preparation of Consolidated Final Statement of Accounts.
Unit 5	**Accounting For Banking Companies** Bank accounts - Concept of Non-Performing Assets (NPA)-Preparation of Profit and Loss Account - Asset classification - Preparation of Balance Sheet.

Course Objectives	
Title	**CUSTOMER RELATIONSHIP MANAGEMENT IN BANKS**
Course Code	**CB24B**
CO-1	To impart skill based knowledge of Customer Relationship Management.
CO-2	To understand the concepts and principle of CRM.
CO-3	To understand the need and importance of maintaining a good customer relationship.
CO-4	To gain knowledge of strategic customer acquisition and retention techniques in CRM.
CO-5	To tech the conceptual aspects of service quality.

Course Outcome	
Title	**CUSTOMER RELATIONSHIP MANAGEMENT IN BANKS**
Course Code	**CB24B**
CO-1	The students will be able to understand the concepts and principles of CRM and the conceptual aspects of service quality
CO-2	To formulate a successful CRM strategy.
CO-3	To inspect customer equity and customer analytics in CRM strategy.
CO-4	To demonstrate written proficiency.
CO-5	To apply essential knowledge and interpersonal skills to work effectively as a team.

Syllabus	
Title	**CUSTOMER RELATIONSHIP MANAGEMENT IN BANKS**
Course Code	**CB24B**
Unit 1	**UNDERSTANDING CUSTOMERS** Goals requiring CRM in Banks-CRM opportunities and challenges in Banks- Customer information Database – Customer Profile Analysis – Customer perception- Expectations analysis – Customer Behavior in relationship perspectives; individual and group customers – Customer life time value – Selection of Profitable customer segments
Unit 2	**CRM STRUCTURES** Elements of CRM – CRM Process – Strategies for Customer acquisition in banks – Retention and Prevention of defection in banks– Models of CRM – CRM road map for business applications in banksBenefits of CRM to banks.
Unit 3	**CRM PLANNING AND IMPLEMENTATION** Strategic CRM planning process – Implementation issues – CRM Tools- Analytical CRM – Operational CRM – Collaborative CRM -Call centre management – Role of CRM Managers – CRM Implementation Road Map- Developing a Relationship Orientation

	– Customer-centric Marketing Processes – Customer retention plans
Unit 4	**SERVICE QUALITY** Concept of Quality – Meaning and Definition of Service Quality - Factors influencing customer expectations and perceptions – Types of Service Quality – Service Quality Dimensions – Service Quality Gaps – Measuring Service Quality – Service Quality measurement Scales-Quality circles in Banks-Nature and Types of Customer - Customer Service Committees - Talwar, Goiporia. Damodaran Committee and such other committees's recommendations- Customer Service Committee, Customer Day - Complaint Redressed Methods- Copra Forum – Ombudsman.
Unit 5	**TRENDS IN CRM** **e CRM-** CRM Solutions – Data Warehousing – Data mining for CRM – CRM software packages – The Technological Revolution: Relationship Management – Changing Corporate Cultures.

Course Objectives	
Title	**FINANCIAL SERVICES**
Course Code	**CZ24C**
CO-1	To enable the students to understand the world of financial services.
CO-2	To facilitate the understanding of the various Financial Services.
CO-3	On the completion of modules, the students will understand the various financial services.
CO-4	To acquire the knowledge of money market.
CO-5	To enable the students to gain knowledge of SARFAESI act 2002.

Course Outcome	
Title	**FINANCIAL SERVICES**
Course Code	**CZ24C**
CO-1	To understand the operation and structure of different financial institutions.
CO-2	Describe various types of insurance contracts and their user in financial services in merchant banking.
CO-3	describe the factors clients dispositions towards risk and identify appropriate strategies' to pursue money market and stock exchange.
CO-4	Identify the factors that affect interest rates mechanics of consumer finance.
CO-5	Analyses the venture capital credit rating process and pension fund.

Syllabus	
Title	**FINANCIAL SERVICES**
Course Code	**CZ24C**
Unit 1	**Introduction** Financial Services - Concept - Objectives - Functions - Characteristics - Financial Services Market - Concept - Constituents - Growth of Financial Services in India - Financial Services Sector Problems - Financial Services Environment - The Forces - Players in Financial Markets
Unit 2	**Merchant Banking and Public Issue Management** Definition - Functions - Merchant Bankers Code of Conduct - Public Issue Management - Concept - Functions - Categories of Securities Issue - Mechanics of Public Issue Management - Issue Manager - Role of issue Manager - Marketing of Issue - New Issues Market Vs Secondary Market.
Unit 3	**Money Market and Stock Exchange** Characteristics - Functions -

	Indian Capital Market - Constituents of Indian Capital Market - New Financial Institutions and Instruments - Investor Protection - Stock Exchange - Functions - Services - Features - Role - Stock Exchange Traders -Regulations of Stock Exchanges - Depository - SEBI - Functions and Working.
Unit 4	**Leasing and Factoring and Securitisation** Characteristics - Types - Participants - Myths about Leasing - Hire Purchase – Lease Financing Vs Hire Purchase Financing - Factoring - Mechanism - Functions of a Factor - Factoring - Players- Types - Operational Profile of Indian Factoring - Operational Problems in Indian Factoring - Factoring Vs bills Discounting - Securitisation of Debt- Parties involved- Steps of securitisation - Types of securitisation- Advantages- Limitations – SARFAESI Act 2002- Background- Purpose of the Act- Main provisions
Unit 5	**Venture Capital, credit rating and pension Fund** Origin and Growth of Venture Capital - Investment Nurturing Methods - Mutual Funds - Portfolio Management Process in Mutual Funds - Credit Rating System - Growth Factors - Credit Rating Process - Global and Domestic Credit Rating agencies - Pension Fund - Objectives - Functions - Features - Types - Chilean Model - Pension Investment Policy - Pension Financing.

Course Objectives	
Title	**INDIRECT TAXATION**
Course Code	**CZ24D**
CO-1	To facilitate the students to gain knowledge of the principles of Indirect Taxation.
CO-2	To enable the students to gain knowledge of Goods and Services (GST)
CO-3	To highlight the students about customs duty.
CO-4	The students will be able to understand the concepts of Indirect taxation, types and Assessment procedures
CO-5	To enable the students to gain knowledge of GST audit and tax.

Course Outcome	
Title	**INDIRECT TAXATION**
Course Code	**CZ24D**
CO-1	A tax is a compulsory charge imposed by government.
CO-2	Goods to serve tax that are CGST,SGST,IGST, UGST
CO-3	GST Assessment procedure its self-assessment.
CO-4	GST Audit is enabling to turnover based audit.
CO-5	Custom duty is a tax imposed on import and export of goods.

Syllabus	
Title	**INDIRECT TAXATION**
Course Code	**CZ24D**
Unit 1	History and Objectives of Taxation – Tax System in India- Direct & Indirect Taxes – Meaning and Types – Powers of Union and State to levy taxes. **Constitutional Amendments leading to introduction of GSTand their importance**
Unit 2	Background behind implementing GST- The need for GST- objectives of GST- Business impact- Benefits of GST-SGST- CGST and IGST- Taxes covered by GST- Definitions - Scope and Coverage Scope of supply- Levy of tax- Rate Structure- Taxable Events. **Types of Supplies – Composite and Mixed Supplies – CompositionLevy.**
Unit 3	Return- Refunds- Input Tax Credit- Reverse charge Mechanism Transitional Provisions composition under GST- Administrativ structure of GST-Officers as per CGST Act- Officers as per SGST Ac Jurisdiction- Appointment Powers. **Relevance of Cro Empowerments**
Unit 4	Assessment and Audit under GST- Demands and Recovery- Appeals and revision- Advance ruling Offences and Penalties. **National Anti-Profiteering Authority – GST Practitioners – eligibility and Practiceand Career avenues**
Unit 5	The custom duty- Levy and collection of customs duty- Organisation of custom departments- Officers of customs- powers- Appella Machinery- Infringement of the Law-Offences and Penaltie

	Exemptions from duty customs duty draw back- duties free Zone **Export incentive schemes**

Course Objectives	
Title	**INTERNATIONAL ECONOMICS**
Course Code	**CZ34B**
CO-1	To teach the International Economics
CO-2	To acquire the knowledge 0f Export Import.
CO-3	To know about International Economic Organizations and its Functions.
CO-4	To enable students understand basic and theories of international trade.
CO-5	To know various international financial institutions structure and functions.

Course Outcome	
Title	**INTERNATIONAL ECONOMICS**
Course Code	**CZ34B**
CO-1	Equip the students to have the thorough knowledge of International Economics.
CO-2	Show the benefits of international trade in the way how nations with the strong international trade theories.
CO-3	Understand the world trade financial organisation objectives, structures of working IMF, WTO, ADB, IBRD, IFA

CO-4	Show the importance of maintaining equilibrium in the balance of payment and suggest suitable measures to correct disequilibrium as well.
CO-5	Students are awareness of Indian patent law latest amendment and non-patent articles.

Syllabus	
Title	**INTERNATIONAL ECONOMICS**
Course Code	**CZ34B**
Unit 1	International Trade – Importance of International Trade, Theories of Foreign Trade:- Theories of Adam Smith, Ricardo, Haberler‟sHechsher -Ohlin
Unit 2	Balance of Trade, Balance of Payment – Concepts – Causes of Disequilibrium, Methods to Correct Disequilibrium – Fixed and Floating Exchange Rates – Euro – Dollar Marketing (An Over View)
Unit 3	Export Management – Export Procedure and Documents – Export Finance – Export Promotion – Export Pricing
Unit 4	International Economic Organizations and its Functions IMF, IDA, IFA, IBRD, ADB, UNCTAD, UNIDO
Unit 5	WTO and Trade Liberalization – Liberalization of Trade in Manufacturing and in Agricultural Trade – TRIPS, TRIMS – Indian Patent Law

Course Objectives	
Title	**ENVIRONMENTAL STUDIES**
Course Code	**ENV4B**
CO-1	To develop an understanding of the process of eco system function.
CO-2	To understand the process of recycling.

CO-3	To enable the students of knowledge of renewable and non-renewable resources.
CO-4	To develop the functions of preventing the pollution.
CO-5	To acquire knowledge of the bio-diversity of the environmental surroundings.

Course Outcome	
Title	**ENVIRONMENTAL STUDIES**
Course Code	**ENV4B**
CO-1	To enable the students to acquire knowledge of solving environmental problems
CO-2	Understand and evaluate the global scale of environmental problems.
CO-3	Demonstrate the awareness and values of ecological processes and communities.
CO-4	To enable the students to approach to know about the environmental issues with a focus sustainability.
CO-5	To give a exact way of ability to integrate the discipline and field of environmental concern.

Syllabus	
Title	**ENVIRONMENTAL STUDIES**
Course Code	**ENV4B**
Unit 1	**INTRODUCTION TO ENVIRONMENTAL STUDIES** Multidisciplinary nature of environmental studies; Scope and importance; concept of sustainability and sustainable development.
Unit 2	**ECOSYSTEM (2 LECTURES)** What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem:

	Food chains, food webs and ecological succession, Case studies of the following ecosystem: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystem (ponds, stream, lakes, rivers, ocean, estuaries)
Unit3	**NATURAL RESOURCES : RENEWABLE AND NON – RENEWABLE RESOURCES (6 LECTURES)** Land resources and landuse change: Land degradation, soil erosion and desertification. Deforestation : Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water : Use and over –exploitation of surface and ground water, floods, droughts, conflicts over water (international and inter-state).
Unit 4	**BIODIVERSITY AND CONSERVATION (8 LECTURERS)** Levels of biological diversity: genetics, species and ecosystem diversity, Biogeographic zones of India: Biodiversity patterns and global biodiversity hot spots India as a mega- biodiversity nation, Endangered and endemic species of India. Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservations of biodiversity: In-situ and Ex-situ Conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.
Unit 5	**ENVIRONMENTAL POLLUTION (8 LECTURERS)** Environmental pollution: types, causes, effects and controls: Air, Water, soil and noise Pollution. Nuclear hazards and human health risks Solid waste management: Control measures of urban and industrial waste Pollution case studies.
Unit 6	**ENVIRONMENTAL POLICIES & PRACTICES (8 LECTURERS)**

	Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture Environment Laws: Environment Protection Act, Air (Prevention & Control of Pollution) Act; Water (Prevention and Control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD). Nature reserves, tribal populations and rights, and human Wildlife conflicts in Indian context.
Unit 7	**HUMAN COMMUNITIES AND THE ENVIRONMENT** Human population growth, impacts on environment, human health and welfare. Resettlement and rehabilitation of projects affected persons; case studies. Disaster management: floods, earthquake, cyclone and landslides. Environmental movements : Chipko, Silent Valley, Bishnois of Rajasthan. Environmental ethics : Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies(e.g. CNG Vehicles in Delhi)
Unit 8	**FIELD WORK (6 LECTURES)** Visit to an area to document environmental assets: river / forest/ flora/ fauna etc. Visit to a local polluted site – Urban / Rural/ Industrial/ Agricultural. Study of common plants, insects, birds and basic principles of identification. Study of simple ecosystem- pond, river, Delhi Ridge etc. **(Equal to 5 Lectures)**

Course Objectives	
Title	**ELEMENTS OF COST ACCOUNTING**
Course Code	
CO-1	To make the students to know the Process of Accounting for Cost Elements.
CO-2	To understand the advantages of Costing to the Stakeholders, Workers, Creditors and the Public.
CO-3	At the end of the course students will understand the basic elements of costing
CO-4	To enable students to classify cost and to prepare cost sheet.
CO-5	To enable students to reconcile result as per cost and financial accounts.

Course Outcome	
Title	**ELEMENTS OF COST ACCOUNTING**
Course Code	
CO-1	Aimed to familiarize the concept to for cost accounting.
CO-2	Helpstogatherknowledgeonpreparationofcostsheetitspracticalpointof view.
CO-3	Accrue basic knowledge on cost accounting concept, element of cost, classification of cost, labour, various system of remuneration and incentive
CO-4	Need for material control, valuation
CO-5	To underst and the concept of overhead

Syllabus	
Title	**ELEMENTS OF COST ACCOUNTING**
Course Code	
Unit 1	**Introduction of Cost Accounting** Definition - Nature and Scope – Principles of Cost Accounting – Cost Accounting and Financial Accounting - Cost Accounting Vs Management Accounting –

	Installation of Costing System –Classification of Costs – Cost Centre – Profit Centre
Unit 2	**Cost sheet and methods of costing** Preparation of Cost Sheet. Reconciliation of Cost and Financial Accounts.- Unit Costing- Job Costing.
Unit 3	**Material Costing** Material Control – Meaning and Objectives – Purchase of Materials – Stock Levels of Materials – EOQ – Stores Records – ABC Analysis – Issue of Materials – Methods of Issue – FIFO – LIFO – HIFO – Base Stock Method – Specific Price Method – Simple and Weighted Average Method – Standard and Inflated Price Method.
Unit 4	**Labour Costing** Direct Labour and Indirect Labour – Time Keeping – Methods and Calculation of Wage Payments – Time Wages – Piece Wages – Incentives – Different Methods of Incentive Payments - Idletime – Overtime – Labour Turnover - Meaning, Causes and Measurement.
Unit 5	**Overheads Costing** Overheads – Definition – Classification – Allocation and Apportionment of Overheads – Basis of Allocation – Absorption of Overheads - Preparation of Overheads Distribution Statement – Machine Hour Rate – Computation of Machine Hour Rate.

Course Objectives	
Title	**PRACTICAL AUDITING**
Course Code	
CO-1	To make the students to understand the concept of present day Auditing Practices.
CO-2	To enable the students to gain knowledge of various techniques of Auditing.

CO-3	On the completion of syllabus students will gain in sight of the Auditing practices prevailing in the present scenario.
CO-4	Students will understand the general approach of audit in EDP environment.
CO-5	To study about Internal audit.

Course Outcome	
Title	**PRACTICAL AUDITING**
Course Code	
CO-1	Student would understand the basic concepts in auditing.
CO-2	Able to familiarizes the vouching terms in auditing.
CO-3	Student able to identify the duties liabilities and role play by auditor in concern.
CO-4	Student would prepare the audit report.
CO-5	Student would again knowledge in auditing and non -profit organisation.

Syllabus	
Title	**PRACTICAL AUDITING**
Course Code	
Unit 1	**Introduction** Meaning and Definition of Auditing – Distinctio between Auditing and Accounting - Objectives - Advantages an Limitations of Audit - Scope of Audit - Classifications of Audit – Audi Planning - Meaning. Audit programme – Meaning – Objectives an Contents. Audit Note Book, contents, Usefulness of Audit Note Book - Audi working NAMEs - meaning. Ownership and Custody – Test checkin and Routine checking - Meaning. Internal control – Meaning Definition – Objectives – Technique for evaluation of Internal Contro System. Internal check – Meaning - Objectives difference betwee Internal control, Internal check and Internal Audit.
Unit 2	**Vouching and Verification** Vouching – Meaning and Definitions Objectives. Trading Transactions – Audit of Ledger - Scrutinizing o ledgers – Vouching of cash Receipts and Payments - Vouching o

	outstanding Assets and Liabilities – Verification – Meaning Objectives and Process – Valuation of Assets and liabilities Distinction between Verification and Valuation.
Unit 3	**Audit and Accounting Standards** Types of Audit – Statutory Audit – Concurrent Audit – Stock Audit – Cost Audit – Secretarial Audit – CAG Audit – Management Audit. Accounting Standards – Standards on Auditing Standards on Internal Audit – Penal Provisions – Role of National Financial Reporting Authority (NFRA)
Unit 4	**Auditors and Audit Report** Appointment – Procedures – Eligibilit and Qualifications – Powers and Duties – Rotation and Removal of Auditors – Resignation of Auditors – Remuneration of Auditors - Audit report – Preparation and presentation. Auditor's Responsibilities and liabilities towards Shareholders, Board and Audit Committee. Restriction on other Services.
Unit 5	**Recent Trends in Auditing** EDP Audit – Meaning – Division auditing in EDP environment. Impact of Computerization on Aud Approach – Online Computer System Audit – Types of Onli Computer System Audit – Audit around with the Computers Procedure of Audit under EDP system- Green Audit- Introduction

Course Objectives	
Title	**INTERNATIONAL BANKING**
Course Code	
CO-1	To make the students understand the concept of International Banking structure.
CO-2	To Highlight the role of Foreign Exchange Market and its Management.
CO-3	To identify and sequence the steps that lead to a bank crash.
CO-4	To discuss risk management and money laundering activity in international banking.
CO-5	To compare and contrast regulatory and supervisory processes among central banker in industrialized nation.

Course Outcome	
Title	**INTERNATIONAL BANKING**
Course Code	
CO-1	The students will be able to understand the concepts of International Banking structure and the role of Foreign Exchange Market and its Management.
CO-2	Compare and contrast regulatory and supervisor process, central bankers in industrialized nation.
CO-3	Present the data and analysis of a case study in a logical and concise manner .
CO-4	Examine secrecy laws that are the common denominator for offshore banking.
CO-5	Identify and sequence the steps that lead to a bank crash.

Syllabus	
Title	**INTERNATIONAL BANKING**
Course Code	
Unit 1	**INTRODUCTION** International Banking Vis-à-vis Domestic Banking–Foreign Trade Financing - International Financial Transactions : Lending and Borrowing across borders.
Unit 2	**FOREIGN EXCHANGE MARKET** Rate and Currency – Exchange rate determination under Fixed Exchange Rate and Floating Exchange Rate regimes-

	Determination of Exchange Rates :Spot and Forward- Basic Exchange Arithmetic-Forward Cover and Hedging.
Unit 3	**INTERNATIONAL FINANCIAL INSTITUTIONS** Definition-Functions-WorldBank-IMF-AsianDevelopmentBank-InternationalFinancial Corporation - International Development Association.
Unit 4	**SOURCES OF EXCHANGE** Sources of Foreign Exchange – Export Earnings – Invisible Export Earnings – Role of NRI Remittances - Foreign Direct Investment - Foreign Institutional Investment - External Commercial Borrowings – Global Depository Receipts – Off shore Borrowings.
Unit 5	**EXCHANGE MANAGEMENT** Foreign Exchange Management – Composition of Foreign Exchange Reserves :Foreign Currencies-Gold and SDR – Current Account Convertibility – Capital Account Convertibility and Precautions.

Course Objectives	
Title	**FINANCIAL MANAGEMENT**
Course Code	
CO-1	To impart the basics of Financial Management for the benefit of Commerce students.
CO-2	To enable the students to know the concepts of the Investment, Financing and Working Capital.
CO-3	At the end of syllabus students will understand the basics of financial management, investing, financing and dividend decisions.
CO-4	To enable the students to familiarize with the capital structure and cost of capital.

CO-5	To advance the understanding of fundamental concepts of finance, financial market and market participants.

Course Outcome	
Title	**FINANCIAL MANAGEMENT**
Course Code	
CO-1	To learn theoretical foundation of financial management decisions.
CO-2	To families the theories of Capital structure and concept of cost of capital.
CO-3	To provide basic knowledge about working capital management.
CO-4	To evaluate feasibility of various investment options.
CO-5	Calculate contemporary measures of financial measures of performance and risk.

Syllabus	
Title	**FINANCIAL MANAGEMENT**
Course Code	
Unit 1	**Introduction** Meaning and Objectives of Financial Management – Functions of Financial Management. Finance - Sources of Financing-Role of Financial Manager in Financial Management- Financial Goals- Profit maximization Vs. Wealth maximization – Concept of Time Value of Money- Risk and Return.
Unit 2	**Capital Structure and Cost of Capital** Capital Structure- Meaning- Capital Structure Theories-Definition - Cost of Equity

	Capital – Cost of Preference Capital – Cost of Debt – Cost of Retained Earnings – Weighted Average (or) Composite cost of capital (WACC) Capital Structure – Theories of Capital Structure - Leverage concept.
Unit 3	**Dividend** Meaning – Dividend Policies – Factors affecting Dividen Payment – Provisions on Dividend Payment in Company Law – Dividend Models - Walter's Model Gordon's Model - M. M. Model – Hypothesis Model.
Unit 4	**Working Capital** Working Capital - Meaning and importance Factors Influencing Working Capital – Determining (or) Forecastin of Working Capital requirements – Working Capital Operating cycle
Unit 5	**Capital Budgeting** Capital Budgeting Process – Cash flo estimation- Payback period _ Accounting Rate of Return – Ne Present Value (NPV) – Net Terminal Value - Internal Rate of Retur – Profitability Index – Capital Budgeting under Risk- Certaint Equivalent Approach and Risk – Adjusted Discount Rate – Decisio Tree Analysis.

Course Objectives	
Title	**INCOME TAX LAW AND PRACTICE-I**
Course Code	
CO-1	To provide a detailed understanding of the various provisions of I.T. Act.
CO-2	To enable the students to about the Assessment Procedures and Tax Planning.
CO-3	To enable the students to identify the basic concepts, definition and terms related to income tax.
CO-4	To enable the students to determine the residential status of the individual and scope of total income .
CO-5	To enable the students to compute the net total taxable income of an individual.

Course Outcome	
Title	**INCOME TAX LAW AND PRACTICE-I**
Course Code	

CO-1	The students will understand the concepts of Income tax, Types of filing and computation of tax from various head.
CO-2	Students would identify the technical terms related to income tax .
CO-3	Students would determine the residential status of the individual.
CO-4	Students would compute income from salaries and house properties.
CO-5	Student would compute the net total income of an individual .

Syllabus	
Title	**INCOME TAX LAW AND PRACTICE-I**
Course Code	
Unit 1	**INTRODUCTION** Meaning of Income – Features of Income Tax – Types – Important Definitions Under the Income Tax Act – Assessee – Types – Rates of Tax – Residential Status – Scope of Total Income –Incomes Exempt from tax.
Unit 2	**INCOME FROM SALARY** Definition – Allowances – Valuation of perquisites – Deductions from Salary – Gratuity – Pension – Commutation of Pension – Leave Salary – Profits in lieu of Salary - Provident Funds – Deductions under Sec. 80.
Unit 3	**INCOME FROM HOUSE PROPERTY** Annual Value – Meaning and Computation – Deductions from Annual Value – Legal Provisions.
Unit 4	**PROFITS AND GAINS FROM BUSINESS OR PROFESSION** Income from Business or Profession – Allowable expenses – Not allowable expenses - General deductions – Provisions relating to Depreciation – Deemed Business Profits - Undisclosed incomes – Investments – Compulsory maintenance of Books of accounts – Audit of Accounts of certain persons – Special provisions for Computing Incomes on estimated basis – Computation of Income from Business or Profession.
Unit 5	**E-FILING & SUBMISSION OF RETURNS**

	E-filing – Concept – Procedure - 26AS – TDS – Traces – Filing of Return – Various Returns – Permanent Account Number (PAN) – Usage of PAN – Concept of Transfer Pricing - Fundamentals.

Course Objectives	
Title	**VALUE EDUCATION**
Course Code	
CO-1	Value are socially accepted norms to evaluate objects, persons and situations that form partandparcelofsociality.Avaluesystemisasetofconsistentvaluesandmeasures.
CO-2	Knowledge of the values are inculcated through education.
CO-3	It contributes in forming truehuman being, who are able to face life and make it meaningful.
CO-4	There are different kinds of values like, ethical or moral values, doctrinal orideo logical values, social values and aesthetic values.
CO-5	Values can be defined as broad preferences concerning appropriate coursesof action or outcomes. As such, values reflect a person's sense of right and wrong or what"ought"to be.

Course Outcome	
Title	**VALUE EDUCATION**
Course Code	
CO-1	There are representativevalueslike,"Equal rights forall","Excellencedeserves admiration".
CO-2	People should be treated with respect and dignity".
CO-3	Values tend toinfluence attitudes and behavior and help to solve common human problems.
CO-4	Values arerelatedtothe normsofaculture.

CO-5	To develop thinking in a better aspects and demoncratic way of living

Syllabus	
Title	**VALUE EDUCATION**
Course Code	
Unit 1	Value education-its purpose and significance in the present world Value system – The roleof culture and civilization – Holisticliving –balancing the outer and inner–Body,Mindand Intellectuallevel– Duties and responsibilities.
Unit 2	Salient values for life – Truth, commitment, honesty and integrity, forgiveness and love,empathy and ability tosacrifice,care,unity,and inclusiveness, Selfesteem and self confidence, punctuality – Time, task and resource management – Problem solving and decision making skills–Interpersonal and Intra personal relationship– Teamwork–Positive and creative thinking.
Unit 3	Human Rights – Universal Declaration of Human Rights– Human Rights violations–NationalIntegration–Peaceandnon-violence Dr.APJKalam'stenpoints for enlightened citizenship – Social Values and Welfare of the citizen – The role of media in value building.
Unit 4	Environment and Ecological balance–inter dependenceofallbeings–living and non-living.The bindingofman and nature–Environment conservation and enrichment.
Unit 5	Social Evils – Corruption, Cyber crime, Terrorism – Alcoholism, Drug addiction – Dowry –Domestic violence – untouchability femaleinfanticide – atrocities against women – How to tacklethem.

Course Objectives	
Title	**TECHNOLOGY IN BANKING**

Course Code	
CO-1	To make the students the understand the concept of application of Technology in Banking Sector.
CO-2	To expose the students to learn the role of Technology in Banking Sector.
CO-3	To economic logic and different concept of economics
CO-4	Factors of production and market mechanism
CO-5	To wealth of nation and international trade

Course Outcome	
Title	**TECHNOLOGY IN BANKING**
Course Code	
CO-1	The students will be able to understand the concepts of application of Technology in Banking Sector.
CO-2	To know about trade cycle , growth and welfare state
CO-3	To open economy , globalisation
CO-4	General theory of income and employment
CO-5	To know about Market structure and basic characteristics

Syllabus	
Title	**TECHNOLOGY IN BANKING**
Course Code	
Unit 1	**INTRODUCTION** Different approaches to Banking Computerization – historical perspective – technology adoption in banks : Rangarajan Committee I & II – Saraf Committee, Narasimhan Committee and Vasudevan Committee – CVO directives – RBI initiatives - WAN, LAN, VSAT, Networking system – Single Window Concept – Bank branch network applications – Intranet – internet – other services – corporate internet – Any where Banking – Any time Banking-Home BankingInternet Banking-Online enquiry and update facilities - PIN-ATM Card-Debit Card-Smart Card- Credit Card.

Unit 2	**ELECTRONIC BANKING** Meaning - Services - e-banking and Financial services - Initiatives - Opportunities - Internet banking - Meaning - Internet banking Vs Traditional banking - Services - Drawbacks - Frauds in Internet banking. Core banking solutions (CBS) - Mobile banking - Meaning - Features - Services - Security issues - Electronic Mobile Wallets. ATM - Evolution - Concept - Features - Types - Mechanism - Functions. Electronic money - Meaning - Categories - Merits of e-money - Electronic Funds Transfer (EFT) system - Meaning - Steps - Benefits. Signature storage and Display by Electronic Means- Document Handling System and Document Storage and Retrieval System.
Unit 3	**ELECTRONIC BANKING SERVICES** E – Payments and settlements – payment gateways - Electronic Fund Transfer - SWIFT - Electronic Clearing System - Debit and Credit Clearing RBI-Netdata-Net Bank wire.
Unit 4	**TECHNOLOGY IN BANK** Impact of Technology on its employees - Customer services - Management control.
Unit 5	**MODERN TECHNOLOGY IN BANKING** Protecting - Confidentiality and Secrecy of Data - Cyber laws and its implications: information technology Act 2000 – legal frame work – preamble – salient provisions – exceptions – other statues of relevance – the Prevention of Money Laundering Act (PMLA), 2002 – payments and settlements systems Act, 2007 – RBI guidelines.

Course Objectives	
Title	**MANAGEMENT ACCOUNTING**
Course Code	
CO-1	To enable the students to get knowledge about the various techniques of Management Principles.
CO-2	To make the students to get practical skill in solving management problems.
CO-3	Understand the primary purpose of management accounting namely financial statement analysis and budgetary control
CO-4	Develop and apply budget for planning and controlling purpose.
CO-5	To enable students to classify cost and to prepare cost sheet

Course Outcome	
Title	**MANAGEMENT ACCOUNTING**
Course Code	
CO-1	Helps to understand the basic concept of managerial principle techniques.
CO-2	Help to analyse financial statement.
CO-3	To evaluate financial position of company by using ratio analysis.
CO-4	Fund flow statement helps to schedule working capital changes in business concern.
CO-5	Evaluate cash inflow or outflow in business operations.
CO-6	Describe various budgets in several departments.
CO-7	To inculcate capital budget and to identify best investment proposal.

Syllabus	
Title	**MANAGEMENT ACCOUNTING**
Course Code	
Unit 1	**Introduction** Management Accounting - Meaning- Scope- Importance- Limitations - Management Accounting Vs Cost Accounting – Management Accounting Vs Financial Accounting.
Unit 2	**Financial Statement Analysis** Analysis and Interpretation of Financial Statements – Nature and Significance – Types of Financial Analysis – Tools of Analysis – Comparative Statements – Common size Statement – Trend Analysis.
Unit 3	**Ratio Analysis** Meaning – Advantages – Limitations – Types of Ratios – Liquidity Ratios – Profitability Ratios Turnover Ratios – Capital Structure Ratios – Leverage Ratios – Calculation of Ratios.
Unit 4	**Fund Flow Analysis & Cash Flow Analysis** Introduction, Meanin of Funds Flow Statement-Ascertainment of flow of funds- Techniqu of preparing funds flow statement- Schedule of Changes in Workin Capital- Adjusted Profit and Loss account-Funds Flow Statemer Meaning of Cash Flow Statements – Advantages – Limitations Preparation of Cash Flow Statement – Types of Cash flows Operating, Financing and Investing Cash flows.
Unit 5	**Budgetary Control & Marginal Costing** Budgetary Control Meaning – Preparation of various Budgets – Cash Budget - Flexibl Budget – Production Budget – Sales Budget. Capital Expenditur Control - Application of Marginal Costing in Decision Making Make or Buy –Shut down or Continue – Exploring New Markets.

Course Objectives	
Title	**ENTREPRENEURIAL DEVELOPMENT**

Course Code	
CO-1	To enable the students to understand the concept of Entrepreneurship and to learn the professional behavior expected of an entrepreneur.
CO-2	To identify significant changes and trends which create business opportunities and to analyze the environment for potential business opportunities.
CO-3	To provide conceptual exposure on converting idea to a successful entrepreneurial firm.
CO-4	On completion of syllabus student will understand on the basic concepts of entrepreneurship and business opportunities to familiars with knowledge about business and project reports for starting a new ventures on team based
CO-5	To make people learn compliance with law

Course Outcome	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	
CO-1	Students could able to understand the concept of entrepreneur.
CO-2	Help to identity project and feasible analysis.
CO-3	Students understand government policy for young entrepreneur.
CO-4	Gain knowledge on financial literacy toward entrepreneur.
CO-5	Help to identify the different types of entrepreneur.

Syllabus	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	
CO-1	**Entrepreneurship -**Entrepreneur : Meaning of entrepreneurship –

	Types of Entrepreneurship – Traits of entrepreneurship – Factors promoting entrepreneurship- Barriers to entrepreneurship- the entrepreneurial culture- Stages in entrepreneurial process – Women entrepreneurship and economic development- SHG.
CO-2	**Developing Successful Business Ideas -**Recognizing opportunities – trend analysis – generating ideas – Brainstorming, Focus Groups, Surveys, Customer advisory boards, Day in the life research – Encouraging focal point for ideas and creativity at a firm level- Protecting ideas from being lost or stolen – Patents and IPR.
CO-3	**Opportunity Identification and Evaluation -**Opportunity identification and product/service selection – Generation and screening the project ideas – Market analysis, Technical analysis, Cost benefit analysis and network analysis- Project formulation – Assessment of project feasibility- Dealing with basic and initial problems of setting up of Enterprises.
CO-4	**Business Planning Process -**Meaning of business plan- Business plan process- Advantages of business planning- preparing a model project report for starting a new venture (Team-based project work).
CO-5	**Funding** -Sources of Finance- Venture capital- Venture capital process- Business angles- Commercial banks- Government Grants and Schemes.

Course Objectives	
Title	**INCOME TAX LAW AND PRACTICE-II**
Course Code	
CO-1	To help the students to understand the relevance and significance of Tax.
CO-2	To facilitate the students in understanding the various Provisions I.T. Act.
CO-3	To enable students to identify the basic concept
CO-4	To enable the students to compute the net total taxable income
CO-5	To enable the students to compute income under various heads

Course Outcome	
Title	**INCOME TAX LAW AND PRACTICE-II**
Course Code	
CO-1	The students will understand the procedure for computing taxable income from different heads, clubbing of income, Setoff and carry forward of losses and Deductions applicable to an individual.
CO-2	Students would identify the technical terms related to income tax
CO-3	The students would determine the residential status of individual
CO-4	The students would compute the net total income of an individual
CO-5	Students would compute income from salaries ,house property

Syllabus	
Title	**INCOME TAX LAW AND PRACTICE-II**
Course Code	
Unit 1	**INCOME FROM CAPITAL GAIN** Capital Gain – Meaning – Short term and Long term Capital Gains – Certain Transactions not included as transfer – Cost of Acquisition – Cost of Improvement – Indexation – Capital Gain under different circumstances – Exempted Capital Gains – Computation of Capital Gains.
Unit 2	**INCOME FROM OTHER SOURCES** Computation – Grossing up – Deductions in Computing Income under the head and other related provisions.
Unit 3	**Clubbing of Incomes and Set off / Carry forward and Set – Off of losses** Clubbing of Incomes under various situations – Deemed

	Incomes – Simple Problems on clubbing of incomes – Setoff – Carry forward and set off of losses.
Unit 4	**DEDUCTIONS FROM GROSS INCOME** Permissible Deductions from Gross Total Income Sec.80C, 80CCC, 80CCCD, 80D, 80DD, 80DDB, 80E, 80G, 80GG, 80GGA, 80QQB, 80RRB, 80U. Assessment of Individual – Computation of Tax.
Unit 5	**INCOME TAX AUTHORITIES AND PROCEDURE OF ASSESSMENT** Income Tax Authorities – Powers of the Central Board of Direct Taxes (CBDT), Commissioners of Income Tax and Income Tax officers. Assessment Procedures - Self Assessment – Best Judgement Assessment – Income Escaping Assessment (Reassessment)Advance Payment of Tax – Meaning and Due dates.

Course Objectives	
Title	**PORTFOLIO MANAGEMENT**
Course Code	
CO-1	To acclimate the students on the concept of Portfolio Management.
CO-2	To facilitate the students to know the techniques of Portfolio Management.
CO-3	To improve portfolio flexibility and proficiency
CO-4	To optimal resource allocation
CO-5	To protecting earning from market hazards

Course Outcome	
Title	**PORTFOLIO MANAGEMENT**

Course Code	
CO-1	On completion of syllabus student will understand the basic concepts of Portfolio Management and the techniques of Portfolio Management.
CO-2	To identifying and evaluating potential project
CO-3	To approving future project
CO-4	To assigning project managers to the approved project
CO-5	To approving future project

Syllabus	
Title	**PORTFOLIO MANAGEMENT**
Course Code	
Unit 1	**INTRODUCTION** Portfolio - Meaning - Objectives - Terms relating to Portfolio - Securities - Risk – Return Introduction to Portfolio Management – Role of Portfolio Managers.
Unit 2	**VALUE OF MONEY** Time value- Computation of Present Value Interest Factor(PVIF), Future Value Interest Factor(FVIF), Present Value Interest Factor at an Annuity(PVIFA) - Future Value Interest Factor at an Annuity (FVIFA) Simple Problems relating to it.
Unit 3	**PORTFOLIO ANALYSIS**

	Planning – Selection – Evaluation – Revision -Various Steps involved in Protfolio Development Theories relating to Portfolio Analysis.
Unit 4	**RISK & RETURN** Interpretation of Risk & Return – Mean – Variance Analysis - B(Beta) Measures. Portfolio Diversification – Bond Valuation.
Unit 5	**NEED AND IMPORTANCE OF PORTFOLIO MANAGEMENT** Portfolio Management Vs Wealth Management – Introduction to Derivatives – Futures Options – Swaps – SEBI Regulations relating to Portfolio Operations.

Course Objectives
Title
Course Code
CO-1
CO-2
CO-3
CO-4
CO-5

Course Outcome
Title

Course Code
CO-1
CO-2
CO-3
CO-4
CO-5

Syllabus
Title
Course Code
Unit 1
Unit 2
Unit 3
Unit 4
Unit 5

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF COMPUTER APPLICATIONS

Program : Bachelor of Computer Applications

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	Computational Knowledge: Understand and apply mathematical foundation, computing and domain knowledge for the conceptualization of computing models from defined problems.
PO-2	Problem Analysis: Ability to identify, critically analyze and formulate complex computing problems using fundamentals of computer science and application domains.
PO-3	Design / Development of Solutions: Ability to transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies.
PO-4	Conduct Investigations of Complex Computing Problems: Ability to devise and conduct experiments, interpret data and provide well informed conclusions.
PO-5	Modern Tool Usage: Ability to select modern computing tools, skills and techniques necessary for innovative software solutions

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Understand the basic principles and concepts of Computer applications and integrate the knowledge gained in Computer application domain with practical needs of the society and be an ethically and socially responsible Computer Application Professional
PSO-2	Explore emerging technologies in diverse areas of Computer Application and inculcate skills for successful career, entrepreneurship and higher studies
PSO-3	Ability to apply the concepts of Computer and practices via emerging technologies and Software development tools
PSO-4	Equip themselves to potentially rich & employable field ofcomputer applications.
PSO-5	Higher studies in the area of Computer Science/Applications.

Course Objectives	
Title	**PYTHON**
Course Code	**SE21A**
CO-1	Describe the core syntax and semantics of Python programming language.
CO-2	Discover the need for working with the strings and functions.
CO-3	Illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
CO-4	Understand the usage of packages and Dictionaries.
CO-5	Represent compound data using Python lists, tuples, dictionaries, turtles, Files and modules.

Course Outcome	
Title	**PYTHON**
Course Code	**SE21A**
CO-1	Understand the principles of Python and acquire skills in programming in python
CO-2	To develop the emerging applications of relevant field using Python
CO-3	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
CO-4	Able to develop simple turtle graphics programs in Python
CO-5	Acquire Object Oriented Skills in Python

Syllabus	
Title	**PYTHON**
Course Code	**SE21A**
Unit 1	Introduction: The essence of computational problem solving – Limits of computational problem solving-Computer algorithms-Computer Hardware-Computer Software-The process of computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types.
Unit 2	Control Structures: Boolean Expressions - Selection Control - If Statement- Indentation in Python- Multi-Way Selection -- Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flags and Indefinite Loops. Lists: List Structures - Lists in Python - Iterating over lists in Python.
Unit 3	Functions: Program Routines- Defining Functions- More on Functions: Calling Value-Returning Functions- Calling Non-Value-Returning Functions- Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope.
Unit 4	Objects and their use: Software Objects - Turtle Graphics – Turtle attributes-Modular Design: Modules - Top-Down Design - Python Modules - Text Files: Opening, reading and writing text files - String Processing - Exception Handling.
Unit 5	Dictionaries and Sets: Dictionary type in Python - Set Data type. Object Oriented Programming using Python: Encapsulation - Inheritance – Polymorphism. Recursion: Recursive Functions.

Course Objectives	
Title	**PYTHON PROGRAMMING LAB**
Course Code	**SE211**
CO-1	To implement the python programming features in practical applications.
CO-2	To write, test, and debug simple Python programs.
CO-3	To implement Python programs with conditionals and loops.
CO-4	Use functions for structuring Python programs.
CO-5	Represent compound data using Python lists, tuples, dictionaries, turtles, Files and modules.

Course Outcome	
Title	**PYTHON PROGRAMMING LAB**
Course Code	**SE211**
CO-1	Understand the numeric or real life application problems and solve them.
CO-2	Apply a solution clearly and accurately in a program using Python.
CO-3	Apply the best features available in Python to solve the situational problems.
CO-4	Understand computer programming using python language
CO-5	Handle disk data file for input output operations

Syllabus	
Title	**PYTHON PROGRAMMING LAB**
Course Code	**SE211**
Unit 1	Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
Unit 2	Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria: Grade A: Percentage >=80 Grade B: Percentage >=70 and <80 Grade C: Percentage >=60 and <70 Grade D: Percentage >=40 and <60 Grade E: Percentage <40.
Unit 3	Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
Unit 4	Program to display the first n terms of Fibonacci series.
Unit 5	Program to find factorial of the given number using recursive function.
Unit 6	Write a Python program to count the number of even and odd numbers from array of N numbers.
Unit 7	Python function that accepts a string and calculate the number of

	upper case letters and lower case letters.
Unit 8	Python program to reverse a given string and check whether the give string is palindrome or not.
Unit 9	Write a program to find sum of all items in a dictionary.
Unit 10	Write a Python program to construct the following pattern, using a nested loop 1 22 333 4444 55555 666666 7777777 88888888 999999999
Unit 11	Read a file content and copy only the contents at odd lines into a new file.
Unit 12	Create a Turtle graphics window with specific size.
Unit 13	Write a Python program for Towers of Hanoi using recursion
Unit 14	Create a menu driven Python program with a dictionary for words and their meanings.
Unit 15	Devise a Python program to implement the Hangman Game.

Course Objectives	
Title	**Object Oriented Programming Concepts using C ++**
Course Code	**SU22A**
CO-1	To inculcate knowledge on Object-oriented programming concepts using C++.
CO-2	To gain Knowledge on programming with C++.
CO-3	Explore simple data types
CO-4	Discover how to use arithmetic operations
Co-5	Learn to use useful tools

Course Outcome	
Title	**Object Oriented Programming Concepts using C ++**
Course Code	**SU22A**
CO-1	Compare OOPS with other programming techniques
CO-2	Implement C++ programs with constructors and destructors
CO-3	Develop OOP involving polymorphism using operator overloading and method overloading
CO-4	Implement programs with code reusability using inheritance
CO-5	Develop Programs with file handling and templates

Syllabus	
Title	**Object Oriented Programming Concepts using C ++**
Course Code	**SU22A**
Unit 1	Introduction to C++ - key concepts of Object-Oriented Programming –Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures: - Decision Making and Statements: If .else, jump, goto, break, continue, Switch case statements - Loops in C++ : for, while, do - functions in C++ - inline functions – Function Overloading.
Unit 2	Classes and Objects: Declaring Objects – Defining Member Functions – Static Member variables and functions – array of objects –friend functions – Overloading member functions – Bit fields and classes – Constructor and destructor with static members.
Unit 3	Operator Overloading: Overloading unary, binary operators – Overloading Friend functions – type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes.
Unit 4	Pointers – Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding, Polymorphism and Virtual Functions.
Unit 5	Files – File stream classes – file modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling - String – Declaring and Initializing string objects – String Attributes – Miscellaneous functions .

Course Objectives	
Title	**C++ PROGRAMMING LAB**
Course Code	**SU221**
CO-1	To implement the various object oriented programming concepts using C++
CO-2	Creating C++ programs
CO-3	Classes and Objects in c++
CO-4	Constructor and Destructor in c++
CO-5	Handling exceptions to control error

Course Outcome	
Title	**C++ PROGRAMMING LAB**
Course Code	**SU221**
CO-1	To understand the structure and model of the C++ programming language.
CO-2	To solve problems in C++ demonstrating Object Oriented Concepts.
CO-3	Describe OOPS concept
CO-4	Use functions and pointers in your c++ program
CO-5	Understand and employ file management

Syllabus	
Title	**C++ PROGRAMMING LAB**
Course Code	**SU221**
Unit 1	Write a C++ program to demonstrate function overloading, Default Arguments and Inline function.
Unit 2	Write a C++ program to demonstrate Class and Objects
Unit 3	Write a C++ program to demonstrate the concept of Passing Objects to Functions
Unit 4	Write a C++ program to demonstrate the Friend Functions.
Unit 5	Write a C++ program to demonstrate the concept of Passing Objects to Functions
Unit 6	Write a C++ program to demonstrate Constructor and Destructor

Unit 7	Write a C++ program to demonstrate Unary Operator Overloading
Unit 8	Write a C++ program to demonstrate Binary Operator Overloading
Unit 9	Write a C++ program to demonstrate: Single Inheritance , Multilevel Inheritance , Multiple Inheritance , Hierarchical Inheritance , Hybrid Inheritance
Unit 10	Write a C++ program to demonstrate Virtual Functions.
Unit 11	Write a C++ program to manipulate a Text File.
Unit 12	Write a C++ program to perform Sequential I/O Operations on a file.
Unit 13	Write a C++ program to find the Biggest Number using Command Line Arguments
Unit 14	Write a C++ program to demonstrate Class Template
Unit 15	Write a C++ program to demonstrate Function Template.
Unit 16	Write a C++ program to demonstrate Exception Handling.

Course Objectives	
Title	**DATA STRUCTURES**
Course Code	**SZ23A**
CO-1	To understand the concepts of ADTs
CO-2	To learn linear data structures-lists, stacks, queues
CO-3	To apply Tree and Graph structures
CO-4	To understand sorting, searching and hashing
CO-5	Learning some of the common data structures

Course Outcome	
Title	**DATA STRUCTURES**
Course Code	**SZ23A**
CO-1	Implement abstract data types for linear data structures.
CO-2	Apply the different linear and non linear data structures to problem solutions.
CO-3	Critically analyze the various sorting algorithms.
CO-4	To access how the choices of data structure & algorithm methods impact the performance of program.
CO-5	To Solve problems based upon different data structure & also write programs.

Syllabus	
Title	**DATA STRUCTURES**
Course Code	**SZ23A**
Unit 1	Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementation-singly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation- All operations-Insertion-Deletion-Merge-Traversal.
Unit 2	Stack ADT-Operations- Applications- Evaluating arithmetic expressions – Conversion of infix to postfix expression-Queue ADT-Operations-Circular Queue- Priority Queue- deQueue-applications of queues.
Unit 3	Tree ADT-tree traversals-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT- Threaded Binary Trees-AVL Trees- B-Tree- B+ Tree – Heap-Applications of heap.
Unit 4	Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits-Applications of graphs.
Unit 5	Searching- Linear search-Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Shell sort-Radix sort-Hashing-Hash functions-Separate chaining- Open Addressing-Rehashing-Extendible Hashing.

Course Objectives	
Title	**JAVA PROGRAMMING**
Course Code	**SZ23B**
CO-1	To understand the concepts of Object Oriented Programming.
CO-2	To learn about the control structures, class with attributes and methods used in Java.
CO-3	Java applications and applets
CO-4	Java control flow
CO-5	Methods

Course Outcome	
Title	**JAVA PROGRAMMING**
Course Code	**SZ23B**
CO-1	Introduces object-oriented design techniques and problem solving.
CO-2	Knowledge of the structure and model of the Java programming language..
CO-3	Understand the basic principles of creating Java applications with GUI
CO-4	Demonstrate use of string and String Buffers, Develop multithreaded programs in Java.
CO-5	Describe advanced features of Java like exception handling, multi-threading etc.

Syllabus	
Title	**JAVA PROGRAMMING**
Course Code	**SZ23B**
Unit 1	Introduction to OOPS: Paradigms of Programming Languages – Basic concepts of Object Oriented Programming – Differences between Procedure Oriented Programming and Object Oriented programming - Benefits of OOPs – Application of OOPs. Java: History – Java features – Java Environment – JDK – API. Introduction to Java: Types of java program – Creating and Executing a Java program – Java Tokens- Java Virtual Machine (JVM) – Command Line Arguments –Comments in Java program.
Unit 2	Elements: Constants – Variables – Data types - Scope of variables – Type casting – Operators: Special operators – Expressions – Evaluation of Expressions. Decision making and branching statements- Decision making and Looping– break – labeled loop – continue Statement. Arrays: One Dimensional Array – Creating an array – Array processing – Multidimensional Array – Vectors – ArrayList – Advantages of Array List over Array Wrapper classes.
Unit 3	Class and objects: Defining a class – Methods – Creating objects – Accessing class members – Constructors – Method overloading – Static members –Nesting of Methods – this keyword – Command line input. Inheritance: Defining inheritance –types of inheritance– Overriding methods – Final variables and methods – Final classes – Final methods - Abstract methods and classes – Visibility Control- Interfaces: Defining interface – Extending interface - Implementing Interface - Accessing interface variables. Strings: String Array – String Methods – String Buffer Class.
Unit 4	Packages: Java API Packages – System Packages – Naming Conventions –Creating & Accessing a Package – Adding Class to a Package – Hiding Classes. Exception Handling: Limitations of Error handling – Advantages of Exception Handling - Types of Errors – Basics of Exception Handling – try blocks – throwing an exception – catching an exception – finally statement. Multithreading: Creating Threads – Life of a Thread – Defining & Running Thread – Thread Methods – Thread Priority – Synchronization –Implementing Runnable interface – Thread Scheduling.
Unit 5	I/O Streams: File – Streams – Advantages - The stream classes – Byte streams –Character streams. Applets: Introduction – Applet Life cycle – Creating & Executing an Applet –Applet tags in HTML – Parameter tag – Aligning the display - Graphics Class: Drawing and filling lines – Rectangles – Polygon – Circles – Arcs – Line Graphs – Drawing Bar charts AWT Components and Even Handlers: Abstract window tool kit – Event Handlers – Event Listeners – AWT Controls and Event Handling: Labels – Text Component – Action Event – Buttons – Check Boxes – Item Event – Choice– Scrollbars – Layout Managers- Input Events – Menus.

Course Objectives	
Title	**COMPUTER ORGANIZATION**
Course Code	**SZ23C**
CO-1	To understand the basic organization of computers and the working of each component and CPU
CO-2	To bring the programming features of 8085 Microprocessor and know the features of latest microprocessors.
CO-3	To understand the principles of Interfacing I/O devices and Direct Memory accesses
CO-4	To introduce basic concepts of Computer Organization
CO-5	To teach Assembly language of most recent processor such as Intel Pentium Processor

Course Outcome	
Title	**COMPUTER ORGANIZATION**
Course Code	**SZ23C**
CO-1	Describe the major components of a computer system and state their function and purpose
CO-2	Describe the microstructure of a processor
CO-3	Demonstrate the ability to program a microprocessor in assembly language.
CO-4	Classify and describe the operation DMA and peripheral Interfaces
CO-5	Grasp the different secondary storage devices

Syllabus	
Title	**COMPUTER ORGANIZATION**
Course Code	**SZ23C**
Unit 1	Data representation: Data types – Complements- fixed point and floating point representation other binary codes. Register Transfer and Microoperations: Register transfer language- Register transfer- Bus and Memory transfers – Arithmetic, logic and shift micro operations.
Unit 2	Central processing unit: General register and stack organizations- instruction formats - Addressing modes- Data transfer and manipulation - program control- RISC - Pipelining - Arithmetic and instruction- RISC pipeline - Vector processing and Array processors.
Unit 3	Microprocessor Architecture and its Operations - 8085 MPU - 8085 Instruction Set and Classifications. Programming in 8085: Code conversion - BCD to Binary and Binary to BCD conversions - ASCII to BCD and BCD to ASCII conversions - Binary to ASCII and ASCII to Binary conversions.
Unit 4	Programming in 8085:BCD Arithmetic - BCD addition and Subtraction - Multibyte Addition and Subtraction - Multiplication and Division. Interrupts: The 8085 Interrupt – 8085 Vectored Interrupts –
Unit 5	Direct Memory Access(DMA)and 8257 DMA controller - 8255A Programmable Peripheral Interface. Basic features of Advanced Microprocessors - Pentium - I3 , I5 and I7.

Course Objectives	
Title	**DATA STRUCTURES USING JAVA LAB**
Course Code	**SZ231**
CO-1	To implement linear and non-linear data structures
CO-2	To understand the different operations of search trees
CO-3	To implement graph traversal algorithms
CO-4	To get familiarized to sorting and searching algorithms
CO-5	Practice good documentation skills

Course Outcome	
Title	**DATA STRUCTURES USING JAVA LAB**
Course Code	**SZ231**
CO-1	Write functions to implement linear and non-linear data structure operations.
CO-2	Suggest appropriate linear and non-linear data structure operations for solving a given problem.
CO-3	Analyze various sorting methods.
CO-4	Understand the fundamentals and analysis of algorithm
CO-5	Understand and implement linear data structures

Syllabus	
Title	**DATA STRUCTURES USING JAVA LAB**
Course Code	**SZ231**
Unit 1	Write a Java programs to implement the List ADT using arrays and linked lists.
Unit 2	Write a Java programs to implement the following using a singly linked list. Stack ADT (b) Queue ADT
Unit 3	Write a java program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression (use stack ADT).
Unit 4	Write a Java program to implement priority queue ADT.
Unit 5	Write a Java program to perform the following operations:

	(a) Insert an element into a binary search tree. (b) Delete an element from a binary search tree. (c) Search for a key element in a binary search tree.
Unit 6	Write a Java program to perform the following o perations (a) Insertion into an AVL-tree (b) Deletion from an AVL-tree
Unit 7	Write a Java programs for the implementation of BFS for a given graph.
Unit 8	Write a Java programs for the implementation of DFS for a given graph.
Unit 9	Write a Java programs for implementing the following searching methods: (a) Linear search (b) Binary search.
Unit 10	Write a Java programs for implementing the following sorting methods: (a) Bubble sort (b) Selection sort (c) Insertion sort (d) Radix sort.

Course Objectives	
Title	**OPEN SOURCE TECHNOLOGIES**
Course Code	**SZ24B**
CO-1	To provide a basic idea of Open source technology, their software development process to understand the role and future of open source software in the industry along with the impact of legal, economic and social issues for such software.
CO-2	To understand the free and open source technologies
CO-3	To develop web pages using PHP and perl
CO-4	To learn various tools for developing webpages
CO-5	To develop the design of web domains

Course Outcome	
Title	**OPEN SOURCE TECHNOLOGIES**
Course Code	**SZ24B**
CO-1	To recognize the benefits and features of Open Source Technology and to interpret, contrast and compare open source products among themselves
CO-2	Understand the difference between open source software and commercial software.
CO-3	Familiarity with Linux operating system.
CO-4	Understanding and development of web applications using open source web technologies like Apache, MySql and PHP (LAMP/XAMP)
CO-5	Install and manage applications.

Syllabus	
Title	**OPEN SOURCE TECHNOLOGIES**
Course Code	**SZ24B**
Unit 1	Introduction – Why Open Source – Open Source –Principles, Standards Requirements, Successes – Free Software – FOSS – Internet Application Projects
Unit 2	Open source – Initiatives, Principles, Methodologies, Philosophy, Platform, Freedom, OSSD, Licenses – Copy right, Copy left, Patent, Zero Marginal Technologies, Income generation opportunities, Internalization
Unit 3	Case Studies – Apache, BSD, Linux, Mozilla (Firefox), Wikipedia, Joomla, GCC, Open Office.
Unit 4	Open Source Project –Starting, Maintaining –Open Source – Hardware, Design, Teaching & Media
Unit 5	Open Source Ethics – Open Vs Closed Source – Government – Ethics – Impact of Open source Technology – Shared Software – Shared Source

Course Objectives	
Title	**COMPUTER NETWORK**
Course Code	**SZ24A**
CO-1	To understand the concept of Computer network
CO-2	To impart knowledge about networking and inter networking devices
CO-3	To learn and understand networking protocols
CO-4	To learn and understand wireless technologies
CO-5	To understand network architecture

Course Outcome	
Title	**COMPUTER NETWORK**
Course Code	**SZ24A**
CO-1	Analyse different network models
CO-2	Analyse and compare a number of data link, network and transport layer
CO-3	Analysing key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI
CO-4	Become familiar with fundamental protocols
CO-5	Demonstrate basic understanding of network principles.

Syllabus	
Title	**COMPUTER NETWORK**
Course Code	**SZ24A**
Unit 1	Introduction – Network Hardware - Software - Reference Models - OSI and TCP/IP Models - Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer - Theoretical Basis for Data Communication - Guided Transmission Media.
Unit 2	Wireless Transmission - Communication Satellites - Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues - Error Detection and Correction.
Unit 3	Elementary Data Link Protocols - Sliding Window Protocols - Data Link Layer in the Internet - Medium Access Layer - Channel Allocation Problem - Multiple Access Protocols - Bluetooth.
Unit 4	Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms - IP Protocol - IP Addresses - Internet Control Protocols.
Unit 5	Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection - Simple Transport Protocol - Internet Transport Protocols (ITP) - Network Security: Cryptography.

Course Objectives	
Title	**E-COMMERCE TECHNOLOGIES**
Course Code	**SZ24C**
CO-1	To provide students with an overview and understanding of e-commerce with a specific emphasis on Internet Marketing.
CO-2	To explore the major issues associated with e-commerce-security, privacy, intellectual property rights, authentication, encryption, acceptable use policies, and legal liabilities.
CO-3	To understand the role of e-commerce in world economy
CO-4	Marketing and social impacts of e-commerce
CO-5	Finding and evaluating web hosting services

Course Outcome	
Title	**E-COMMERCE TECHNOLOGIES**
Course Code	**SZ24C**
CO-1	Obtain a general understanding of basic business management concepts.
CO-2	Have complete knowledge about basic technical concepts in E-Commerce.
CO-3	Obtain thorough understanding about the security issues, threats and challenges of E-Commerce.
CO-4	Understand the Internet Architecture and Electronic Payment System.
CO-5	Evaluate E-commerce models and identify the requirements for starting up

Syllabus	
Title	**E-COMMERCE TECHNOLOGIES**
Course Code	**SZ24C**
Unit 1	History of E-commerce and Indian Business Context: E-Commerce – Emergence of the Internet –Emergence of the WWW – Advantages of E-Commerce – Transition to E-Commerce in India – The Internet and India – E-transition Challenges for Indian Corporate. Business Models for E-commerce: Business Model – E-business Models Based on the Relationship of Transaction Parties - E-business Models Based on the Relationship of Transaction Types.
Unit 2	Enabling Technologies of the World Wide Web: World Wide Web – Internet Client-Server Applications –Networks and Internets – Software Agents – Internet Standards and Specifications – ISP. e-Marketing :Traditional Marketing – Identifying Web Presence Goals – Online Marketing – E-advertising – E-branding.
Unit 3	E-Security: Information system Security – Security on the Internet – E-business Risk Management Issues – Information Security Environment in India. Legal and Ethical Issues : Cybers talking – Privacy is at Risk in the Internet Age – Phishing – Application Fraud – Skimming – Copyright – Internet Gambling – Threats to Children.
Unit 4	e-Payment Systems: Main Concerns in Internet Banking – Digital Payment Requirements – Digital Token-based e-payment Systems – Classification of New Payment Systems – Properties of Electronic Cash – Cheque Payment Systems on the Internet – Risk and e-Payment Systems – Designing e-payment Systems – Digital Signature – Online Financial Services in India - Online Stock Trading.
Unit 5	Information systems for Mobile Commerce: What is Mobile Commerce? – Wireless Applications –Cellular Network – Wireless Spectrum – Technologies for Mobile Commerce – Wireless Technologies –Different Generations in Wireless Communication – Security Issues Pertaining to Cellular Technology. Portals for E-Business: Portals – Human Resource Management – Various HRIS Modules.

Course Objectives	
Title	**OPEN SOURCE TECHNOLOGIES LAB**
Course Code	**SZ241**
CO-1	To be aware of the various open source software available for different problem needs
CO-2	To be familiar with the usage of the software like installation and configuration
CO-3	To understand the free and open source technologies
CO-4	To learn various tools for developing web pages
CO-5	To develop web pages using PHP and perl

Course Outcome	
Title	**OPEN SOURCE TECHNOLOGIES LAB**
Course Code	**SZ241**
CO-1	Students must be able to use appropriate open source tools based on the nature of the problem
CO-2	Students should be able to code and compile different open source software
CO-3	Build application software using open source technology
CO-4	Provide solutions to reliability, security, scalability and robustness in internet
CO-5	Design of web domains

Syllabus	
Title	**OPEN SOURCE TECHNOLOGIES LAB**
Course Code	**SZ241**
Unit 1	Study and usage of Libre Office Suite – Writer, Calc& Impress
Unit 2	Text Processing with PERL
Unit 3	Simple Applications using PHP
Unit 4	Simple Applications using Python
Unit 5	Image editing using GIMP
Unit 6	Study and usage of Business Intelligence tools – BIRT,

	JMagallanes
Unit 7	Creation of network diagrams using GraphViz
Unit 8	Linux Installation
Unit 9	Software Configuration in Linux environment.
Unit 10	Version Control System using Git.

Course Objectives	
Title	**SOFTWARE ENGINEERING**
Course Code	
CO-1	To introduce the software development life cycles
CO-2	To introduce concepts related to structured and objected oriented analysis & design co
CO-3	To provide an insight into UML and software testing techniques
CO-4	Extension of software Engineering Knowledge
CO-5	Study and presentation of relevant research work

Course Outcome	
Title	**SOFTWARE ENGINEERING**
Course Code	
CO-1	The students should be able to specify software requirements, design the software using tools
CO-2	To write test cases using different testing techniques.
CO-3	To function effectively as a member of a team engaged in technical work
CO-4	To study the various perspectives on software quality and change management
CO-5	Meet the information technology program objectives of identifying and solving Engineering problems

Syllabus	
Title	**SOFTWARE ENGINEERING**
Course Code	
Unit 1	Introduction – Evolution – Software Development projects – Emergence of Software Engineering. Software Life cycle models – Waterfall model – Rapid Application Development – Agile Model – Spiral Model
Unit 2	Requirement Analysis and Specification – Gathering and Analysis – SRS – Formal System Specification
Unit 3	Software Design – Overview – Characteristics – Cohesion & Coupling – Layered design – Approaches Function Oriented Design – Structured Analysis – DFD – Structured Design – Detailed design
Unit 4	Object Modeling using UML – OO concepts – UML – Diagrams – Use case, Class, Interaction, Activity, State Chart – Postscript
Unit 5	Coding & Testing – coding – Review – Documentation – Testing – Black-box, White-box, Integration, OO Testing, Smoke testin

Course Objectives	
Title	**OPERATING SYSTEM**
Course Code	
CO-1	To understand the fundamental concepts and role of Operating System.
CO-2	To learn the Process Management and Scheduling Algorithms
CO-3	To understand the Memory Management policies
CO-4	To gain insight on I/O and File management techniques
CO-5	To impact knowledge of operating system from user and design perspectives

Course Outcome	
Title	**OPERATING SYSTEM**
Course Code	
CO-1	Understand the structure and functions of Operating System
CO-2	Compare the performance of Scheduling Algorithms
CO-3	Analyze resource management techniques
CO-4	Identify the features of I/O and File handling methods
CO-5	The course will cover an introduction on the policies for scheduling, kernel, processes, deadlocks, memory management, synchronization, system calls, and file systems.

Syllabus	
Title	**OPERATING SYSTEM**
Course Code	
Unit 1	Introduction: Views - Types of System - OS Structure – Operations - Services – Interface- System Calls- System Structure - System Design and Implementation. Process Management: Process - Process Scheduling - Inter-process Communication. CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms.
Unit 2	Process Synchronization: Critical- Section Problem - Synchronization Hardware Semaphores - Classical Problems of Synchronization - Monitors. Deadlocks: Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.
Unit 3	Memory Management: Hardware - Address Binding – Address Space - Dynamic Loading and Linking – Swapping – Contiguous Allocation - Segmentation - Paging – Structure of the Page Table.
Unit 4	Virtual Memory Management: Demand Paging - Page Replacement Algorithms - Thrashing. File System: File Concept -. Access Methods - Directory and Disk Structure - Protection - File System Structures - Allocation Methods - Free Space Management.
Unit 5	I/O Systems: Overview - I/O Hardware - Application I/O Interface - Kernel I/O Subsystem - Transforming 1/0 Requests to Hardware Operations - Performance. System Protection: Goals - Domain - Access matrix. System Security: The Security Problem - Threats – Encryption- User Authentication.

Course Objectives	
Title	**RELATIONAL DATABASE MANAGEMENT SYSTEM**
Course Code	
CO-1	Gain a good understanding of the architecture and functioning of Database Management Systems
CO-2	Understand the use of Structured Query Language (SQL) and its syntax.
CO-3	Apply Normalization techniques to normalize a database.
CO-4	Understand the need of transaction processing and learn techniques for controlling the consequences of concurrent data access.
CO-5	To learn about the history and future direction of the SQL standard

Course Outcome	
Title	**RELATIONAL DATABASE MANAGEMENT SYSTEM**
Course Code	
CO-1	Describe basic concepts of database system
CO-2	Design a Data model and Schemas in RDBMS
CO-3	Competent in use of SQL
CO-4	Analyze functional dependencies for designing robust Database
CO-5	Perform basic operation with DBMS

Syllabus	
Title	**RELATIONAL DATABASE MANAGEMENT SYSTEM**
Course Code	
Unit 1	Introduction to DBMS– Data and Information - Database – Database Management System – Objectives - Advantages – Components - Architecture. ER Model: Building blocks of ER Diagram – Relationship Degree – Classification – ER diagram to Tables – ISA relationship – Constraints – Aggregation and Composition – Advantages
Unit 2	Relational Model: CODD's Rule- Relational Data Model - Key - Integrity – Relational Algebra Operations – Advantages and limitations – Relational Calculus – Domain Relational Calculus - QBE.
Unit 3	Structure of Relational Database. Introduction to Relational Database Design - Objectives – Tools – Redundancy and Data Anomaly – Functional Dependency - Normalization – 1NF – 2NF – 3NF – BCNF. Transaction Processing – Database Security.
Unit 4	SQL: Commands – Data types – DDL - Selection, Projection, Join and Set Operations – Aggregate Functions – DML – Modification - Truncation - Constraints – Subquery.
Unit 5	PL/SQL: Structure - Elements – Operators Precedence – Control Structure – Iterative Control - Cursors - Procedure - Function - Packages – Exceptional Handling - Triggers.

Course Objectives	
Title	**OPERATING SYSTEM LAB**
Course Code	
CO-1	To learn Process management and scheduling.
CO-2	To understand the concepts and implementation of memory management policies.
CO-3	To understand the various issues in Inter Process Communication.
CO-4	To learn Unix commands and shell programming
CO-5	To implement page replacement algorithms

Course Outcome	
Title	**OPERATING SYSTEM LAB**
Course Code	
CO-1	Understand the process management policies and scheduling process by CPU.
CO-2	Analyze the memory management and its allocation policies.
CO-3	To evaluate the requirement for process synchronization.
CO-4	Implement semaphores
CO-5	Create processes and implement IPC

Syllabus	
Title	**OPERATING SYSTEM LAB**
Course Code	
Unit 1	Basic I/O programming.To implement CPU Scheduling Algorithms:
Unit 2	Shortest Job First Algorithm.
Unit 3	First Come First Served Algorithm.
Unit 4	Round Robin and Priority Scheduling Algorithms.
Unit 5	To implement reader/writer problem using semaphore.
Unit 6	To implement Banker's algorithm for Deadlock avoidance. Program for page replacement algorithms:
Unit 7	First In First Out Algorithm.
Unit 8	Least Recently Used Algorithm.
Unit 9	To implement first fit, best fit and worst fit algorithm for memory management.
Unit 10	Program for Inter-process Communication.

Course Objectives	
Title	**PL/SQL LAB**
Course Code	
CO-1	Learn the various DDL and DML commands
CO-2	Understand queries in SQL to retrieve information from data base
CO-3	Understand PL/SQL statements: Exception Handling, Cursors, and Triggers.
CO-4	Develop database applications using front-end and back-end tools.
CO-5	To learn about the basics and basic programming constructs

Title	**PL/SQL LAB**
Course Code	
CO-1	Implement the DDL , DML Commands and Constraints
CO-2	Create, Update and query on the database.
CO-3	Design and Implement simple project with Front End and Back End.
CO-4	Write PL/SQL code to interface with the database
CO-5	Use PL/SQL programming constructs and conditionally control statements

Syllabus	
Title	**PL/SQL LAB**
Course Code	
Unit 1	DDL commands with constraints.
Unit 2	DML Commands with constraints.
Unit 3	SQL Queries: Queries, sub queries, Aggregate function
Unit 4	PL/SQL : Exceptional Handling
Unit 5	PL/SQL : Cursor
Unit 6	PL/SQL : Trigger
Unit 7	PL/SQL : Packages
Unit 8	Design and Develop Application for Library Management
Unit 9	Design and Develop Application for Student Mark Sheet Processing
Unit 10	Design and Develop Application for Pay Roll Processing

Course objective	
Title	
Course Code	
CO-1	To understand Web based programming and scripting languages.
CO-2	To learn the basic web concepts and to create rich internet applications that use most recent client-side programming technologies.
CO-3	To learn the basics of HTML, DHTML, XML, CSS, Java Script and AJAX.
CO-4	Develop a new perspective of the WWW
CO-5	Begin to reconstruct the elements of a webpage

Course Outcome	
Title	**WEB DESIGN AND DEVELOPMENT**
Course Code	
CO-1	Ability to Develop and publish Web pages using Hypertext Markup Language (HTML).
CO-2	Ability to optimize page styles and layout with Cascading Style Sheets (CSS).
CO-3	Ability to Understand, analyze and apply the role of languages to create a capstone
CO-4	Website using client-side web programming languages like HTML, DHTML, CSS, XML, JavaScript, and AJAX.
CO-5	Style and HTML table with CSS

Syllabus	
Title	**WEB DESIGN AND DEVELOPMENT**
Course Code	
Unit 1	HTML: HTML-Introduction-tag basics- page structure-adding comments working with texts, paragraphs and line break. Emphasizing test- heading and horizontal rules-list-font size, face and color-alignment-links-tables-frames
Unit 2	Forms & Images Using Html: Graphics: Introduction-How to work efficiently with images in web pages, image maps, GIF animation, adding multimedia, data collection with html forms textbox, password, list box, combo box, text area, tools for building web page front page
Unit 3	XML & DHTML: Cascading style sheet (CSS)-what is CSS-Why we use CSS-adding CSS to your web pages-Grouping styles-extensible markup language (XML). Dynamic HTML: Document object model (DCOM)-Accessing HTML & CSS through DCOM Dynamic content styles & positioning-Event bubbling-data binding.
Unit 4s	JavaScript : Client side scripting, What is JavaScript, How to develop JavaScript, simple JavaScript, variables, functions, conditions, loops and repetition, Advance script, JavaScript and objects, JavaScript own objects, the DOM and web browser environments, forms and validations
Unit 5	Ajax: Introduction, advantages &disadvantages, Purpose of it, ajax based web application, alternatives of ajax Java Script & AJAX: Introduction to array-operators, making statements-date & time-mathematics-strings-Event handling-form properties. AJAX. Introduction to jQuery and AngularJS.

Course Objectives	
Title	**DATA MINING**
Course Code	
CO-1	To learn about data mining Concepts
CO-2	To study the different data mining techniques
CO-3	List and describe hardware and software
CO-4	Describe functions of the informatics nurse
CO-5	Identify, describe and review information system

Course Outcome	
Title	**DATA MINING**
Course Code	
CO-1	To have knowledge in Data mining concepts
CO-2	To apply Data mining concepts in different fields
CO-3	Identify the key processes of data mining, data warehousing and knowledge discovery process.
CO-4	Understand the basic principles and algorithms used in practical data mining and their strengths and weaknesses.
CO-5	Apply data mining techniques to solve problems in other disciplines in a mathematical way.

syllabus	
Unit 1	Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery in Data Bases – Data Mining Issues – Data Mining Matrices – Social Implications of Data Mining – Data Mining from Data Base Perspective.
Unit 2	Data Mining Techniques – a Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.
Unit 3	Classification: Introduction – Statistical – Based Algorithms – Distance Based Algorithms – Decision.
Unit 4	Clustering Tree – Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – Combining Techniques: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms. Partitioned Algorithms.
Unit 5	Association Rules: Introduction - Large Item Sets – Basic Algorithms – Parallel & Distributed Algorithms – Comparing Approaches – Incremental Rules – Advanced Association Rules Techniques – Measuring the Quality of Rules.

Course Objectives	
Title	**MOBILE APPLICATION DEVELOPMENT**
Course Code	
CO-1	To make the student understand the basic concepts of mobile application development, be aware of Characteristics of mobile applications, User-interface design, basics of graphics and multimedia.
CO-2	To gain knowledge about testing and publishing of Android application
CO-3	Mobile application development
CO-4	Development tools
CO-5	Application building blocks

Course Outcome	
Title	**MOBILE APPLICATION DEVELOPMENT**
Course Code	
CO-1	To explain the basics of mobile application development
CO-2	Develop Android application with User interface, networking and animation.
CO-3	Use simulator tools to test and publish the application.
CO-4	Understand the concepts of android operating system and its development tools.
CO-5	Gain conceptual understanding of Android Activities and GUI Design Concepts
CO-6	Able to demonstrate their ability to develop software with reasonable complexity in mobile platform.

Syllabus	
Title	**MOBILE APPLICATION DEVELOPMENT**
Course Code	
Unit 1	Mobile Application Development - Mobile Applications and Device Platforms - Alternatives for Building Mobile Apps - Comparing Native vs. Hybrid Applications -The Mobile Application Development Lifecycle-The Mobile Application Front-End-The Mobile Application Back-End-Key Mobile Application Services-What is Android-Android version history-Obtaining the Required Tools- Launching Your First Android Application-Exploring the IDE-Debugging Your Application-Publishing Your Application
Unit 2	Understanding Activities-Linking Activities Using Intents-Fragments-Displaying Notifications- Understanding the Components of a Screen-Adapting to Display Orientation-Managing Changes to Screen Orientation- Utilizing the Action Bar-Creating the User Interface Programmatically Listening for UI Notifications
Unit 3	Using Basic Views-Using Picker Views -Using List Views to Display Long Lists-Understanding Specialized Fragments - Using Image Views to Display Pictures -Using Menus with Views-Using WebView- Saving and Loading User Preferences-Persisting Data to Files-Creating and Using Databases.
Unit 4	Sharing Data in Android-Creating Your Own Content Providers - Using the Content Provider- SMS Messaging -Sending Email-Displaying Maps- Getting Location Data- Monitoring a Location.
Unit 5	Consuming Web Services Using HTTP-Consuming JSON Services- Creating Your Own Services - Binding Activities to Services -Understanding Threading.

Course Objectives	
Title	**MOBILE APPLICATION DEVELOPMENT LAB**
Course Code	
CO-1	To give overall view of Mobile application development
CO-2	Develop and Publish Android applications using Graphical user interface
CO-3	Develop and Publish Android application which can use Location and network services
CO-4	Understand the capabilities and limitations of mobile devices
CO-5	Understand how to work with various mobile application development frameworks

Course Outcome	
Title	**MOBILE APPLICATION DEVELOPMENT LAB**
Course Code	
CO-1	At the end of the course, the student should be able to:
CO-2	Use Emulator tools to design and develop applications
CO-3	Design and replacement various mobile application using emulators
CO-4	Deploy applicators to hand-hold devices
CO-5	Analyse and discover own mobile app for sample needs

Syllabus	
Title	**MOBILE APPLICATION DEVELOPMENT LAB**
Course Code	
Unit 1	Develop an application that finds greatest among three numbers using GUI Components
Unit 2	Develop an application to display your personal details using GUI Components
Unit 3	Develop an application that uses the radio button
Unit 4	Develop an application that uses the image button
Unit 5	Develop an application that uses Alert Dialog Box
Unit 6	Develop an application that uses Layout Managers.
Unit 7	Develop an application that uses audio mode (NORMAL,

	SILENT, VIBRATE)
Unit 8	Develop an application that uses to send messages from one mobile to another mobile.
Unit 9	Develop an application that uses to send email
Unit 10	Develop an application for mobile calls.
Unit 11	Develop an application for Student Mark sheet processing
Unit 12	Develop an application for Login Page in Database.
Unit 13	Develop an application for Google map locator (optional)

Course Objectives	
Title	**IOT AND ITS APPLICATIONS**
Course Code	
CO-1	To understand the concepts of Internet of Things and the application of IoT.
CO-2	To Determine the Market perspective of IoT.
CO-3	To Understand the vision of IoT from a global context
CO-4	Introduction to fundamentals of IOT
CO-5	Hardware and Software that enables IOT

Course Outcome	
Title	**IOT AND ITS APPLICATIONS**
Course Code	
CO-1	Use of Devices, Gateways and Data Management in IoT.
CO-2	Design IoT applications in different domain and be able to analyze their performance
CO-3	Implement basic IoT applications on embedded platform
CO-4	Examine the potential business opportunities that IoT can uncover
CO-5	Explore the relationship between IoT, cloud computing, and big data

Syllabus	
Title	**IOT AND ITS APPLICATIONS**
Course Code	
Unit 1	IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.
Unit 2	M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.
Unit 3	IoT Architecture -State of the Art – Introduction, State of the art, Architecture. Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.
Unit 4	IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and GasIndustry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.
Unit 5	Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF COMMERCE

Program: B.COM (COMPUTER APPLICATION)

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	Build a strong foundation in accounting, management and business subjects
PO-2	Seek variety of career options in accounting, managementandbusinessrelated fields
PO-3	Equip with skills and knowledge to excel in their future careers
PO-4	Develop critical thinking skills in students
PO-5	Enter master programmes likeM.Com, MBA and pursue professional programmes like CA, CMA, C.S, etc.

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Understand the application of business knowledge in both theoretical and practical aspects
PSO-2	Determine the procedures and schedules to be followed on preparing financial statements of companies
PSO-3	Understand the basic concepts and functions of accounting, trade and computer software
PSO-4	Develop proficiency in the management of an organization
PSO-5	Attain skills in conducting business transactions online

Course Objectives	
Title	**FINANCIAL ACCOUNTING**
Course Code	**CZ21A**
CO-1	To understand the basic concepts of accounting
CO-2	To know about the depreciation and claims
CO-3	To learn about the rectification of errors and BRS
CO-4	To familiarize students about financial reporting standards.
CO-5	To understand the system of financial statement

Course Outcome	
Title	**FINANCIAL ACCOUNTING**
Course Code	**CZ21A**
CO-1	To know about the basicconceptsof Accounting.
CO-2	To Know About the Depreciation And InsuranceClaims
CO-3	To introduce single entry system of accounts
CO-4	To Understand the Rectification of Errors And Bank Reconciliation Statement
CO-5	To gain knowledge on preparation of accounts in Hire purchase and Installment system.

Syllabus	
Title	**FINANCIAL ACCOUNTING**
Course Code	**CZ21A**
Unit 1	**Preparation of Financial Statement** Final accounts of sole trading concern-Adjustments-Receipts and Payments-Income and expenditure-Balance sheet of nontrading organisation
Unit 2	**Depreciation and Insurance Claims** Depreciation Accounting: Depreciation- Meaning –Causes-Types-Straight Line Method-Written down value method-Concept of useful life under Companies Act 2015. Insurance Accounting: Insurance claims –Calculation of Claim amount-Average clause
Unit 3	Meaning and Features of Singleentry-Defects-Difference between single entry and double entry system-Methods of calculation of Profit-Statement of Affairs Method-Conversion Method
Unit 4	**Rectification of Errors and Bank Reconciliation Statement** Classification of Errors – Rectification of Errors – Preparation of Suspense a/c. Bank Reconciliation Statement – Need and preparation.
Unit 5	**Hire Purchase and Instalment System** Hire Purchase System- Default and repossession-Hire purchase trading account Instalment System-Calculation of Profit.

Course Objectives	
Title	**OFFICE AUTOMATION THEORY &PRACTICLAS - (3 + 3 HRS)**
Course Code	**CP21A**
CO-1	To understand the basics of computer systems
CO-2	To know about the concepts of database system
CO-3	To learn about the power point tools
CO-4	Tounderstand to basic concept of database
CO-5	To update the knowledge of power student in global scenario.

Course Outcome	
Title	**OFFICE AUTOMATION THEORY &PRACTICLAS - (3 + 3 HRS)**
Course Code	**CP21A**
CO-1	Understand the basics of computer systems and its components
CO-2	Understand and apply the basic concepts of a word processing package
CO-3	Understand and apply the basic concepts of electronic spreadsheet software.
CO-4	Understand and apply the basic concepts of database management system.
CO-5	Understand and create a presentation using PowerPoint tool.

Syllabus	
Title	**OFFICE AUTOMATION THEORY &PRACTICLAS - (3 + 3 HRS)**
Course Code	**CP21A**
Unit 1	Introductory concepts: Memory unit – CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS – UNIX – Windows. Introduction to Programming Languages.
Unit 2	Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing – Preview, options, merge.
Unit 3	Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying; Charts – creating, formatting and printing,analysis tables, preparation of financial statements, introduction to data analytics.
Unit 4	Database Concepts: The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding Programming environment in DBMS; Developing menu drive applications in query language (MS – Access).
Unit 5	Power point: Introduction to Power point - Features – Understanding slide typesating& viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects, audio inclusion, timers.

Course Objectives	
Title	**OFFICE AUTOMATION PRACTICALS**
Course Code	**CP212**
CO-1	To understand the basics of computer systems
CO-2	To know about the concepts of database system
CO-3	To learn about the power point tools
CO-4	To know the usage of word processing.
CO-5	To update the student knowledge relating to current trend.

Course Outcome	
Title	**OFFICE AUTOMATION PRACTICALS**
Course Code	**CP212**
CO-1	Understand the basics of computer systems and its components
CO-2	Understand and apply the basic concepts of a word processing package
CO-3	Understand and apply the basic concepts of electronic spreadsheet software.
CO-4	Understand and apply the basic concepts of database management system.
CO-5	Understand and create a presentation using PowerPoint tool.

Syllabus	
Title	**OFFICE AUTOMATION PRACTICALS**
Course Code	**CP212**
Unit 1	Datasorting-AscendingandDescending (both numbers andalphabets) Marklistpreparationfor a student Individual Pay Bill preparation. Invoice Report preparation. Drawing Graphs. Take your own table. Creation of Balance Sheet
Unit 2	Create a database using Students Mark details.Perform the Sort operation using the student database.Create a database using Employee details and generate a Form to get the input for the table.Create a database using Library Information System with appropriate fields and generate a report todisplay the availability of books in the library.
Unit 3	Create a slide show presentation for a seminar.Preparation of Organization Charts. Create a slide show presentation to display percentage of marks in each semester for all students. Use bar chart (X-axis: Semester, Y-axis: % marks). Use different presentation template different transition effect for each slide.
Unit 4	WWW (Browsing) E-mail

Course Objectives	
Title	**BUSINESS ECONOMICS**
Course Code	**CZ31A**
CO-1	To understand the concepts of business economics
CO-2	To know about the demand and supply
CO-3	To learn about the operations of markets
CO-4	To understand about competition strategies
CO-5	To analyses the operations of market.

Course Outcome	
Title	**BUSINESS ECONOMICS**
Course Code	**CZ31A**
CO-1	Understanding the basic concepts of Business Economics
CO-2	Basic concepts of demand, supply and equilibrium and their determinants
CO-3	Understanding the theory of consumer behaviour
CO-4	Design competition strategies including production function, costing, pricing and product differentiation
CO-5	Analyse operations of markets under varying competitive conditions

Syllabus	
Title	**BUSINESS ECONOMICS**
Course Code	**CZ31A**
Unit 1	Introduction to Economics – Wealth, Welfare and Scarcity Views on Economics - Positive and Normative Economics - Definition – Scope and Importance of Business Economics - Concepts: Production Possibility frontiers – Opportunity Cost – Accounting Profit and Economic Profit – Incremental and Marginal Concepts – Time and Discounting Principles – Concept of Efficiency- Business Cycle:- Inflation, Depression, Recession, Recovery, Reflation and Deflation.
Unit 2	Demand and Supply Functions: - Meaning of Demand – Determinants and Distinctions of demand – Law of Demand – Elasticity of Demand – Demand Forecasting – Supply concept and Equilibrium
Unit 3	Consumer Behaviour: Law of Diminishing Marginal utility – Equilibrium marginal Utility – Indifference Curve – Definition, Properties and equilibrium.
Unit 4	Production: Law of Variable Proportion – Laws of Returns to Scale – Producer's equilibrium – Economies of Scale - Cost Classification – Break Even Analysis
Unit 5	Product Pricing: Price and Output Determination under Perfect Competition, Monopoly – Discriminating monopoly – Monopolistic Competition – Oligopoly – Pricing objectives and Methods-

Course Objectives	
Title	**BASICS OF RETAIL MARKETING**
Course Code:	**AR51B**
CO-1	Understanding how retailing originated in India
CO-2	Knowing theFunctions a retailer originated has to perform
CO-3	Describing the status of retailing in India and abroad
CO-4	Explaining the Present and Future of traditional kirana stores
CO-5	Identifying the essence of Productivity in modern retailing

Course Outcome	
Title	**BASICS OF RETAIL MARKETING**
Course Code:	**AR51B**
CO-1	Identifying the Different Retailing Formats.
CO-2	To Analyse the consumer evaluation of retail offerings.
CO-3	Formulate the retailing offerings.
CO-4	To conduct the retail in depth Strategies.
CO-5	To apply retail management Concepts.

Syllabus	
Title	**BASICS OF RETAIL MARKETING**
Course Code	**AR51B**
Unit 1	Retailing – Definition – Retail Marketing – Growth of organized retailing in India – Importance of retailing
Unit 2	Functions of Retailing – characteristics of Retailing – Types of Retailing – store retailing – Nonstore retailing
Unit 3	Retail location factors – Branding in retailing – private labeling – Franchising concept.
Unit 4	Communication tools used in Retailing – Sales promotion, e-tailing- window display
Unit 5	Supply chain management – definition – importance – Role of information Technology in retailing.

Course Objectives	
Title	**ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
CO-1	To understand the types of branch accounts
CO-2	To know about the admission of partnership firms
CO-3	To learn about the accounting standards
CO-4	To update student knowledge relating to corporate undertaking and their utility.
CO-5	To familiarize the students knowledge about financial reporting standard.

Course Outcome	
Title	**ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
CO-1	To acquire the skill to prepare different types of branch accounts.
CO-2	To transform the accounting knowledge in preparing departmental accounting.
CO-3	To familiarize the procedure involved in the admission of partnership firms
CO-4	To familiarize the procedure involved in the dissolution of partnership firms
CO-5	To familiarize students with the application of important accounting standards.

Syllabus	
Title	**ADVANCED FINANCIAL ACCOUNTING**
Course Code	**CZ22A**
Unit 1	**Branch Accounts** Dependent Branches - Stock and Debtors system – Distinction between Wholesale Profit and Retail Profit – Independent Branches (Foreign Branches excluded)
Unit 2	**Departmental Accounts** Basis of Allocation of Expenses – Calculation of Profit - Inter-departmental Transfer at cost or Selling Price.
Unit 3	**Partnership Accounts** Admission of a Partner – Retirement of a Partner – Death of a Partner.
Unit 4	**Partnership Accounts** Dissolution of a Partnership Firm – Insolvency of a Partner – Insolvency of all Partners- Piecemeal Distribution of cash in case of Liquidation of Partnership Firm.
Unit 5	**Accounting Standards for financial reporting** Objectives and uses of financial statements for users-Role of accounting standards-Development of accounting standards in India-Requirements of international accounting standards - Role of developing IFRS- IFRS adoption or convergence in India-Implementation plan in India- Ind ASDifference between Ind AS and IFRS.

Course Objectives	
Title	**PYTHON PROGRAMMING**
Course Code	
CO-1	To know about the basics of python
CO-2	To understand various programming language like strings, number
CO-3	An indepth look at python modules
CO-4	To analyse the basic procedure statement
CO-5	To enable students to gain knowledge on python modules and packages

Course Outcome	
Title	**PYTHON PROGRAMMING**
Course Code	
CO-1	Use the python modules and packages
CO-2	Interpret the expressions like scope , functions
CO-3	To know the basic syntax
CO-4	To know the basic settings in python
CO-5	Interpret the concept of numbers,strings, etc

Syllabus	
Title	**PYTHON PROGRAMMING**
Course Code	
Unit-1	Computersystems– PythonProgrammingLanguageComputationalThinking– PythonDataTypes:Expressions,Operator,Variables,andAssignments– Strings–Lists–Objects &Classes–Pythonstandard library.
Unit-2	Imperative programming: Python modules – Built-in-function: print() function –eval() function –user-definedfunction&assignments-parameterpassing.
Unit-3	TextData,Files&Exceptions:Strings,revisited– formattedoutput–files–errors&Exceptions – ExecutioncontrolStructures: decisioncontrol&theIFstatement

Unit-4	ForLOOP& Iteration Patterns–two-dimensional list- whileloop –moreloop patterns –additional iteration control statements – Container and Randomness: Dictionaries – other built-incontainertypes–characterencodings&strings– module random.
Unit-5	Namespaces–encapsulationinfunctions– globalvslocalnamespacesexceptionalflowcontrol –modulesasnamespaces.

Course Objectives	
Title	**INDIAN ECONOMY**
Course Code	**CZ32A**
CO-1	To have the fundamental knowledge of Economic Developments.
CO-2	To teach the Economic problems and five year Plans.
CO-3	To provide understanding of core economic terms, concepts and theories.
CO-4	To prompt students to have economic way of thinking.
CO-5	To indue critical thinking skills without the contest of subject matter of economics.

Course Outcome	
Title	**INDIAN ECONOMY**
Course Code	**CZ32A**
CO-1	After completion of the syllabus students well versed with the features of Indian economy and known the five year plans.
CO-2	Understand the aspects of Indian economy.
CO-3	Develop a perspective on the different problems and approaches to economic planning and development of INDIA.
CO-4	Understand the role of the Indian economy in the global context and how different factors have effected this process.
CO-5	Not only be aware of the economy as a whole, sources of revenue, how the state government finance its programmes and projects.

Syllabus	
Title	**INDIAN ECONOMY**
Course Code	**CZ32A**
Unit 1	**Economic Growth and Economic Development- Transition on Indian Economy-– Indian Economy from 1950 .- Indicators of economic development- National Income- Basic Concepts and computation of national income.**
Unit 2	**Major problems of Indian Economy- Human Development Index. Present Scenarios of population, unemployment, Poverty and inequality. Demographic trends in Population. Measures to control the population-**Foreign trade
Unit 3	**Agriculture**: Contribution to economic development- Green Revolution- **Organicfarming**- Food policy and Publicdistribution system.
Unit 4	**Industry**- Role of industries in economic development-Large scale industries and small scale industries- New Economic Policy 1991- **Industrial development before and after globalization in India.**
Unit 5	**Five year plans in India**- Achievement and strategy and failures- **Nidhi Aayog.**

Course Objectives	
Title	**BASICS OF BUSINESS INSURANCE**
Course Code:	
CO-1	To enable the students to understand the fundamental of insurance
CO-2	Learn how to attainthe agency license
CO-3	Learn the organisational Functions
CO-4	Learn to create company profile
CO-5	To gain knowledge on functional agent

Course Outcome	
Title	**BASICS OF BUSINESS INSURANCE**
Course Code	
CO-1	Acquire the basic of insurance.
CO-2	Acquire the skill of agency
CO-3	To identity the code of conduct
CO-4	To know the procedure of licensing
CO-5	The organization functions, sturctures,etc

Syllabus	
Title	**BASICS OF BUSINESS INSURANCE**
Course Code	
Unit 1	Introduction to Insurance – Type of Insurance – Principles of Insurance.
Unit 2	Salient features of IRDA Act – Administration of IRDA Act – Regulatory measures of IRDA
Unit 3	Life insurance products – Term, Whole life, Endowment.
Unit 4	Introduction to general Insurance – fire, marine and motor insurance.
Unit 5	Governmentand insurance companies – LIC India- private players in Insurance in India.

Course Objectives	
Title	**CORPORATE ACCOUNTING**
Course Code	**CZ23A**
CO-1	To understand the features of shares and debentures
CO-2	To know about the company final accounts
CO-3	To learn about the internal reconstruction
CO-4	To make the students familiarize with corporate accounting procedure.
CO-5	To update their knowledge on company final a/c

Course Outcome	
Title	**CORPORATE ACCOUNTING**
Course Code	**CZ23A**
CO-1	Enabling the students to understand the features of Shares and Debentures
CO-2	Develop an understanding about redemption of Shares and Debenture and its types
CO-3	To give an exposure to the company final accounts
CO-4	To provide knowledge on Goodwill
CO-5	Students can get an idea about internal reconstruction

Syllabus	
Title	**CORPORATE ACCOUNTING**
Course Code	**CZ23A**
Unit 1	**Share Capital** Issue of Shares - Types of Shares – Forfeiture of Shares- Reissue of Shares- Redemption of Preference Shares.
Unit 2	**Debentures& Underwriting** Issue of Debentures – Redemption of Debentures- Profit prior to incorporation. Underwriting of Shares & Debentures.
Unit 3	**Final Accounts** Final Accounts - Preparation of Profit & Loss account and Balance sheet- Managerial Remuneration.
Unit 4	**Valuation of Goodwill & Shares** Valuation of Goodwill & Shares – Meaning – Methods of valuation.
Unit 5	**Accounting for Insurance Companies** Insurance Accounts- Types- Final accounts of Life Insurance- Profit determination of Life Insurance

Course Objectives	
Title	**BUSINESS LAWS**
Course Code:	**CZ23A**
CO-1	To understand the business law
CO-2	To know about the types of contracts
CO-3	To learn about the transparency and accountability
CO-4	To enable the students to understand legal remedies
CO-5	To enable the students to gather knowledge on scale of goods act.

Course Outcome	
Title	**BUSINESS LAWS**
Course Code:	**CZ23A**
CO-1	Make the students understand about business law
CO-2	Develop knowledge on contract and various types of contracts
CO-3	To help the students to understand the concept of sale of goods
CO-4	Make the students understand about companies and its types
CO-5	To empower the citizens, promote transparency and accountability in the working of the Public Authorities

Syllabus	
Title	**BUSINESS LAWS**
Course Code:	**CZ23A**
Unit 1	**Formation of Contract** Indian Contract Act -Formation-Nature and Elements of Contract – Classification of Contracts, Contract Vs Agreement.
Unit 2	**Offer, Acceptance & other elements of Valid Contract** Offer – Definition – Forms of offer – Requirements of a Valid Offer. Acceptance – Meaning - Legal rules as to a Valid Acceptance. Consideration – Definition – Types - Essentials. Capacity of Parties – Definition – Persons Competent to contract. Free consent – Coercion – UndueInfluence – Fraud – Misrepresentation - Mistake. Legality of object - Void agreements Unlawful Agreements.
Unit 3	**Performance of Contract** Performance of Contracts – Actual Performance – Attempted Performance - Tender. Quasi Contract – Definition and Essentials. Discharge of Contract - Modes of Discharge – Breach of Contract – Remedies available for Breach of Contract.
Unit 4	**Sale of Goods Act** Sale – Contract of Sale – Sale Vs Agreement to Sell – Meaning of Goods – Conditions and Warranty – Caveat Emptor – Exceptions of Caveat Emptor – Buyer and Seller of Goods - Unpaid Seller – Definition – Rights of an Unpaid Seller.
Unit 5	**Contemporary Issues in Business Law** Right to Information Act, 2005 - Meaning of 'Information', 'Right to Information' 35 -Need for Right to Information. Public Information - Request for obtaining information. Grounds for rejection of information. Central Information Commission - Constitution and powers. Information Technology Act - Purpose and significance. Cyber Crimes - Types of crimes, nature and punishment Intellectual Property Law - Patent, trademark, copyright and industrial design

Course Objective	
Title	**OBJECT ORIENTED PROGRAMING WITH C++**
Course Code	
CO-1	To understand basic programming constructs
CO-2	To understand the principle of object oriented mode
CO-3	To build on the concept learn in c-language
CO-4	It helps the student to write and execute well structured C++ program
CO-5	To use problem solving and program design technique

Course Outcome	
Title	**OBJECT ORIENTED PROGRAMING WITH C++**
Course Code	
CO-1	To demonstrate ability to test and debug programs
CO-2	To demonstrate ability to analyze program
CO-3	To carry out operational tasks
CO-4	To perform both procedural and object-oriented program
CO-5	Student develop familiarity with Microsoft

Syllabus	
Title	**OBJECT ORIENTED PROGRAMING WITH C++**
Course Code	
Unit 1	Principlesofobjectoriented programming, object-oriented programming paradigm.Applications of OOPs. OOPs concepts – OOPs Languages. Models:-Class Model-State ModelandInteractionModel.
Unit-2	IntroductiontoC++-Tokens,
Unit-3	Functions-MainFunction-FunctionPrototyping-InlineFunctions-FriendandVirtualFunctions-ParametersPassinginFunctions-ValuesReturnbyFunctions,fileconcepts.
Unit-4	ClassesandObjects;ConstructorsandDestructors;andOperatorOverloadingandType Conversions-TypeofConstructors-Functionoverloading.
Unit-5	Inheritance:SingleInheritance-MultilevelInheritance-MultipleInheritance-Hierarchical Inheritance - Hybrid Inheritance. Virtual Functions and Polymorphism; ManagingConsole I/Ooperations.

Course Objective	
Title	**BUSINESS STATISTICS**
Course Code	**CZ33A**
CO-1	Aim to provide practical approach in statistics
CO-2	To use basic statistical theory
CO-3	To use statistics in organisation
CO-4	Statistical technique to use to undertake research
CO-5	To gain knowledge on various approach

Course Outcome	
Title	**BUSINESS STATISTICS**
Course Code	**CZ33A**
CO-1	How to use statistical tool
CO-2	To apply arithmetical skills in problem
CO-3	To apply algebraic skills in every day business
CO-4	To represent data, correlation and business decision making
CO-5	To use elementary probability theory

Syllabus	
Title	BUSINESS STATISTICS
Course Code	CZ33A
Unit-1	MeaningandDefinitionofStatistics-CollectionandTabulationofStatisticalData-PresentationofStatisticalData-Graphs andDiagrams
Unit-2	UNIT-IIMeasuresofCentralTendency andMeasuresofVariation Measuresof Central Tendency-ArithmeticMean,Median,Mode,HarmonicMeanandGeometric Mean.Measures of Variation-Standard Deviation -Mean Deviation-QuartileDeviation-SkewenessandKurtosis-LorenzCurve
Unit-3	UNIT-IIICorrelationandRegressionAnalysis SimpleCorrelation-ScatterDiagram-KarlPearson'sCorrelation-Spearman'sRankCorrelation-Regression-Meaning-LinearRegression.
Unit-4	UNIT-IVTimeSeries Analysis of Time Series-Causes of Variation in Time Series Data -Components of TimeSeries-Additive andMultiplicative Models-Determinationof TrendBy SemiAverage,MovingAverageandLeastSquare(LinearSecondDegreeAndExponential)Methods-Computation of Seasonal Indices By Simple Average, Ratio to Moving Average, Ratio toTrendandLinkRelativeMethodsAnalysis of Time Series-Causes of Variation in Time Series Data -Components of TimeSeries-Additive andMultiplicative Models-Determinationof TrendBy SemiAverage,MovingAverageandLeastSquare(LinearSecondDegreeAndExponential)Methods-Computation of Seasonal Indices By Simple Average, Ratio to Moving Average, Ratio toTrendandLinkRelativeMethods
Unit-5	MeaningandTypesofIndexNumbers-ProblemsinConstructionofIndexNumbers-Methods of Construction of Price and Quantity Indices- Test of Adequacy-Errors in IndexNumbers- Chain Base Index Numbers- Base Shifting -Splicing -Deflation -Customer PriceIndexandItsUses-StatisticalQualityControl

Course Objectives	
Title	**ADVANCED CORPORATE ACCOUNTING**
Course Code	**CZ24A**
CO-1	To understand about amalgamation, absorption and external reconstruction
CO-2	To know about the awareness on banking
CO-3	To learn about the idea of liquidation of companies
CO-4	To introduce students to the changes in the preparations of banking and insurance.
CO-5	Company accounts its related to as per companies act 2013.

Course Outcome	
Title	**ADVANCED CORPORATE ACCOUNTING**
Course Code	**CZ24A**
CO-1	Enablethestudents to understandaboutamalgamation,absorption Andexternalreconstruction
CO-2	To create awareness on accounts of banking and insurance companies
CO-3	To introduce and develop knowledge of holding companies accounts
CO-4	Enable the students to gain an idea of liquidation of companies
CO-5	0To resolve the problem of over-capitalization/ huge accumulated losses/ overvaluation of assets

Syllabus	
Title	**ADVANCED CORPORATE ACCOUNTING**
Course Code	**CZ24A**
Unit 1	**Internal Reconstruction** Meaning - Alteration of share capital – Accounting Procedures.
Unit 2	**Amalgamation, Absorption & External Reconstruction** Meaning-Amalgamation in the nature ofMerger, Purchase - External Reconstruction – Applicability of AS 14- Calculation of Purchase consideration (all methods) – Journal Entries in the books of Transferor and Transferee Companies, Revised Balance Sheet (excluding inter - company holdings)
Unit 3	Meaning – Preparation of Liquidator's Final Statement of Accounts – Calculation of Liquidator Remuneration.
Unit 4	**Consolidation** Holding Company –Subsidiary company - Meaning – Preparation of Consolidated Final Statement of Accounts.
Unit 5	**Accounting For Banking Companies** Bank accounts - Concept of Non-Performing Assets (NPA)- Preparation of Profit and Loss Account - Asset classification - Preparation of Balance Sheet.

Course Objectives	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**CP24A**
CO-1	To understand the concepts of management
CO-2	To know about the organisation and its types
CO-3	To learn about the process of authority
CO-4	Learn to take decision making own concept.
CO-5	To understand the basic concept of management.

Course Outcome	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**CP24A**
CO-1	To know the basic concepts of Management
CO-2	To familiarize students with the planning anddecision makingprocess
CO-3	To inculcate knowledge on Organization and its types
CO-4	To know about the process of Authority and Responsibilities
CO-5	To understand the aspects of Direction ,Co ordination and control

Syllabus	
Title	**PRINCIPLES OF MANAGEMENT**
Course Code	**CP24A**
Unit 1	**Introduction** Definition – Importance – Nature and Scope of Management – Process of Management - Role and functions of Managers - Levels of Management Scientific Management Contributions to Management by different Schools of thought.
Unit 2	**Planning** Nature – Importance -Types of Planning - Steps in planning - Objectives of Planning – Policies Decision making Process- Types of Decisions.
Unit 3	**Organization** Meaning and Types of organizations - Principles – Formal and Informal organization - organisation Structure – Span of Control – Departmentalisation – Basis - Meaning and Importance of Departmentalisation. Policies - Meaning and Types – Procedures - Forecasting.
Unit 4	**Authority and Responsibility** Authority – Definition – Sources – Limitations – Difference between Authority and Responsibility – Delegation of Authority – Meaning – Principles and importance – Centralisation Vs Decentralisation- Leadership & Communication
Unit 5	**Direction Co-ordination & Control** Direction – Nature - Purpose. Co-ordination – Need – Types and Techniques – Requisites for Excellent Co-ordination. Controlling – Meaning – Importance – Control Process.

Course Objectives	
Title	**E-COMMERCE**
Course Code	**CP24B**
CO-1	To understand the concept of E-commerce
CO-2	To know about the E-payment technology
CO-3	To learn about the security issues
CO-4	To learn about decision making process
CO-5	To develop knowledge about commerce using information technology.

Course Outcome	
Title	**E-COMMERCE**
Course Code	**CP24B**
CO-1	Understand the concept of E-Commerce and describe the opportunities and challenges offered by E-Commerce
CO-2	Able to handle electronic payment technology and requirements forinternet based payments
CO-3	Understand the categories of E-Commerce and understand the different applications of E-commerce
CO-4	To understand and identify security issues of E-Commerce
CO-5	Understand the concept of WEB Based Business Understand the M-Commerce applications

Syllabus	
Title	**E-COMMERCE**
Course Code	**CP24B**
Unit 1	**Introduction to E- commerce**: Meaning and concept – E- commerce v/s Traditional Commerce- E- Business & E- Commerce – History of E- Commerce – EDI – Importance , features & benefits of E- Commerce – Impacts, Challenges & Limitations of E- Commerce – Supply chain management & E – Commerce
Unit 2	**Business models of E – Commerce**: Business to Business – Business to customers – customers to customers - Business to Government – Business to employee – E – Commerce strategy – Influencing factors of successful E-Commerce – E- Business Infrastructure – The internet – Intranets and Extranets – World Wide Web – Voice over IP (VoIP) – The Internet Standards – The HTTP Protocol – Audio and Video Standards – Managing E- Business Infrastructure – Web services and Service-oriented architecture – (SOA) – New access devices – future of the internet infrastructure.
Unit 3	**Marketing strategies & E – Commerce:** Website – components of website – Concept & Designing website for E- Commerce – Corporate Website – Portal – Search

	Engine – Internet Advertising – Emergence of the internet as a competitive advertising media- Models of internet advertising – Weakness in Internet advertising – Mobile Commerce.
Unit 4	**Electronic Payment system:** Introduction – Online payment systems – prepaid and postpaid payment systems – e- cash, e - cheque, Smart Card, Credit Card, Debit Card, Electronic purse – Security issues on electronic payment system – Solutions to security issues – Biometrics – Types of biometrics- EDP and business plan
Unit 5	**Legal and ethical issues in E- Commerce:** Security issues in E- Commerce- Regulatory frame work of E-commerce.

Course Objective	
Title	**PROGRAMMING IN JAVA**
Course Code	
CO-1	To discuss the classes, present in java package
CO-2	To outline the basic structure of GUI
CO-3	To show how to add components to containers
CO-4	To understand how to use layout managers
CO-5	To understand inheritance hierarchy

Course Outcome	
Title	**PROGRAMMING IN JAVA**
Course Code	
CO-1	Design GUI using AWT &Swing
CO-2	To develop program using event handling
CO-3	To use network concept
CO-4	To develop web-based program
CO-5	To develop program using JDBC connectivity

Syllabus	
Title	**PROGRAMMING IN JAVA**
Course Code	
Unit 1	Introduction toJava-Features of Java-Basic Concepts of Object orientedProgramming-JavaTokens-Java Statements-Constants-Variables-Data Types- Type Casting-Operators-Expressions-ControlStatements:BranchingandLoopingStatements
Unit-2	
	Classes,ObjectsandMethods-Constructors-MethodsOverloading-Inheritance-OverridingMethods-Finalizer and Abstract Methods-Visibility Control –Arrays, Strings and Vectors-StringBufferClass
Unit-3	
	Interfaces-Packages-CreatingPackages-AccessingaPackage-MultithreadedProgramming-CreatingThreads-StoppingandBlockingaThread-LifeCycleofaThread-UsingThreadMethods-ThreadPriority
Unit-4	
	ManagingErrorsandExceptions-SyntaxofExceptionHandlingCode-UsingFinallyStatement-Throwing Our Own Exceptions-Applet Programming-Applet Life Cycle-Graphics Programming
Unit-5	ManagingInput/OutputFiles:ConceptofStreams-StreamClasses-ByteStreamClasses-CharacterStreamClasses–UsingStreams-UsingtheFileClass-CreationofFiles-RandomAccessFiles-OtherStreamClasses

Course Objectives	
Title	**FINANCIAL MANAGEMENT**
Course Code	
CO-1	To understand the concept of financial management
CO-2	To know about the cost of capital
CO-3	To learn about the working capital management
CO-4	To enable the students to know the concept of investment
CO-5	Students will understand about investing ,financing ,etc.

Course Outcome	
Title	**FINANCIAL MANAGEMENT**
Course Code	
CO-1	To provide introduction to Financial Management
CO-2	To create an awareness on capital structure and theories of capital structure
CO-3	To make them understand the cost of capital in wide aspects
CO-4	To provide knowledge about dividend policies and various dividend models.
CO-5	To enable them to understand working capital management

Syllabus	
Title	**FINANCIAL MANAGEMENT**
Course Code	
Unit 1	**Introduction** Meaning and Objectives of Financial Management – Functions of Financial Management. Finance - Sources of Financing-Role of Financial Manager in Financial Management- Financial Goals- Profit maximization Vs. Wealth maximization – Concept of Time Value of Money- Risk and Return.
Unit 2	**Capital Structure and Cost of Capital** Capital Structure- Meaning- Capital Structure Theories-Definition - Cost of Equity Capital – Cost of Preference Capital – Cost of Debt – Cost of Retained Earnings – Weighted Average (or) Composite cost of capital (WACC) Capital Structure – Theories of Capital Structure - Leverage concept.
Unit 3	**Dividend** Meaning – Dividend Policies – Factors affecting Dividend Payment – Provisions on Dividend Payment in Company Law – Dividend Models - Walter's Model - Gordon's Model - M. M. Model – Hypothesis Model.
Unit 4	**Working Capital** Working Capital - Meaning and importance – Factors Influencing Working Capital – Determining (or) Forecasting of Working Capital requirements – Working Capital Operating cycle-

Course Objectives	
Title	**PRACTICAL AUDITING**
Course Code	
CO-1	To understand the tools of auditing
CO-2	To know about the concepts of vouching
CO-3	To learn about the audit and types of audit
CO-4	To understand the concept of present day auditing practices.
CO-5	To analyses the approaches in EDP audit.

Course Outcome	
Title	**PRACTICAL AUDITING**
Course Code	
CO-1	To acquire knowledge in concepts and tools of Auditing
CO-2	To Understand the concepts of Vouching and Verification
CO-3	To know about Auditors Duty
CO-4	To know the appointment,removal, power and preparation of audit report
CO-5	To know about EDP Audit and Types of online Audit system

Syllabus	
Title	**PRACTICAL AUDITING**
Course Code	
Unit 1	**Introduction** Meaning and Definition of Auditing – Distinction between Auditing and Accounting- Objectives - Advantages and Limitations of Audit - Scope of Audit - Classifications of Audit – Audit Planning - Meaning. Audit programme – Meaning– Objectives and Contents. Audit Note Book, contents, Usefulness of Audit Note Book- Audit working papers - meaning. Ownership and Custody – Test checking and Routine checking - Meaning. Internal control – Meaning – Definition – Objectives – Technique for evaluation of Internal Control System. Internal check – Meaning - Objectives difference between Internal control, Internal check and Internal Audit.
Unit 2	**VouchingandVerification** Vouching – Meaning and Definitions - Objectives. Trading Transactions – Audit of Ledger - Scrutinizing of ledgers – Vouching of cash Receipts and Payments - Vouching of outstanding Assets and Liabilities – Verification – Meaning Objectives and Process – Valuation of Assets and liabilities – Distinction between Verification and Valuation.
Unit 3	**Audit and Accounting Standards** Types of Audit – Statutory Audit – Concurrent Audit – Stock Audit – Cost Audit – Secretarial Audit – CAG Audit – Management Audit. Accounting Standards – Standards onAuditing Standards on Internal Audit – Penal Provisions – Role of National Financial Reporting Authority (NFRA)
Unit 4	**Auditors and Audit Report** Appointment – Procedures – Eligibility and Qualifications – Powers and Duties – Rotation and Removal of Auditors – Resignation of Auditors – Remuneration of Auditors - Audit report – Preparation and presentation. Auditor's Responsibilities and liabilities towards Shareholders, Board and Audit Committee. Restriction on other Services.
Unit 5	**Recent Trends in Auditing** EDP Audit – Meaning – Division of auditing in EDP environment. Impact of Computerization on Audit Approach – Online Computer System Audit – Types of Online Computer System Audit – Audit around with the Computers – Procedure of Audit under EDP system- Green Audit- Introduction

Course Objectives	
Title	**ELEMENTS OF COST ACCOUNTING**
Course Code	
CO-1	To understand the concept of cost accounting
CO-2	To know about the preparation of cost sheet
CO-3	To learn about the concept of overhead cost
CO-4	To understand the basic elements of cost a/c.
CO-5	To know the process of accounting for cost elements.

Course Outcome	
Title	**ELEMENTS OF COST ACCOUNTING**
Course Code	
CO-1	Aimed to familiarize the concept of cost accounting
CO-2	Helps to gather knowledge on preparation of cost sheet in its practical point of view
CO-3	To facilitate the idea and meaning of material control with pricing methods
CO-4	To introduce the concept of overhead cost
CO-5	To gain wide knowledge and insights into the subject to excel and flourish in their contemporary and competitive world.

Syllabus	
Title	**ELEMENTS OF COST ACCOUNTING**
Course Code	
Unit 1	**Introduction of Cost Accounting** Definition - Nature and Scope – Principles of Cost Accounting – Cost Accounting and Financial Accounting - Cost Accounting Vs Management Accounting – Installation of Costing System – Classification of Costs – Cost Centre – Profit Centre– Preparation of Cost Sheet – Reconciliation of Cost and Financial Accounts.
Unit 2	**Material Costing** Material Control – Meaning and Objectives – Purchase of Materials – Stock Levels of Materials – EOQ – Stores Records – ABC Analysis – Issue of Materials – Methods of Issue – FIFO – LIFO – HIFO – Base Stock Method – Specific Price Method – Simple and Weighted Average Method – Standard and Inflated Price Method.
Unit 3	**Labour Costing** Direct Labour and Indirect Labour – Time Keeping – Methods and Calculation of Wage Payments – Time Wages – Piece Wages – Incentives – Different Methods of Incentive Payments - Idletime – Overtime – Labour Turnover - Meaning, Causes and Measurement.
Unit 4	**Overheads Costing** Overheads – Definition – Classification – Allocation and Apportionment of Overheads – Basis of Allocation – Absorption of Overheads - Preparation of Overheads Distribution Statement – Machine Hour Rate – Computation of Machine Hour Rate.
Unit 5	**Methods of Costing** Unit Costing- Job Costing- Contract Costing- Process Costing.

Course Objectives	
Title	**SPSS - STATISTICAL PACKAGE FOR SOCIAL SCIENCES**
Course Code	
CO-1	**Introduction**: Introduction to SPSS – Types of data – functions – menus – commands – SPSS file management – defining variables – manual input of data – automated input and file import.
CO-2	**Descriptive analysis of data:** Construct of frequency tables – descriptive – explore – cross table - histogram – charts.
CO-3	**SPSS for data analysis:** Data entry in SPSS – Data analysis tools in SPSS – Calculation of descriptive statistics – Correlation and Regression – Regression model for forecasting with SPSS.
CO-4	**Statistical Inference:** Basic concepts – Standard error – central limit theorem – sampling and types of sampling – large sample test – small sample test – test for mean – test for proportion – test for paired observation.
CO-5	**Non parametric test:** One wayChi-Square test (test for Homogeneity) - Two wayChi-Square test (test for Attributes). Analysis of variance: One way ANOVA and two way ANOVA.

Course Objectives	
Title	**RESEARCHMETHODOLOGY**
Course Code	
CO-1	To understand the research process
CO-2	To know about the research tools
CO-3	To learn the research design
CO-4	To formulate research report
CO-5	To evaluate with various tools (ANOVA)

Course Outcome	
Title	**RESEARCHMETHODOLOGY**
Course Code	
CO-1	To identify and discuss the concepts and procedures of sampling, data collection, analysis and reporting
CO-2	To examine the research problem and to study the research process.
CO-3	To evaluate research designs
CO-4	To analyse data collection techniques.
CO-5	To organize the research reports

Syllabus	
Title	**RESEARCHMETHODOLOGY**
Course Code	
Unit 1	**Introduction** Research – Types – Objectives of Research – Social Research – Criteria of Good Research - Qualities of a Researcher – Research process – Research problem – Selection of a Research problem.
Unit 2	**Research Design** Meaning – Need for Research Design – Features and Types – Preparation of Research Design.
Unit 3	**Hypothesis** Formulation & Types of hypothesis – Sources of hypothesis – testing of hypothesis- Parametric Test-t test, f test, z test - Non-Parametric Test -Chi square test, ANOVA, Factor Analysis
Unit 4	**Methodology** Collection of Data – Source of information – Primary and Secondary Data - Methods of Data Collection – Interview – Observation – Questionnaire – Schedules – Difference between Questionnaire and Schedule.
Unit 5	**Analysis of Data and Project Report** Analysis of data – Measures of Central Tendency - Correlation, Regression, Linear Programming (Simple Problems) – Data Processing through Computers – Meaning of Thesis writing – Mechanics of Thesis writing – Contents of Thesis – Pages of the Preliminary Section – Body of the Thesis (outline)- Modern Practices: Ethical Norms in Research, Plagiarism.

Course Objectives	
Title	**FINANCIAL SERVICES**
Course Code	
CO-1	To understand the fundamentals of financial services
CO-2	To know about the merchant banking and issue management
CO-3	To learn about the liquidity, ensured and short term income
CO-4	To enable the students about the world financial services.
CO-5	To facilitate various financial services.

Course Outcome	
Title	**FINANCIAL SERVICES**
Course Code	
CO-1	To give an idea about fundamentals of financial services and players in financial sectors
CO-2	To create an awareness about merchant banking, issue management, capital markets and role of SEBI
CO-3	To provide knowledge about leasing and hire purchase concepts
CO-4	To make them understand about different types of insurance and IRDA Act.
CO-5	To ensure liquidity, capital protection, and reasonable income in the short-term.

Syllabus	
Title	**FINANCIAL SERVICES**
Course Code	
Unit 1	**Introduction** Financial Services - Concept - Objectives - Functions - Characteristics - Financial Services Market - Concept - Constituents - Growth of Financial Services in India - Financial Services Sector Problems - Financial Services Environment - The Forces - Players in Financial Markets
Unit 2	**Merchant Banking and Public Issue Management** Definition - Functions - Merchant Bankers Code of Conduct - Public Issue Management - Concept - Functions - Categories of Securities Issue - Mechanics of Public Issue Management - Issue Manager - Role of lssue Manager - Marketing of Issue - New Issues Market Vs Secondary Market.
Unit 3	**Money Market and Stock Exchange** Characteristics - Functions - Indian Capital Market - Constituents of Indian Capital Market - New Financial Institutions and Instruments - Investor Protection - Stock Exchange - Functions - Services - Features - Role - Stock Exchange Traders -Regulations of Stock Exchanges - Depository - SEBI - Functions and Working.
Unit 4	**Leasing and Factoring and securitization** Characteristics - Types - Participants - Myths about Leasing - Hire Purchase – Lease Financing Vs Hire Purchase Financing - Factoring - Mechanism - Functions of a Factor - Factoring - Players- Types - Operational Profile of Indian Factoring - Operational Problems in Indian Factoring - Factoring Vs bills Discounting - Securitisation of Debt- Parties involved- Steps of securitisation - Types of securitisation- Advantages- Limitations – SARFAESI Act 2002- Background- Purpose of the Act- Main provisions
Unit 5	**Venture Capital, credit rating and pension Fund** Origin and Growth of Venture Capital - Investment Nurturing Methods - Mutual Funds - Portfolio Management Process in Mutual Funds - Credit Rating System - Growth Factors - Credit Rating Process - Global and Domestic Credit Rating agencies - Pension Fund - Objectives - Functions - Features - Types - Chilean Model - Pension Investment Policy - Pension Financing.

Course Objectives	
Title	**HUMAN RESOURCE MANAGEMENT**
Course Code	
CO-1	To understand the concepts of human resource management
CO-2	To know about the placement and training
CO-3	To learn about the various skills like training and development
CO-4	To know the importance of human resource.
CO-5	To understand the concept wage and salary.

Course Outcome	
Title	**HUMAN RESOURCE MANAGEMENT**
Course Code	
CO-1	To enable the students to gain knowledge in Human Resources Management
CO-2	To introduce the students about placement and training
CO-3	To facilitate the knowledge about performance appraisal and different methods
CO-4	To provide an idea about different compensation policies
CO-5	To enable the students to understand various skills like training and development.

Syllabus	
Title	**HUMAN RESOURCE MANAGEMENT**
Course Code	
Unit 1	**Introduction** Nature and Scope of Human Resources Management – Differences between Personnel Management and HRM – Environment of HRM- HRM Accounting– Human Resource Planning – Recruitment – Selection – Methods of Selection – Uses of various Tests – Interview techniques in Selection and Placement.
Unit 2	**Training** Meaning – Induction – Methods – Techniques – Identification of the Training needs – Training and Development – Performance appraisal – Transfer – Promotion and Termination of services – Career Development.
Unit 3	**Compensation &Labour Relation** Cost to Company – CTC Fixed and FlexiblePay - Components – Incentives – Benefits – Motivation – Talent Retention- Welfare and Social Security Measures - Opportunities, Challenges, and Recent Trends in Compensation. Need – Functions of Trade Unions – Forms of Collective bargaining – Workers Participation in management - Types and effectiveness. Industrial Disputes and Settlements (laws excluded)- Social Ethics and Responsibility
Unit 4	**Human Resource Accounting & Audit** Human Resource Accounting- Meaning- Objectives- Need & Limitations. Human Resource Audit – Nature – Benefits – Scope – Approaches.
Unit 5	**Corporate Ethics & Corporate Social Responsibility** Business Ethics – Concept, Characteristics, Importance and Need for ethics- Sources of Ethics, Concept of Corporate Ethics, code of Ethics- Guidelines for developing code of ethics, Ethics in Human Resource Management Corporate Social Responsibility: Concept, Scope & Relevance and Importance of CSR in Contemporary Society. CSR towards employees and workers- CSR and environmental concerns- Role of HR professionals in CSR.

Course Objectives	
Title	**MANAGEMENTACCOUNTING**
Course Code	
CO-1	To understand the aspects of management accounting
CO-2	To know about the financial statement analysis
CO-3	To learn about the concept of marginal costing
CO-4	To know about techniques of management principles.
CO-5	Develop and apply budget for planners.

Course Outcome	
Title	**MANAGEMENTACCOUNTING**
Course Code	
CO-1	To enlighten and sensitize the students on the aspects of management Accounting
CO-2	Helps to give an organized idea on financial statement analysis in practical point of view
CO-3	To introduce the concept of fund flow and cash flow statement
CO-4	To provide knowledge on budget control, keeping in mind the scope of the concept
CO-5	To develop the know-how and concept of marginal costing with practical problems

Syllabus	
Title	**MANAGEMENTACCOUNTING**
Course Code	
Unit 1	**Introduction** Management Accounting - Meaning- Scope- Importance- Limitations - Management Accounting Vs Cost Accounting – Management Accounting Vs FinancialAccounting.
Unit 2	**Financial Statement Analysis** Analysis and Interpretation of Financial Statements – Nature and Significance – Types of Financial Analysis – Tools of Analysis – Comparative Statements – Common size Statement – Trend Analysis.
Unit 3	**RatioAnalysis** Meaning – Advantages – Limitations – Types of Ratios – Liquidity Ratios – Profitability Ratios Turnover Ratios – Capital Structure Ratios – Leverage Ratios – Calculation of Ratios.
Unit 4	**Fund Flow Analysis & Cash Flow Analysis** Introduction, Meaning of Funds Flow Statement-Ascertainment of flow of funds- Technique of preparing funds flow statement-Schedule of Changes in Working Capital- Adjusted Profit and Loss account-Funds Flow Statement Meaning of Cash Flow Statements – Advantages – Limitations – Preparation of Cash Flow Statement – Types of Cash flows - Operating, Financing and Investing Cash flows.
Unit 5	**Budgetary Control & Marginal Costing** Budgetary Control – Meaning – Preparation of various Budgets – Cash Budget -Flexible Budget – Production Budget – Sales Budget. Capital Expenditure Control - Application of Marginal Costing in Decision Making – Make or Buy –Shut down or Continue – Exploring New Markets.

Course Objective	
Title	**WEB TECHNOLOGY**
Course Code	
CO-1	To introduce basic PHP programming
CO-2	To design simple data base
CO-3	To construct web application
CO-4	To describe the mechanisms
CO-5	To construct advanced community website

Course Outcome	
Title	**WEB TECHONOLOGY**
Course Code	
CO-1	To use tools for server-side programming
CO-2	Able to design SQL database
CO-3	To implement web application
CO-4	To implement access control using cookies
CO-5	To design and implement web application with roles and privileges

Syllabus	
Title	**WEB TECHONOLOGY**
Course Code	
Unit 1	Internet Basic – Introduction to HTML – List – Creating Table – linking document – frames –graphicstoHTMLDoc-Creatingsimple staticpages.
Unit-2	IntroductiontoJavaScript–AdvantageofJavascript–javascriptsyntax– Datatype–variable –array–operatorand expression–loopingconstructor–function– Dialogbox
Unit-3	JavaScript document object model – introduction – object in HTML – event handling – windowobject– browserobject– formobject– navigatorobject– buildinobject– cookies.
Unit-4	ASP.NET : Language Structure – page structure – page event, properties - compiler directives.HTML server controls – Anchor, Tables, Forms - Basic Web server controls – label, textbox,button,image,links,check&radiobutton,hyperlink.
Unit-5	Request and Response objects - Working with data – OLEDB connection class, Command classTransactionclass,dataadaptorclass,datasetclass. Security:Authentication,IPAddress,SecurebySSL&ClientCertificates.

Course Objectives	
Title	**PROJECT WORK (GROUP)**
Course Code	
CO-1	To understand the concept of research
CO-2	To know about the technical knowledge in various research fields
CO-3	To learn about the space provided for creativity
CO-4	To give a practical exposure to students.
CO-5	To gain to knowledge about the research.

Course Outcome	
Title	**PROJECT WORK (GROUP)**
Course Code	
CO-1	To identify the problem and finding the solution.
CO-2	To demonstrates sound technical knowledge of their selected project topic.
CO-3	To identify, analyse, and solve problems creatively through sustained critical investigation by conducting secondary survey.
CO-4	To give a practical exposure on any emerging managerial area andprovide opportunities to the students to apply theoretical and practical knowledge toprovide solution.
CO-5	Provides space for creativity.

Syllabus	
Title	**PROJECT WORK (GROUP)**
Course Code	
Unit 1	Title Page
Unit 2	Declaration by the student
Unit 3	Certificate from the guide
Unit 4	Acknowledgements
Unit 5	Contents
Unit 6	Chapter I: Introduction (Research problem, Objectives of the study, methodology etc)
Unit 7	Chapter II: Company Profile
Unit 8	Chapter II: Review of Literature/Conceptual Framework
Unit 9	Chapter III: Data Analysis
Unit 10	Chapter IV: Summary /findings/ Recommendations
Unit 11	Appendix(Questionnaire, Specimen copies of forms, other exhibits etc). Bibliography

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF COMMERCE

PROGRAM B.COM (C.S)

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	Become knowledgeable in the subject of Corporate Laws and apply the principles of the same to the requirements of the Employer / Institution / Own Business or Enterprise
PO-2	Apply various Provisions of company and Business Laws and IRDA
PO-3	Fundamentals of Taxation,Auditing and Budgeting
PO-4	Understanding and giving solutions to varied Financial Problems
PO-5	Identify and adopt compliance formalities in Company Administration.

Program Specific Outcomes	
	On Completion of Program , the student will be able to
PSO-1	Inculcating analytical heart and mind to manage day- to- day businessactivities
PSO-2	Solve the practical problems in the area of Company Administration and GST inconformity with the Societal, Legal and Cultural environment
PSO-3	Understand the problems of Corporate sector and inculcate inrequired skills for better Corporate Management
PSO-4	Be an active member of a corporate team with Leadership Attitude

Course Objectives	
Title	**I - FINANCIAL ACCOUNTING**
Course Code	**AY21A**
CO-1	To enable the students to understand the system of preparing financial statements f various types of organisation
CO-2	To familiarize the students with knowledge about financial reporting standards
CO-3	To enable the students to prevent money defalcation and cost
CO-4	To identify the main financial statements and their purpose.
CO-5	To describe the purpose of accounting and explain its role in business and society.

Course Outcome	
Title	**I FINANCIAL ACCOUNTING**
Course Code	**AY21A**
CO-1	The students will be able to analyse and prepare financial statement of different types of organisation.
CO-2	The students will be aware of the various amendments in financial reporting.
CO-3	The students should be able to solve practical problems regarding inventory valuation by FIFO.
CO-4	The students must know to classify in considering features of various transactions and able to apply structure of final accounts in proper manner.
CO-5	To understand application of hire purchase transactions in real life as regular transaction in the society.

Syllabus	
Title	**I FINANCIAL ACCOUNTING**
Course Code	**AY21A**
Unit 1	**Preparation of Financial Statement:** Final accounts of sole trading concern-Adjustments-Receipts and Payments-Income and expenditure-Balance sheet of non-trading organisation
Unit 2	**Depreciation and Insurance Claims:** Depreciation Accounting: Depreciation-Meaning –Causes-Types-Straight Line Method-Written down value method- Concept of useful life under Companies Act 2015 Insurance Accounting: Insurance claims – Calculation of Claim amount-Average clause(Loss of stock only)
Unit 3	**Single entry system:** Meaning and Features of Single entry-Defects-Difference between single entry and double entry system-Methods of calculation of Profit-Statement of Affairs Method-Conversion Method
Unit 4	**Rectification of Errors and Bank Reconciliation Statement**: Classification of Errors – Rectification of Errors – Preparation of Suspense a/c. Bank Reconciliation Statement – Need and preparation.
Unit 5	**Hire Purchase and Installment System:** Hire Purchase System- Default a repossession-Hire purchase trading account Installment System-Calculation of Profit.

Course Objectives	
Title	**BUSINESS COMMUNICATION**
Course Code	**AY21B**
CO-1	To facilitate the students to understand the concept of Communication.
CO-2	To know the basic techniques of the modern forms of communication.
CO-3	To participate effectively in groups with emphasis on listening , critical and reflective thinking and responding.
CO-4	To develop the ability to research and write a document paper or to give an oral presentation.
CO-5	To understand and apply basic principles of critical thinking,problem solving in the development of exposition and argument.

Course Outcome	
Title	**BUSINESS COMMUNICATION**
Course Code	**AY21B**
CO-1	Students understand the concept of communication and familiarize with modern form of communication
CO-2	To identify ethical,legal, cultural and global issues affecting business communication.
CO-3	To utilize analytical and problem solving skills appropriate to business communication.
CO-4	To communicate via electronic mail , internet, and other technologies.
CO-5	To deliver an effective oral business presentation.

Syllabus	
Title	**BUSINESS COMMUNICATION**
Course Code	**AY21B**
Unit 1	**Communication:** Definition – Methods – Types – Principles of effective Communication – Barriers to Communication – Business Letters – Layout.
Unit 2	**Business Letters:** Kinds of Business Letters: Interview – Application for a situation – Interview -Appointment – Acknowledgement – Promotion – Enquiries – Reply letter – Orders – Sales letter – Circular letter – Complaint letter.
Unit 3	**ɔrrespondence:** Bank Correspondence – Insurance Correspondence – Agency ɔrrespondence – Correspondence with Shareholders, Directors.
Unit 4	**Reports and Meetings:** Report Writing – Meetings – Agenda - Minutes of Meeting – Memorandum – Office Order – Circular – Notes.
Unit 5	**Forms of Communication:** Modern Forms of Communication: Fax – E-mail – Video Conferencing – Internet – Websites – uses of the various forms of communication.

Course Objectives	
Title	**International Trade**
Course Code	**AY31A**
CO-1	To acquire specialist knowledge in international trade
CO-2	To learn about WTO and how globalization of economy takes place
CO-3	It focus on analysis the again from trade and the changing pattern of trade
CO-4	This course deals theory and practice of international trade and of trade related police
CO-5	To learn about International monetary fund International liquidity

Course Outcome	
Title	**International Trade**
Course Code	**AY31A**
CO-1	To recognize various aspects of international marketing
CO-2	To identify the concerns of a more functional orientation in an setting
CO-3	To learn a basic international business vocabulary and become familiar with institutions and process of international trade
CO-4	To demonstrate an understanding of the nature of the international business environment and culture diversity
CO-5	To recognize how management operates within the framework of diverse financial system

Syllabus	
Title	**International Trade**
Course Code	**AY31A**
Unit 1	Theories of international trade – Ricardo – Haberlers opportunity cost – Heckseher Ohlin theorem
Unit 2	Trade policy – case for protection – Regional integration – European union – EEC – UNCTAD – GATT – Asian – Development bank
Unit 3	WTO – Function of WTO – An overview.
Unit 4	Balance of payments – Disequilibrium – Remidies – Exchange control – Purchasing power parity theory
Unit 5	International monetary system – IMF – SDR - International liquidity – IBRD.

Course Objectives	
Title	**ADVANCED FINANCIAL ACCOUNTING –II**
Course Code	**AY22A**
CO-1	To enable the students to understand the system of preparing financial statements for various types of organisation
CO-2	To familiarize the students with knowledge about financial reporting standards.
CO-3	To enable the student to understand the primary objectives of financial accounting is to reveal the profit and loss of the business
CO-4	To acquire conceptual knowledge of basis of accounting.
CO-5	To develop the skill of recording financial transactions and preparation of reports in accordance with GAAP.

Course Outcome	
Title	**ADVANCED FINANCIAL ACCOUNTING**
Course Code	**AY22A**
CO-1	The student will be able to understand the preparation of financial statements for business units other than corporate undertaking and their utility
CO-2	To recognize circumstances providing for increased exposed to errors and frauds.
CO-3	To determine the useful life and value of the appreciable asset.
CO-4	To describe the roles of accounting information and its limitations.
CO-5	To identify events that need to be recorded in the accounting records.

Syllabus	
Title	**ADVANCED FINANCIAL ACCOUNTING**
Course Code	**AY22A**
Unit 1	**Branch Accounts:** Dependent Branches - Stock and Debtors system – Distinction betwee Wholesale Profit and Retail Profit – Independent Branches (Foreign Branches excluded)
Unit 2	**Departmental Accounts:** Basis of Allocation of Expenses – Calculation of Profit - Inte departmental Transfer at cost or Selling Price.
Unit 3	**Partnership Accounts:** Admission of a Partner – Retirement of a Partner – Death of a Partner.
Unit 4	**Partnership Accounts:** Dissolution of a Partnership Firm – Insolvency of a Partner – Insolvency of all Partners- Piecemeal Distribution of cash in case of Liquidation of Partnership Firm.
Unit 5	**Accounting Standards for financial reporting** Objectives and uses of financial statements for users-Role of accounting standards-Development of accounting standards in India- Requirements of international accounting standards - Role of developing IFRS- IFRS adoption or convergence in India- Implementation plan in India- Ind AS- Difference between Ind AS and IFRS.

Course Objectives	
Title	**Corporate Management**
Course Code	**AY22B**
CO-1	To make the students to understand the basic concepts of management.
CO-2	To prepare the students to know about the significance of the management in Corporate world
CO-3	To help students gain business knowledge and be aware of the forgeries of trade.
CO-4	The main objectives of the course is to train students to make strategic and operational decisions to meet the expectations of the company.
CO-5	To make the students to know the goals of achieving in corporate management.

Course Outcome	
Title	**Corporate Management**
Course Code	**AY22B**
CO-1	To demonstrate a general knowledge framework and understanding of key functions in management as applied in practice.
CO-2	To obtain through electives in depth knowledge and understanding in more specific management related areas.
CO-3	To identify and appreciate the ethical issues in management decision areas.
CO-4	To obtain an understanding of how to undertake qualitative and quantitative research and apply this knowledge in the context of a major independent work.
CO-5	To identify and evaluate social , cultural, global, ethical and environmental responsibilities and issues

	Corporate Management
Course Code	**AY22B**
Unit 1	**Introduction to management :** Nature and functions of management – Priniciples of management – Role and functio of manager – Levels of management – Development of scientific management and othe schools of thought and approaches
Unit 2	**Planning and Organizing:** Planning – Need and importance – Forms - Types – Steps – Decision making – Types – Process. Organisation – Types – Organisation structure – Centralisation and decentralisation - Departmentation
Unit 3	**Human Resource Management:** Human resource – HRM and personal management- recruitment, selection and training methods –Human Resource Audit.
Unit 4	**Performance Appraisal And Incentives:** Performance Appraisal- Methods Promotion and transfer- Incentives- Monetary and Non-Monetary- Welfare and socia security measures.
Unit 5	**Direction & Control** Direction – Purpose – Requirements of effective direction – Motivation theories.Co-ordination – Need, type and techniques for excellent co-ordination- Controlling – Meaning and importance – Control process

Course Objectives	
Title	**BUSINESS ECONOMICS**
Course Code	AY32A
CO-1	To facilitate the students to understand the concept of Economics
CO-2	To Know the basic techniques of the modern forms of Economics
CO-3	To introduce students to the basic elements of commerce and economics.
CO-4	To illustrate what elements are considered while policy and decision making at the strategic level.
CO-5	To analyze operations of market under varying competitive condition and make optimal business decision.

Course Outcome	
Title	**BUSINESS ECONOMICS**
Course Code	**AY32A**
CO-1	Students understand the concept of communication and familiarize wit modern form of Economics
CO-2	Students will be able to understand and identify the economic variable in general business atmosphere.
CO-3	Students will be perceive the knowledge about economic at micro leve and various economic concepts.
CO-4	Learners will comprehend the relationship between various policies of business.
CO-5	Student will accomplish the identical short run and long run equilibriu of a firm and industry and also about different market structure and various pricing techniques.

Syllabus	
Title	**BUSINESS ECONOMICS**
Course Code	**AY32A**
Unit 1	Introduction to Economics – Wealth, Welfare and Scarcity Views on Economics - Positive and Normative Economics - Definition – Scope and Importance of Business Economics - Concepts: Production Possibility frontiers – Opportunity Cost – Accounting Profit and Economic Profit – Incremental and Marginal Concepts – Time and Discounting Principles – Concept of Efficiency- Business Cycle:- Inflation, Depression, Recession, Recovery, Reflation and Deflation.
Unit 2	Demand and Supply Functions: - Meaning of Demand – Determinants and Distinctions of mand – Law of Demand – Elasticity of Demand – Demand Forecasting – Supply concept and uilibrium
Unit 3	Consumer Behaviour : Law of Diminishing Marginal utility – Equimarginal Utility – Indifference Curve – Definition, Properties and equilibrium
Unit 4	Production: Law of Variable Proportion – Laws of Returns to Scale – Producer'sequilibrium – Economies of Scale - Cost Classification – Break Even Analysis
Unit 5	Product Pricing: Price and Output Determination under Perfect Competition, Monopoly – scriminating monopoly – Monopolistic Competition – Oligopoly – Pricing objectives and ethods.

Course Objectives	
Title	**CORPORATE ACCOUNTING – I**
Course Code	**AY23A**
CO-1	To make the students familiarize with corporate accounting procedures
CO-2	To enable the students to acquire conceptual knowledge about the preparation of the company accounts.
CO-3	To provide the students with an understanding of financial reporting for the partners as well as for external users.
CO-4	To know the concepts and standards underlying the accounting procedures.
CO-5	To know the uses of accounting information for business decisions as a basic language of business.

Course Outcome	
Title	**CORPORATE ACCOUNTING – I**
Course Code	**AY23A**
CO-1	The student will learn the accounting procedures of corporate undertaking and their financial statement preparations.
CO-2	To understand exactly what a partnership is.
CO-3	To know what the main features of a partnership agreement should be.
CO-4	To draw up the final accounts of a partnership business.
CO-5	To record the entries relating to the dissolution of a partnership.

Course Outcome	
Title	**COMPANY LAW AND SECRETARIAL PRACTICE**
Course Code	AY23B
CO-1	To gain the knowledge about general administration of company law including corporate structure.
CO-2	To have knowledge about dividend ,distribution ,accounts , audits and liquidation of companies.
CO-3	To gather knowledge about the procedural aspects of depositories law.
CO-4	Students will be able to understand the basic of control and management of the companies in India.
CO-5	To know about the uses and application of various documents in corporate sector

Syllabus

Syllabus	
Title	**CORPORATE ACCOUNTING – I**
Course code	

Course Objectives	
Title	**COMPANY LAW AND SECRETARIAL PRACTICE**
Course Code	**AY23B**
CO-1	To acquire knowledge at practical and procedural aspects of a company formation and e-governance including digital signature and compliance requirements .
CO-2	To understand and evaluate the legal framework of corporate environment in India and to gain elementary knowledge of Indian corporate law.
CO-3	To impart basic knowledge of the provisions of the companies act 2013 and the depositories act 1996.
CO-4	To know about the uses and application of various documents in corporate sector.
CO-5	To understand the basic of control and management of the companies in India.

Title	**COMPANY LAW AND SECRETARIAL PRACTICE**
Course Code	**AY23B**
Unit 1	**INTRODUCTION OF COMPANY AND ROLE OF COMPANY SECRETARY** Evolution of company law – Meaning and characteristics of a company – Stages of incorporation – e-filling – Memorandum of association and articles of association - alternation – Effects of registration – doctrine of constructive notice – Ultravires and indoor management – lifting of corporate veil .
Unit 2	**PROSPECTUS AND SHARE CAPITAL** Prospectus – shelf prospectus – red herring prospectus – civil & criminal liability for mis-statement in prospectus – statement in lieu of prospectus – secretarial duties in the issue of prospectus Share capital – Alternation f share capital – rights issue , Bonus issue ,Private and preferential allotment- Dividend , interim dividends , warrants and mandates – secretarial duties in the issue of share capital .
Unit 3	**MEMBERS AND SHAREHOLDERS** Members – rights and responsibilities – who can be a member – member , shareholder , contributory- difference – transfer and transmission of shares (including depository mode)- nomination and its importance .
Unit 4	**KEY MANAGERIAL PERSONAL AND MEETINGS** Directors – Women Director – Independent Director and whole time key managerial personnel – Director identification number and its significance – Duties , qualification and disqualification . Board meeting , shareholder meeting , committee meeting , mandatory committee meeting – role and composition – Powers of the board – Notice , Agenda , minutes and resolution – secretarial duties and meeting .

Unit 5	**WINDING UP** Modes of winding up – winding up the tribunal – Voluntary winding up – NCLT – Special courts – mediation and Conciliation panel.

Course Objectives	
Title	**BUSINESS STATISTICS**
Course Code	**AY33A**
CO-1	To customize the importance of business statistics fot the commerce students
CO-2	To identify the fundamental legal principals behind contractual agreements .
CO-3	To examine how business can be held liable in tort for the actions of their employees.
CO-4	To understand the legal and fiscal structure of different forms of business organizations and a responsibilities as an employer.
CO-5	To acquire problem solving techniques and to be able to present coherent concise legal argument.

Syllabus	
Title	**BUSINESS STATISTICS**
Course Code	**AY33A**
Unit 1	**Introduction** Meaning and Definition of statistics – Collection and tabulation of statistical Data – Presentation of statistical data – Graphs and diagram
Unit 2	**Measures of central tendency and measures of variation :** Measures of central tendency – arithmetic mean, Median, Mode, Harmonic Mean and Geometric Mean , measures of variation – Standard deviation – Mean deviation – Quartile deviation – Skeweness and kurtosis – Lorenz curve
Unit 3	**CORRELATION AND REGRESSION ANALYSIS :** Simple correlation – Scatter diagram – karl Pearson's correlation – Spearman's Rank correlation – Regression - meaning – Linear Regression. .
Unit 4	**TIME SERIES :** Analysis of time series – causes of variation in time series Data – Components of time series – Additive and multiplicative models – determination of trend by semi average , moving average and least square (linear second degree and exponential) Methos – computation of seasonal indices by simple average, ratio to moving average ratio to trend and link relative methods
Unit 5	**INDEX NUMBERS** Meaning and types of index numbers – problems in construction of index numbers- methods of construction of price and quantity indices –test of adequacy – errors in index numbers – chain base index numbers – base shifting – splicing – deflation – customer price index and its users – statistical control

Course Objectives	
Title	**ADVANCED CORPORATE ACCOUNTING – II**
Course Code	**AY24A**
CO-1	To provide the students with an understanding of accounting procedure for corporate restructuring.
CO-2	TomakethestudentsunderstandtheapplicationsofAccountingTransactions in Corporate Sector.
CO-3	Apply the concept and legal rules of amalgamation, reconstruction and liquidation process of company.
CO-4	To know how the accounting entries are posted in books.
CO-5	To the accounting system for non profit organization.

Course Outcome	
Title	**ADVANCED CORPORATE ACCOUNTING**
Course Code	**AY24A**
CO-1	Student would able to understand amalgamation, absorption and External reconstruction.
CO-2	Student would aware about preparation of final accounts in banking sectors as per schedules.
CO-3	Students would able to families with the liquidation process of company.
CO-4	Students would able to introduce and develop the knowledge of holding company accounts as per schedule.
CO-5	Students would compute the internal reconstruction.

Syllabus	
Title	**ADVANCED CORPORATE ACCOUNTING**
Course Code	**AY24A**

Unit 1	**Internal Reconstruction** Meaning - Alteration of share capital – Accounting Procedures.
Unit 2	**Amalgamation, Absorption & External Reconstruction** Meaning- Amalgamation in the nature of Merger, Purchase - External Reconstruction – Applicability of AS 14- Calculation of Purchase consideration (all methods) – Journal Entries in the books of Transferor and Transferee Companies, Revised Balance Sheet (excluding inter - company holdings)
Unit 3	**Liquidation** Meaning – Preparation of Liquidator's Final Statement of Accounts – Calculation of Liquidator Remuneration.
Unit 4	**Consolidation** Holding Company –Subsidiary company - Meaning – Preparation of Consolidated Final Statement of Accounts.
Unit 5	**Accounting For Banking Companies** Bank accounts - Concept of Non-Performing Assets (NPA)-Preparation of Profit and Loss Account - Asset classification - Preparation of Balance Sheet.

Course Objectives	
Title	**INDIRECT TAXATION**
Course Code	**AY24B**
CO-1	To facilitate the students to gain knowledge of the principles of Indirect Taxation.
CO-2	To enable the students to gain knowledge of Goods and Services (GST)
CO-3	To highlight the students about customs duty.
CO-4	The students will be able to understand the concepts of Indirect taxation, types and Assessment procedures
CO-5	To make students to use various deductions to reduce the taxable income.

Course Outcome	
Title	**INDIRECT TAXATION**
Course Code	**AY24B**
CO-1	A tax is a compulsory charge imposed by government.
CO-2	Goods to serve tax that are CGST,SGST,IGST, UGST
CO-3	GST Assessment procedure its self-assessment.
CO-4	GST Audit is enabling to turnover based audit.
CO-5	Custom duty is a tax imposed on import and export of goods.

Syllabus	
Title	**INDIRECT TAXATION**

Course Code	**AY24B**
Unit 1	History and Objectives of Taxation – Tax System in India- Direct & Indirect Taxes – Meaning and Types – Powers of Union and State to levy taxes. **Constitutional Amendments leading to introduction of GSTand their importance**
Unit 2	Background behind implementing GST- The need for GST- objectives of GST- Business impact- Benefits of GST-SGST- CGST and IGST- Taxes covered by GST- Definitions - Scope and Coverage Scope of supply- Levy of tax- Rate Structure- Taxable Events. **Types of Supplies – Composite and Mixed Supplies –CompositionLevy.**
Unit 3	Return- Refunds- Input Tax Credit- Reverse charge Mechanism, Transitional Provisio composition under GST- Administrative structure of GST-Officers as per CGST Act- Office as per SGST Act-Jurisdiction- Appointment Powers. **Relevance of Cross Empowerments**
Unit 4	Assessment and Audit under GST- Demands and Recovery- Appeals and revision- Advance ruling Offences and Penalties. **National Anti-Profiteering Authority – GST Practitioners – eligibility and Practiceand Career avenues**
Unit 5	The custom duty- Levy and collection of customs duty- Organisations of custom departments- Officers of customs- powers- Appellate Machinery- Infringement of the Law-Offences and Penalties- Exemptions from duty customs duty draw back- duties free Zones. **Export incentive schemes**

Course Objectives	
Title	**Securities Law And Market Operation**
Course Code	**AY34A**
CO-1	To promote understanding and in-depth knowledge of trading in securities and its implication in financial markets.
CO-2	To provide expert knowledge in the legislation, rules, regulation, governing the entities listed on the stock exchange
CO-3	To provide the basic understanding of the working capital markets in India
CO-4	To make understand SEBI guidelines
CO-5	Gain knowledge on trading in stock exchange

Course Outcome	
Title	**Securities Law And Market Operation**
Course Code	**AY34A**
CO-1	Students can enable regarding regulations of stock exchange in India.
CO-2	To know about meaning and role of stock exchange.
CO-3	To make students to overview of stock exchange in India.
CO-4	To make students to understand about stock exchange is an organized market place.
CO-5	To analyze the various market structure in stock exchange.

Syllabus	
Title	**Securities Law And Market Operation**
Course Code	**AY34A**
Unit 1	Primary Market /New Issue Market: Meaning – Functions of New issue market- Methods of floating new issues – Players involved in the new issue market (Merchant bankers – Underwriters – Brokers – Register -Lead managers and bankers)- role of SEBI relating to the new issue market – SEBI Guidelines for disclosure & Investor Protection.
Unit 2	Secondary Market / Stock Exchange : Origin & Management of stock exchanges in India – Characteristics – functions –Members – Granting recognition to stock exchange – Listing of securities & registration of brokers – kinds of brokers in stock exchanges – NSE – BSE – OTCEI – SEBI Guidelines relating to listing of securities.
Unit 3	Financial Instruments in New Issue & Secondary Market : Treasury bills – Commercial bills – Certificate of deposits- Equity shares – preference shares – Sweat equity shares - debentures – American Depository Receipts – Global Depository Receipts – exchange traded funds & exchange traded notes – Mutual Funds .

Unit 4	Mechanism of Stock Market trading :Screen based trading – Demat trading and role of depositories – Market Derivatives , advantages and its types – future , hedge fund , forward , options & swaps-market indexes-SENSEX,NIFTY & CNX NIFTY (basics)
Unit 5	Meaning – functions-credit rating in India -credit rating agencies in India -CRISIL & CARE

Course Objectives	
Title	**ENVIRONMENTAL STUDIES**
Course Code	**ENV4V**
CO-1	Demonstrate critical thinking skills in relation to environmental affairs
CO-2	Demonstrate knowledge and application of communication skills and the ability to write effectively in a variety of contexts
CO-3	Demonstrate an ability to integrate the many disciplines and fields that intersects with environmental concerns
CO-4	Demonstrate an awareness, knowledge, and appreciation of the intrinsic values of ecological processes and communities
CO-5	Demonstrate an integrative approach to environmental issues with a focus on sustainability

Course Outcome	
Title	**ENVIRONMENTAL STUDIES**
Course Code	**ENV4V**
CO-1	Demonstrate critical thinking skills in relation to environmental affairs
CO-2	Demonstrate knowledge and application of communication skills and the ability to write effectively in a variety of contexts
CO-3	Demonstrate an ability to integrate the many disciplines and fields that intersects with environmental concerns
CO-4	Demonstrate an awareness,knowledge,and appreciation of the intrinsic values of ecological processes and communities

CO-5	Demonstrate an integrative approach to environmental issues with a focus on sustainability

Syllabus	
Title	**ENVIRONMENTAL STUDIES**
Course Code	**ENV4V**
Unit 1	**Introduction to Environmental Studies** Multidisciplinary nature of environmental studies; Scope and importance; concept of sustainability and sustainable development.
Unit 2	**Ecosystem (2 lectures)** What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: Food chains, food webs and ecological succession, Case studies of the following ecosystem: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystem (ponds, stream, lakes, rivers, ocean, estuaries)
Unit3	**Natural Resources : Renewable and Non – renewable Resources (6 lectures)** Land resources and landuse change: Land degradation, soil erosion and desertification. Deforestation : Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water : Use and over –exploitation of surface and ground water, floods, droughts, conflicts over water (international and inter-state). Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.
Unit 4	**Biodiversity and Conservation (8 lecturers)** Levels of biological diversity: genetics, species and ecosystem diversity, Biogeographic zones of India: Biodiversity patterns and global biodiversity hot spots India as a mega- biodiversity nation, Endangered and endemic species of India. Threats to biodiversity: Habitat loss, poaching of wildlife, man- wildlife conflicts, biological invasions; Conservations of biodiversity: In-situ and Ex-situ Conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.
Unit 5	**Environmental Pollution (8 lecturers)** Environmental pollution: types, causes, effects and controls: Air, Water, soil and noise Pollution. Nuclear hazards and human health risks

	□ Solid waste management: Control measures of urban and industrial waste □ Pollution case studies.

Course Objectives	
Title	**COST ACCOUNTING**
Course Code	DSC09
CO-1	To make the students to know the Process of Accounting for Cost Elements.
CO-2	To understand the advantages of Costing to the Stakeholders, Workers, Creditors and the Public.
CO-3	At the end of the course students will understand the basic elements of costing
CO-4	To create mass awareness and promote cost and management accounting education.
CO-5	To extend all possible professional expertise to ensure transparency and governance as desired by the government.

Course Outcome	
Title	**COST ACCOUNTING**
Course Code	DSC09
CO-1	Aimed to familiarize the concept of cost accounting.
CO-2	Helpstogatherknowledgeonpreparationofcostsheetitspracticalpointofview.
CO-3	Accrue basic knowledge on cost accounting concept, element of cost,classification of cost, labour,various system of remuneration and incentive
CO-4	Need for material control ,valuation
CO-5	To understand the concept of overhead

Syllabus	
Title	**COST ACCOUNTING**
Course Code	DSC09
Unit 1	**Introduction of Cost Accounting** Definition - Nature and Scope – Principles of Cost Accounting – Cost Accounting and Financial Accounting - Cost Accounting Vs Management Accounting – Installation of Costing System –Classification of Costs – Cost Centre – Profit Centre
Unit 2	**Cost sheet and methods of costing** Preparation of Cost Sheet. Reconciliation of Cost and Financial Accounts.- Unit Costing- Job Costing.
Unit 3	**Material Costing** Material Control – Meaning and Objectives – Purchase of Materials – Stock Levels of Materials – EOQ – Stores Records – ABC Analysis – Issue of Materials – Methods of Issue – FIFO – LIFO – HIFO – Base Stock Method – Specific Price Method – Simple and Weighted Average Method – Standard and Inflated Price Method.
Unit 4	**Labour Costing** Direct Labour and Indirect Labour – Time Keeping – Methods and Calculation of Wage Payments – Time Wages – Piece Wages – Incentives – Different Methods of Incentive Payments - Idletime – Overtime – Labour Turnover - Meaning, Causes and Measurement.
Unit 5	**Overheads Costing** Overheads – Definition – Classification – Allocation and Apportionment of Overheads – Basis of Allocation – Absorption of Overheads - Preparation of Overheads Distribution Statement – Machine Hour Rate – Computation of Machine Hour Rate.

Course Objectives	
Title	**CORPORATE GOVERNANCE AND ETHICS**
Course Code	**DSCO6**
CO-1	To impart knowledge on governance which ensure ethics in corporate management.
CO-2	To provide an understanding on legal enforcement for management of corporate health in the interest of shareholder & public.
CO-3	To demonstrate critical thinking on corporate governance and ethics.
CO-4	To plan, work and study independently.

CO-5	To identify,find , record, organize and manipulate relevant knowledge.

Course Outcome	
Title	**CORPORATE GOVERNANCE AND ETHICS**
Course Code	**DSCO6**
CO-1	To understand the importance of ethics and corporate governance in the day to day working of organization.
CO-2	To learn the issues involved in maintaining ethics and how to deal with such situation.
CO-3	To learn the scope of business ethics in compliance finance, human resources, marketing production.
CO-4	To demonstrate problem solving ability.
CO-5	To communicate effectively to a variety of audiences or using a variety of methods.

Syllabus	
Title	**CORPORATE GOVERNANCE AND ETHICS**
Course Code	**DSCO6**
Unit 1	**Corporate Governance** Corporate governance – meaning – objectives – need - importance – principles – corporate governance and organisation success. Corporate governance in India
Unit 2	**Levels of Governance Structure** Corporate governance and role, responsibilities and powers - Board of Directors, Corporate Management Committee and Divisional Management Committee.
Unit 3	**Corporate Governance Forums**

	CII code on corporate governance – features - Various Corporate Governance forums – CACG, OECD, ICGN AND NFCG.
Unit 4	**Corporate Social Responsibility** Corporate Social Responsibility – definition – nature – levels – phases and approaches, principles, Indian models – dimensions. Corporate social reporting - Objectives of Corporate Social Reporting and case studies.
Unit 5	**Business Ethics** Business ethics – meaning, significance, scope – factors responsible for ethical and unethical business decision. Unethical practices in Business – Business ethics in India – Ethics training programme.

Course Objectives	
Title	**BUSINESS LAWS**
Course Code	**CSC06**
CO-1	To highlight the Provisions of Law governing the General Contract and Special Contract.
CO-2	To enable the students to understand the Legal Remedies available in the Law to the Business and other People.
Co-3	To identify the fundamental legal principles behind contractual agreements
Co-4	To examine how businesses can be held in tort for the actions of their employees
Co-5	To acquire prblem solving techniques .

Course Outcome	
Title	**BUSINESS LAWS**
Course Code	**CSC06**
CO-1	On the completion of the syllabus students will understand the basis provisions of law, contract and legal remedies in the law.
Co-2	To demonstrate an understanding of the legal environment of business
C0-3	To apply basic legal knowledge to business transaction
Co-4	To communicate effectively using standard business and legal terminology
Co-5	To identify contract remedies.

Syllabus	
Title	**BUSINESS LAWS**
Course Code	**CSC06**
Unit 1	Indian Contract Act -Formation-Nature and Elements of Contract – Classification of Contracts- Contract Vs Agreement.
Unit 2	Offer – Definition – Forms of offer – Requirements of a Valid Offer. Acceptance – Meaning - Legal rules as to a Valid Acceptance. Consideration – Definition – Types - Essentials. Capacity of Parties – Definition – Persons Competent to contract. Free consent – Coercion – Undue Influence – Fraud – Misrepresentation - Mistake. Legality of object - Void agreements Unlawful Agreements.
Unit 3	**Performance of Contract** Performance of Contracts – Actual Performance – Attempted Performance - Tender. Quasi Contract – Definition and Essentials. Discharge of Contract - Modes of Discharge – Breach of Contract – Remedies available for Breach of Contract.
Unit 4	**Sale of Goods Act** Sale – Contract of Sale – Sale Vs Agreement to Sell – Meaning of Goods – Conditions and Warranty – Caveat Emptor – Exceptions of Caveat Emptor – Buyer and Seller of Goods - Unpaid Seller – Definition – Rights of an Unpaid Seller.
Unit 5	**Contemporary Issues in Business Law** Right to Information Act, 2005 - Meaning of 'Information', 'Right to Information' 35 -Need for Right to Information. Public Information - Request for obtaining information. Grounds for rejection of information. Central Information Commission - Constitution and powers. Information Technology Act - Purpose and significance. Cyber Crimes - Types of crimes, nature and punishment Intellectual Property Law - Patent, trademark, copyright and industrial design and laws of Insurance.

Course Objectives	
Title	**INCOMETAX LAW AND PRACTICE-I**
Course Code	**CSE1A**
CO-1	To provide a detailed understanding of the various provisions of I.T. Act.
CO-2	To enable the students to about the Assessment Procedures and Tax Planning.
Co-3	To measure the income under the head income from salary
Co-4	To calculate income under the head income from house property
C0-5	To assess income under the head income from business and profession .

Course Outcome	
Title	**INCOMETAX LAW AND PRACTICE-I**
Course Code	**CSE1A**
CO-1	The students will understand the concepts of Income tax, Types of filing and computation of tax from various head.
Co-2	The students will be able to communicate effectively both in the oral and written format
Co-3	The students will be able to apply the knowledge of fundamental concept of finance
Co-4	The students will understand basic concepts in economics and how the economy works
Co-5	The students will be able to use the statistical, graphical and algebraic and other techniques wherever relavent

Syllabus	
Title	**INCOMETAX LAW AND PRACTICE-I**
Course Code	**CSE1A**

UNIT-1	INTRODUCTION Meaning of Income – Features of Income Tax – Types – Important Definitions Under the Income Tax Act – Assessee – Types – Rates of Tax – Residential Status – Scope of Total Income –Incomes Exempt from tax.
UNIT-2	Income from Salary Definition – Allowances – Valuation of perquisites – Deductions from Salary – Gratuity – Pension – Commutation of Pension – Leave Salary – Profits in lieu of Salary - Provident Funds – Deductions under Sec. 80.
UNIT-3	Income from House Property Annual Value – Meaning and Computation – Deductions from Annual Value – Legal Provisions.
UNIT-4	Profits and Gains from Business or Profession Income from Business or Profession – Allowable expenses – Not allowable expenses - General deductions – Provisions relating to Depreciation – Deemed Business Profits - Undisclosed incomes – Investments – Compulsory maintenance of Books of accounts – Audit of Accounts of certain persons – Special provisions for Computing Incomes on estimated basis – Computation of Income from Business or Profession.
UNIT-5	E-filing & Submission of Returns E-filing – Concept – Procedure - 26AS – TDS – Traces – Filing of Return – Various Returns – Permanent Account Number (PAN) – Usage of PAN – Concept of Transfer Pricing - Fundamentals.

Course Objectives	
Title	**MARKETING**

Course Code	**CSC08**
CO-1	To facilitate the students to understand the importance and the relevance of marketing i to- day's Business world
CO-2	To facilitate the students to understand the importance and the relevance of marketing i to- day's Business world
CO-3	To understand the basic concepts of Marketing, Market Segmentation, Marketing Mix and Recent trends in Marketing.
Co-4	To introduce the marketing concepts and how we identify,understand and satisfy the needs of customers and markets
Co-5	To analyse companies and competitors and to introduce marketing strategy to increase awarenessof the strategic and tactical decisions

Course Outcome	
Title	**MARKETING**
Course Code	**CSC08**
CO-1	Student would able to understand marketing concept and environment.
CO-2	Students acquire knowledge about products and channels of distribution.
CO-3	Learn knowledge about promotion.
CO-4	Learn how to fix the product pricing and product mix.
CO-5	Students would able to know CRM concept.

Syllabus	
Title	**MARKETING**

Course Code	CSC08
Unit 1	InIntroduction to Marketing –Meaning – Definition and Functions of Marketing marketing Orientation – Role and Importance of Marketing – Classification of Markets
Unit 2	Market Segmentation – Concept – Benefits – Basis and Levels. Introduction to consumer Behaviour – Need for study – Consumer buying decision process – Buying motives.
Unit 3	Marketing mix. Product – Meaning – Introduction to Stages of New Product Development – Types – Introduction to PLC – Product Mix – Price – Pricing Policies and Methods.
Unit 4	Channels of Distribution (Levels) -Channel Members -Promotion,-Communication Mix –baasics of Advertising, Sales promotion and personal selling.
Unit 5	Recent trends in marketing -A basic understanding of e- marketing – consumerism-market research - MIS and marketing regulation .

Course Objectives	
Title	**INDUSTRIAL LAWS**
Course Code	**DSC13**
CO-1	To acquire knowledge on various rules and regulations prevalent in the present business scenario.
CO-2	To gain insight on various legal Acts passed to protect the health, safety & welfare of the employees.
CO-3	To provide and improve the welfare,amenities of workers
Co-4	To maintain good relationship between employees and employers
Co-5	To safeguard the workers against exploitation

Course Outcome	
Title	INDUSTRIAL LAWS
Course Code	DSC13
CO-1	Students should able to elaborate the concepts of industrial relations
CO-2	The students should able illustrate the role of trade union in the industrial setup
C0-3	The students able to outline the important causes and impact of industrial disputes
CO-4	Students should able to elaborate industrial dispute settlement procedure
CO-5	Students should be able to summarize the important provision of wage legislation,in reference to payment of wages act 1936,minimum wages act 1948 and payment of bonus act 1965.

Syllabus	
Title	**INDUSTRIAL LAWS**
Course Code	DSC13
Unit 1	**Factories act 1948** Definitions – Health – Safety – Welfare – Working Hours of Adults – Employment of Women – Employment of Young Persons – Leave with Wages.
Unit 2	**Industrial Disputes Act 1947** Definitions – Authorities under the Act – Reference of Disputes – Procedures and Powers of Authorities – Strikes and Lock-outs – Lay-off & Retrenchment – Special Provisions relating to Lay-off, Retrenchment & Lock-outs
Unit 3	**The Workmen Compensation Act 1923** Need for the Act – Scope & Coverage of the Act – Definitions – Employer's liability for Compensation (Section 3) including Theory of Notional Extension & Occupational Diseases – Defences available to Employer – Amount & Distribution of Compensation – Notice & Claim – Medical Examination - Obligations & Rights of Employers & Employees - Schedules to the Act
Unit 4	**Employees State Insurance Act 1948** Objects-definitions-ESI Corporation, functions-contribution and recovery- benefits- penalties for false claims
Unit 5	**Employees Provident Fund and Miscellaneous Provision Act, 1952** Objects- definition- provident fund schemes- contribution and recovery – penalties and offences

Course Objectives

Title	MANAGEMENTACCOUNTING
Course Code	CSC18
CO-1	To enable the students to get knowledge about the various techniques of Management Principles.
CO-2	To make the students to get practical skill in solving management problems.
CO-3	Understand the primary purpose of management accounting namely financial statement analysis and budgetary control
CO-4	Develop and apply budget for planning and controlling purpose.
CO-5	To inculcate capital budget and to identify best investment proposal.

Course Outcome	
Title	MANAGEMENTACCOUNTING
Course Code	CSC18
CO-1	Helps to understand the basic concept of managerial principle techniques.
CO-2	Help to analyse financial statement.
CO-3	To evaluate financial position of company by using ratio analysis.
CO-4	Fund flow statement helps to schedule working capital changes in business concern.
CO-5	Evaluate cash inflow or outflow in business operations.
CO-6	Describe various budgets in several departments.

Syllabus	
Title	MANAGEMENTACCOUNTING

Course Code	CSC18
Unit 1	**Introduction** Management Accounting - Meaning- Scope- Importance- Limitations - Management Accounting Vs Cost Accounting – Management Accounting Vs Financial Accounting.
Unit 2	**Financial Statement Analysis** Analysis and Interpretation of Financial Statements – Nature and Significance – Types of Financial Analysis – Tools of Analysis – Comparative Statements – Common size Statement – Trend Analysis.
Unit 3	**Ratio Analysis** Meaning – Advantages – Limitations – Types of Ratios – Liquidity Ratios – Profitability Ratios Turnover Ratios – Capital Structure Ratios – Leverage Ratios – Calculation of Ratios.
Unit 4	**Fund Flow Analysis & Cash Flow Analysis** Introduction, Meaning of Funds Flo Statement-Ascertainment of flow of funds- Technique of preparing funds flow statemen Schedule of Changes in Working Capital- Adjusted Profit and Loss account-Funds Flo Statement Meaning of Cash Flow Statements – Advantages – Limitations – Preparatic of Cash Flow Statement – Types of Cash flows - Operating, Financing and Investin Cash flows.
Unit 5	**Budgetary Control & Marginal Costing** Budgetary Control – Meaning – Preparatic of various Budgets – Cash Budget - Flexible Budget – Production Budget – Sales Budge Capital Expenditure Control - Application of Marginal Costing in Decision Making Make or Buy –Shut down or Continue – Exploring New Markets.

Course Objectives	
Title	**ENTREPRENEURIAL DEVELOPMENT**
Course Code	CSC19
CO-1	To enable the students to understand the concept of Entrepreneurship and to learn the professional behavior expected of an entrepreneur.
CO-2	To identify significant changes and trends which create business opportunities and to analyze the environment for potential business opportunities.
CO-3	To provide conceptual exposure on converting idea to a successful entrepreneurial firm.
CO-4	On completion of syllabus student will understand on the basic concepts of entrepreneurship and business opportunities to familiars with knowledge about business and project reports for starting a new ventures on team based
CO-5	To make students to learn about business sectors.

Course Outcome

Title	ENTREPRENEURIAL DEVELOPMENT
Course Code	CSC19
CO-1	Students could able to understand the concept of entrepreneur.
CO-2	Help to identity project and feasible analysis.
CO-3	Students understand government policy for young entrepreneur.
CO-4	Gain knowledge on financial literacy toward entrepreneur.
CO-5	Help to identify the different types of entrepreneur.

Syllabus	
Title	ENTREPRENEURIAL DEVELOPMENT
Course Code	CSC19
UNIT-1	**Entrepreneurship** -Entrepreneur : Meaning of entrepreneurship – Types of Entrepreneurship – Traits of entrepreneurship – Factors promoting entrepreneurship- Barriers to entrepreneurship- the entrepreneurial culture- Stages in entrepreneurial process – Women entrepreneurship and economic development- SHG.
UNIT-2	**Developing Successful Business Ideas** -Recognizing opportunities – trend analysis – generating ideas – Brainstorming, Focus Groups, Surveys, Customer advisory boards, Day in the life research – Encouraging focal point for ideas and creativity at a firm level-Protecting ideas from being lost or stolen – Patents and IPR.
UNIT-3	**Opportunity Identification and Evaluation** -Opportunity identification and product/service selection – Generation and screening the project ideas – Market analysis, Technical analysis, Cost benefit analysis and network analysis- Project formulation – Assessment of project feasibility- Dealing with basic and initial problems of setting up of Enterprises.
UNIT-4	**Business Planning Process** -Meaning of business plan- Business plan process- Advantages of business planning- preparing a model project report for starting a new venture (Team-based project work).
UNIT-5	**Funding** -Sources of Finance- Venture capital- Venture capital process- Business angles- Commercial banks- Government Grants and Schemes.

Course Objectives	
Title	**INCOMETAX LAW AND PRACTICE-II**
Course Code	CSE2A
CO-1	To facilitate the students in understanding the various Provisions I.T. Act.
C0-2	To acquire knowledge regarding provisions of set-off and carry forward of losses along with deemed income
Co-3	Able to compute total income of an individual after defining reductions U/S 80C to 80U
Co-4	Able to compute income under the head income from capital gain and other
Co-5	Able to understand amendments made from time to time in finance act

Course Outcome	
Title	**INCOMETAX LAW AND PRACTICE-II**
Course Code	CSE2A
CO-1	The students will understand the procedure for computing taxable income from different heads, clubbing of income, Setoff and carry forward of losses and Deductions applicable to an individual.
CO-2	To acquire knowledge regarding provisions of set-off and carry forward of losses along with deemed income
Co-3	Able to compute total income of an individual after defining reductions U/S 80C to 80U
Co-4	Able to compute income under the head income from capital gain and other
Co-5	Able to understand amendments made from time to time in finance act

Syllabus	
Title	**INCOMETAX LAW AND PRACTICE-II**
Course code	CSE2A
UNIT-1	Income from Capital Gain Capital Gain – Meaning – Short term and Long term Capital Gains – Certain Transactions not included as transfer – Cost of Acquisition – Cost of Improvement – Indexation – Capital Gain under different circumstances – Exempted Capital Gains – Computation of Capital Gains.
UNIT-2	Income from other sources Computation – Grossing up – Deductions in Computing Income under the head and other related provisions
UNIT-3	Clubbing of Incomes and Set off / Carry forward and Set – Off of losses Clubbing of Incomes under various situations – Deemed Incomes – Simple Problems on clubbing of incomes – Setoff – Carry forward and set off of losses
UNIT-4	Deductions from Gross Income Permissible Deductions from Gross Total Income Sec.80C, 80CCC, 80CCCD, 80D, 80DD, 80DDB, 80E, 80G, 80GG, 80GGA, 80QQB, 80RRB, 80U. Assessment of Individual – Computation of Tax.
UNIT-5	Income Tax Authorities – Powers of the Central Board of Direct Taxes (CBDT), Commissioners of Income Tax and Income Tax officers. Assessment Procedures - Self Assessment – Best Judgement Ass e ssme n t – Income Escaping Assessment (Reassessment)-Advance Payment of Tax – Meaning and Due dates

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR -602024

DEPARTMENT OF BIOTEHNOLOGY

Program:B.Sc.BIOTECHNOLOGY

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	The program aims to train the students to develop global competence in the area of basic and applied biological science
PO-2	The students can understand the role of biotechnology in society
PO-3	Biotechnology program has the opportunities in the health care sector, diagnostics, research, food technology, pharmaceutical industry and education.
PO-4	It is an integrated science with interdisciplinary knowledge of Biochemistry, Molecular Biology, Microbiology, Genetics, Plant and Animal Sciences, Environmental and Pharmaceutical Sciences.
PO-5	The subject knowledge of students are enhanced by using traditional and modern teaching methods

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	The practical syllabus is designed to enable the students to link and support with their theory background.
PSO-2	The syllabus imparts the knowledge of handling instruments
PSO-3	The programme provides knowledge to start own enterprises by students for their future development.

Course Objectives	
Title	**CELL AND MOLECULAR BIOLOGY**
Course Code	**SC21A**
CO-1	To introduce the students to various biological activities occurring at cellular level
CO-2	To introduce the student to the basic properties of cells.
CO-3	Students can understand the structural design of Prokaryotic and Eukaryotic cells.
CO-4	Students can gain knowledge in the synthesis, structure, importance and the inter-relationships between the DNA, RNA and Proteins.
CO-5	The major molecular processes which governs all the cellular activities and their regulations.

Course Outcome	
Title	**CELL AND MOLECULAR BIOLOGY**
Course Code	**SC21A**
CO-1	To understand the structure and organization of prokaryotes and eukaryotes
CO-2	To gain knowledge about the cell organelles and function
CO-3	To know the structure and function of DNA and RNA
CO-4	To understand the central dogma of the cell
CO-5	To gain knowledge about cell cycle, cell division, cell differentiation and communication

Syllabus	
Title	**CELL AND MOLECULAR BIOLOGY**
Course Code	**SC21A**
Unit 1	Introduction to the cells: Discovery and diversity of cells - Cell theory - Structure of prokaryotic (bacteria) and eukaryotic cells (plant and animal cells).
Unit 2	Biomolecules and Cell organelles: Biomacromolecules and Biomicromolecules (Primary functions in the cell). Structure and Functions of Cell Organelles: Cell wall - Cell membrane (Fluid Mosaic Model) - Cytoplasm - Nucleus - Endoplasmic reticulum (RER & SER) - Ribosomes - Golgi bodies - Plastids - Vacuoles - Lysosomes - Mitochondria - Microbodies - Flagella - Cilia - Centrosome and Centrioles - Cytoskeleton.
Unit 3	Introduction to Nucleic acids: Discovery of Nucleic acids - Primary and Secondary structure of DNA - DNA Replication - Models of DNA Replication - Circular and Linear forms of DNA - A, B & Z Types of DNA - DNA Damages - DNA Repair Mechanisms - Mutations - Functions of DNA. RNA Types, Structure and Function
Unit 4	Central Dogma of the cell: Structure of chromosomes and genes - Gene expression - Genetic code - Transcription in Prokaryotes and Eukaryotes - RNA processing- Translation - Similarities and differences in prokaryotic and eukaryotic translation - Post translational modifications- Protein sorting -Protein degradation.
Unit 5	Cell cycle, cell division, cell differentiation & cellular communications: Cell cycle - Cell cycle check points - Cell division - Mitosis & Meiosis - Cellular differentiation - Cell junctions - Cell Adhesion - Extra Cellular Matrix - Cell to cell communications - Signal transduction - G - Protein Coupled Receptors Signal transduction pathways

Course Objectives	
Title	**FUNDAMENTALS OF MICROBIOLOGY**
Course Code	**SN31A**
CO-1	Understand the basics of microbiology, types of microbes, classification and characterization.
CO-2	Students can understands the various applied aspects of microbes in biotechnology field and the role of microbes in human health
CO-3	To impart the knowledge of the basic principles of bacteriology.
CO-4	To acquire requisite skill in the use and care of basic microbiological equipments.
CO-5	To demonstrate practical skill in fundamental microbiological techniques.

Course Outcome	
Title	**FUNDAMENTALS OF MICROBIOLOGY**
Course Code	**SN31A**
CO-1	To understand the basics of microbiology, classification and characterization of microbes
CO-2	To know the culture of bacteria, fungi, virus and algae
CO-3	To acquire knowledge about sterilization methods and antibacterial agents
CO-4	To know the role of microbes as Bioinsecticides and Biofertilizers
CO-5	To aware on various microbial diseases, diagnosis and treatment

Syllabus	
Title	**FUNDAMENTALS OF MICROBIOLOGY**
Course Code	**SN31A**
Unit 1	History of Microbiology, Classification of bacteria, fungi, virus, protozoa and algae – classical and molecular approaches. Future of microbiology – Role of microbes in biotechnology.
Unit 2	Structure of bacteria - Bacterial growth and measurement of growth, Media – types and preparation- plating methods - staining methods (grams, capsule, spore, LCB mount)- methods of preservation and storage of microbes. Culture of fungi, virus and algae.
Unit 3	Sterilization methods - physical and chemical methods- Mode of action – Antibiotic in clinical use - Resistance to antibacterial agents - MRSA, ESBL.
Unit 4	Bioinsecticides - *Bacillus thuringiensis*, Baculoviruses - Biofertilizers - *Azospirillum*and blue green algae- single cell protein – prebiotics and probiotics - Dairy products (Cheese and Yoghurt).
Unit 5	Microbial Disease- host -pathogen interaction, clinical features, lab diagnosis and treatment of Airborne disease (Pneumonia, Chicken pox), food borne disease (Typhoid, Aspergillosis), Water borne disease (Cholera, Amebiasis), Sexually transmitted disease (AIDS, Trichomoniasis), Vector borne disease (Dengue, Malaria).

Course Objectives	
Title	**GENETICS**
Course Code	**SC22A**
CO-1	Enrich knowledge on classical genetics
CO-2	Helps students to understand about human and population genetics, the role of genes in evolution.
CO-3	To impart fundamental knowledge on human genetics
CO-4	To study the laws and concepts of mendelian inheritance
CO-5	Upon successful completion the students will gain the knowledge on the concepts of heredity, Genes, Mendelian genetics, Blood grouping, genetic map preparation

Course Outcome	
Title	**GENETICS**
Course Code	**SC22A**
CO-1	To understand the genetic concepts and scope of genetics
CO-2	To gain knowledge about Mendelian genetics
CO-3	To acquire knowledge about linkage,crossing over and genetic mapping of chromosome
CO-4	To gain comprehensive detail understanding of chemical basis of heredity
CO-5	Students can able to recognise the experimental rational of genetic studies

Syllabus	
Title	**GENETICS**
Course Code	**SC22A**
Unit 1	Concepts and Scope of Genetics. Gene, Chromosome structure and organization in Prokaryotes and Eukaryotes. Identification of the DNA as the genetic material- Griffith experiments, Avery, McLeod, Mccarty and Hershey Chase experiment.
Unit 2	Concepts and Scope of Genetics. Gene, Chromosome structure and organization in Prokaryotes and Eukaryotes. Identification of the DNA as the genetic material- Griffith experiments, Avery, McLeod, Mccarty and Hershey Chase experiment.
Unit 3	Linkage, Crossing over and Genetic Mapping of Chromosomes., Three point test cross. Conjugation, Interrupted mating technique Transformation and Transduction and their mapping.
Unit 4	Variation in Chromosome Number and Structure. Mendelian Inheritance in Man (Autosomal Dominant, Autosomal Recessive Sex linked Inheritance,) Gender defective Phenotypes, Pedigree Analysis, Eugenics.
Unit 5	Lamarckism and Darwin`s Natural Selection. Gene frequency and genotype frequency. Mutation, Genetic drift, Inbreeding, Speciation. Hardy Weinberg law and the factors affecting hardy

Course Objectives	
Title	ALLID CHEMISTRY
Course Code	**SC32A**
CO-1	To understand the basic concepts of organic chemistry
CO-2	To understand the fundamentals of coordination chemistry and its application
CO-3	To gain knowledge on fundamental concepts of chemical reactions
CO-4	Students have exposure on industrial chemistry
CO-5	Students know nuclear reactions and applications of radioisotopes

Course Outcome	
Title	ALLIED CHEMISTRY
Course Code	**SC32A**
CO-1	Understand the principle of various fields of chemistry
CO-2	Students will have firm foundation of current chemicals
CO-3	Students will be skilled in the problem solving and analytical reasoning
CO-4	Students will be able to communicate the results of scientific work
CO-5	Students will be able to explain integral activity for environmental problems

Syllabus	
Title	ALLIED CHEMISTRY
Course Code	**SC32A**
Unit 1	Electrochemistry: Electrolytic conductance in metals and in electrolytic solution –specific conductance and equalent conductance-Arrhenius theory of electrolytic dissociation and its limitation- weak and strong electrolytes and according Arrhenius theory- Ostwald's dilution law- applications and limitations-conducto metric titration-strong acid vs strong base only
Unit 2	Fundamentals of organic Chemistry: Classification of organic compounds- hyberdization in methane, ethane, ethylene, acetylene, benzene- classifications of reagents –electrophiles, nucleophiles and free radicals-classification of reactions- addition, substitution, elimation, condensation and polymerization
Unit 3	**Industrial Chemistry:** Fuels-Classification- Gaseous fuels like water gas, producer gas, liquefied petroleum gas, gobar gas, compressed natural gas- fertilizers-classifiaction-Urea, ammonium sulphate, super phosphate, triple super phosphate, potassium nitrate-manufacture and uses-silicones- preparation, properties and applications. Hardness of water. Temporary and permenent hardness.
Unit 4	**Coordination Chemistry:** Definition of terms –classification of ligands –nomenclature-chealtion – EDTA and its application-werner's theory-effective atomic number-pauling's theory-posteulates- biological role of hemoglobin and chlorophil (Elementary idea only)
Unit 5	**Nuclear Chemistry:**Fundamentals particle of nuclear isotopes, isobars, isotomes and isomers –differences between chemical reactions, nuclear reactions, fusion and fission –radioactive series. Group displacement law- mass defect- applications of radioisotopes-carbon dating, rock dating and in medicine

Course Objectives	
Title	GENETIC ENGINEERING
Course Code	**SC23A**
CO-1	The students gain knowledge about genes and its manipulation
CO-2	Helps to gain knowledge on techniques involved in the cloning and its applications in genetic engineering.
CO-3	To illustrate creative use of modern tools for manipulation of genes
CO-4	Students understands the application of genetic engineering in biomedical research
CO-5	Students know the essentials of various techniques employed in rDNA technology

Course Outcome	
Title	GENETIC ENGINEERING
Course Code	**SC23A**
CO-1	To gain knowledge about genes and its manipulation techniques
CO-2	To identify, select and screen the recombinant
CO-3	To acquire knowledge about expression system and their application
CO-4	To have insight on gene transfer techniques in plants
CO-5	To know the applications of genetic engineering in agriculture, horticulture and pharmaceuticals

Syllabus	
Title	GENETIC ENGINEERING
Course Code	**SC23A**
Unit 1	**Introduction of genetic engineering:–**Tools in recombinant DNA technology – recombinant DNA – cloning strategies (enzymes, vectors, host) – introduction of rDNA into host cells.
Unit 2	**Recombinant DNA Technology:-**Identification of recombinants, selection and screening for recombinants DNA sequencing – Construction of library (Genomic DNA library, cDNA library), Chromosome walking.
Unit 3	**Gene Expression:** Expression system and their applications - gel electrophoresis and 2D gel electrophoresis – protein based products – protein engineering (designing protein) – production of protein from cloned genes.
Unit 4	**Gene transfer techniques in plants** :- vector-mediated gene transfer (Agrobacterium mediated gene transfer) and vector-less gene transfer (Physical methods : Electroporation, Microinjection, Microprojectile) – transgenic plants *Bacillus thuringiensis* - stress tolerance – Abiotic stress tolerance – secondary metabolite – Biosafety of GM plants and Animals.
Unit 5	**Applications of genetic engineering:**-Transgenic animals and its applications - Agriculture, Horticulture , Diagnostics, Prevention and Treatment of diseases Pharmaceuticals ,Forensics ,Other Industrial applications

Course Objectives	
Title	**ALLIED SUBJECT II - ESSENTIALS OF BIOCHEMISTRY**
Course Code	**SB33A**
CO-1	To understand the structure, properties and functions of Biomolecules,
CO-2	Major metabolic pathways, role of vitamins and hormones in humans,
CO-3	Students understand the importance of enzymes and porphyrins and the basics of Biological oxidation.
CO-4	Students understand the classification and functions of various biomolecules
CO-5	To learn and understand the fundamentals of cellular metabolisms

Course Outcome	
Title	ALLIED SUBJECT II - ESSENTIALS OF BIOCHEMISTRY
Course Code	**SB33A**
CO-1	Understand the chemistry of carbohydrates, lipids and proteins
CO-2	To understand the Biological pathways and to learn about amino acids and proteins
CO-3	To understand about the function, classification, of simple lipids fatty acids and lipoproteins
CO-4	Understand about the nucleic acids, vitamins and hormones
CO-5	To understand the importance of enzyme and porphyrin

Syllabus	
Title	ALLIED SUBJECT II - ESSENTIALS OF BIOCHEMISTRY
Course Code	**SB33A**
Unit 1	Definition and classification of carbohydrates, linear and ring forms (Haworth' s formula) for monosaccharides (glucose,fructose,mannose) and disaccharides (maltose, lactose, sucrose). Physical properties-mutarotation, chemical properities, ten reactions of glucose and four reactions of fructose (oxidation,reduction,osazone formation, Seliwanoff's reaction), Disaccharide-maltose, lactose, sucrose-structure, occurrence, physical and chemical properties. Polysaccharides-starch, glycogen. cellulose, structure and properities. Glycolysis, TCA cycle, energy yield, HMP pathway, Electron Transport Chain, Oxidative phosphorylation and its mechanism
Unit 2	**A**minoacids - Classifications - Essential and Non-essential aminoacids, Non-proteinaminoacids, Amphoteric nature, Isoelectric point. Proteins – Classification based on shape , solubility and composition, Biological functions of Proteins, Physical Properties – Ampholytes, Isoionic point, Salting in and Salting out, Denaturation, Peptide bond. Deamination, Transamination, Decarboxylation and Urea Cycle
Unit 3	Fat - function, classification, simple lipids, fatty acids (saturated and unsaturated) compound lipids, derived lipids, properties-saponification, rancidity, reduction,

	oxidation, halogenation. Functions of Phospholipids. Cholesterol structure - biological importance, chemical properties. Bile salts-function. Lipoproteins: Structure, properties and Biochemical functions Ketone bodies: structure and functions. Metabolism: Fatty acid oxidation – β oxidation. Biosynthesis of saturated and unsaturated fatty acids.
Unit 4	Purine and pyrimidine bases, nucleosides, nucleotides, polynucleotides, DNA structure, various types, properties-absorbance, effect of temperature. Different types of RNA, structure and functions. Vitamins - Definition, classification, Fat soluble vitamins-A, D. E and K.- Occurrence, deficiency diseases, biochemical roles, daily requirements. Water soluble vitamins-B1, B2, B3, B6, B9, B12 and vitamin C - occurrence, deficiency diseases, biochemical roles, daily requirements. Hormones – Definition, Classification based on Chemical nature and Mechanism of Action. Eicosanoids- Definition, types and functions.
Unit 5	Enzymes definitions, units , various classifications, nomenclature, specificity, isoenzymes, factors affecting enzyme activity - substrate, pH, temperature. Classifications of porphyrins, their structure and properties, structure of metalo porphyrins- haeme and chlorphyll

Course Objectives	
Title	PLANT BIOTECHNOLOGY
Course Code	**SC24A**
CO-1	To introduce students to the principles, practice and application of plant biotechnology
CO-2	Students Can gain knowledge for the development of organic products
CO-3	Students can understand the practical applications of transgenic plants
CO-4	Students can understand the mechanism for nitrogen fixation and transformation.
CO-5	Upon completion of the course, the student would be able to gain the knowledge about the plant tissue culture.

Course Outcome	
Title	PLANT BIOTECHNOLOGY
Course Code	**SC24A**
CO-1	To understand the organization of plant genome
CO-2	To know the importance and molecular basis of action of hormones
CO-3	To have insight on various plant tissue culture techniques
CO-4	To aware on plant transformation technique and application of plant genetic engineering
CO-5	To acquire knowledge on plant vaccine and genetically modified food.

Syllabus	
Title	PLANT BIOTECHNOLOGY
Course Code	**SC24A**
Unit 1	Plant Genome: Organization, structure of representative plant genes and gene families in plants – chloroplast genome organization and mitochondrial genome.
Unit 2	Hormones – Auxins, cytokinins and gibberlins – molecular basis of action – phytochrome – role in photomorphogeneisis – Regulation of gene expression – abscisic acid – and stress – induced promoter switches in the control of gene expression – Ethylene and fruit ripening.
Unit 3	Plant tissue culture - Media composition (MS media) - Micropropagation techniques - direct and indirect organogenesis - somoclonal variation - somatic embryogenesis - haploid and triploid - Protoplast isolation and culture - hybrid and cybrid production, Synthetic seed production. Secondary metabolite production.
Unit 4	Agrobacterium and crown gall tumors – Mechanism of T-DNA transfer to plants, Ti Plasmid vectors and its utility – Plant viral vectors. Symbiotic nitrogen fixation in Rhizobia. Applications of Plant Genetic Engineering: Genetic engineering & crop improvement, herbicide resistance, insect resistance, virus resistance, plants as bioreactors.
Unit 5	Seed storage proteins. Transgenic plants, Regeneration of gene expression . Applications – plant vaccine and plant development, genetically modified food - future perspectives & ecological impact of transgenic plants.

Course Objectives	
Title	**BIOINSTRUMENTATION AND BIOSTATISTICS**
Course Code	**SC34A**
CO-1	The students would have depth knowledge in the analytical techniques and principles and handling of instruments
CO-2	Students would have knowledge on research data analysis
CO-3	Students are able to understand the principles of biomedical instrumentations.
CO-4	Student learn about the principle concepts of biostatistics
CO-5	Student can perform basic analytical techniques to generate results

Course Outcome	
Title	**BIOINSTRUMENTATION AND BIOSTATISTICS**
Course Code	**SC34A**
CO-1	Students can measure and calibrate pH, centrifuge and spectroscopy
CO-2	Students have depth knowledge about principle and instrumentation of different chromatography and electrophoresis techniques
CO-3	Students acquire knowledge about various Radioisotopic techniques
CO-4	Students have insight on scope of biostatistics
CO-5	Students can interpret correlation, regression and ANOVA

Syllabus	
Title	**BIOINSTRUMENTATION AND BIOSTATISTICS**
Course Code	**SC34A**
Unit 1	Measurement of pH and calibration of pH meter, Centrifuge-Preparative and Analytical centrifuge, density gradient centrifugation. Spectroscopy: Principle, Instrumentation and applications of UV-Visible. Microscopy: Principle and applications of Compound , Bright field, phase contrast and fluorescence Microscope.
Unit 2	Chromatography: Principle, Instrumentation and applications of Paper, TLC, Ion exchange, Gel filtration, Affinity, GLC and HPLC. Electrophoretic techniques: Agarose gel Electrophoresis, SDS-PAGE, Isoelectric focusing, Immunoelectrophoresis.
Unit 3	Radioisotopic techniques: Principle and applications of GM counter, Solid and Liquid Scintillation, Autoradiography, Radioimmunoassay and Radiation Dosimetry.
Unit 4	Scope of Biostatistics, Data- collection, tabulation, classification. Frequency table, graphical representation of data-bar diagram. Measures of central tendency-Mean,Median,and Mode. Measures of Dispersions-Range, Mean deviation, Std deviation. Variance.
Unit 5	Correlation- types and methods. Regression. Probability distribution-Binomial, Negative binomial, multinomial distribution, Poisson distribution. Test of significance- t test, F test,chi square test.Spreadsheet.ANOVA-One way and Two way.

Course Objectives	
Title	**ANIMAL AND MEDICAL BIOTECHNOLOGY**
Course Code	
CO-1	To gain knowledge in the concepts of animal and medical biotechnology would be developed. To demonstrate an understanding of setting up an animal tissue culture laboratory would be obtained.
CO-2	Ability to recall the transmissions, pathogenicity, symptoms of microorganisms.
CO-3	To describe various molecular techniques in disease diagnosis and reproduction technologies
CO-4	To differentiate various vaccine producing methodologies
CO-5	To gain knowledge in the concepts of animal and medical biotechnology would be developed. To demonstrate an understanding of setting up an animal tissue culture laboratory would be obtained.

Course Outcome	
Title	**ANIMAL AND MEDICAL BIOTECHNOLOGY**
Course Code	
CO-1	To gain knowledge on the concepts of animal and medical biotechnology
CO-2	To understand the different manipulation techniques
CO-3	To perceive knowledge various animal diseases and diagnosis
CO-4	To acquire knowledge on vaccine, types and production
CO-5	To demonstrate an understanding of setting up an animal tissue culture laboratory

Syllabus	
Title	**ANIMAL AND MEDICAL BIOTECHNOLOGY**
Course Code	
Unit 1	Historical aspects - Basics of developmental biology - Animal Biotechnology – setting up animal cell line laboratory and SOP - Principles of sterile techniques and cell propagation - media and types of cell culture - Scaling up of animal cell cultures.
Unit 2	Manipulation of reproductive process: Artificial insemination – freezing of semen – Embryo technology – *in vitro* maturation and fertilization – Pregnancy diagnosis – Assisted reproductive technology – cloning strategies – Preservation and characterization of animal cells- transgenic animals
Unit 3	Manipulation of reproductive process: Artificial insemination – freezing of semen – Embryo technology – *in vitro* maturation and fertilization – Pregnancy diagnosis – Assisted reproductive technology – cloning strategies – Preservation and characterization of animal cells- transgenic animals
Unit 4	Vaccines – Production of recombinant vaccines – bacterial, viral or parasitic infections – DNA Vaccines. Synthetic peptide, anti-idiotype, deletion, mutant and vaccinia vectored vaccine – Prophylaxis.
Unit 5	Genetic engineering of Microorganisms and molecules – Protein production by genetically engineered mammalian cell lines, Stem cells and their applications-; Cell culture as a source of valuable products.

Course Objectives	
Title	**BIOINFORMATICS**
Course Code	
CO-1	Students can able apply knowledge and awareness of basic principles of biology and computer science
CO-2	Students will gain the understanding of the computational challenges
CO-3	The students will be able to extract information from large databases and to use this information in computer modeling,
CO-4	Students will get the ability to develop new algorithms and analysis methods.
CO-5	To produce and present original research in bioinformatics

Course Outcome	
Title	**BIOINFORMATICS**
Course Code	
CO-1	Students have an insight on overview and clarification of biological database
CO-2	Students will able to analyse the sequence using various tools
CO-3	Students will be able to perform phylogenetic analysis
CO-4	Students can understand the haitory of drug discovery and deug designing
CO-5	Students can predict the structure of protein

Syllabus	
Title	**BIOINFORMATICS**
Course Code	
Unit 1	**Introduction of Bioinformatics**: Overview and Definition, Application of Bioinformatics, Sequences format used in Bioinformatics- Biological Database: Introduction, Classification of biological databases, Primary database- Nucleic acids- NCBI-DDBJ-EMBL. Protein- PDB- SWISSPORT. Secondary database-PROSITE ,PFAM. Structure and classification-SCOP- CATH, Metabolic pathway database.
Unit 2	**Sequences Analysis**: Sequences similarity, Identify & homology-Definition of homologues, Orthologues, Paralogues. Scoring matrices, Pairwise Sequences alignment. Dot Matrix, BLAST, FASTA- Needleman Wunsch – Smith and waterman Algorithm.
Unit 3	**Phylogenetic Analysis (DEMO-Optional)**: Multiple Sequences alignment – Different method of multiple sequences alignment-Evolutionary analysis, clustering methods Phylogenic trees-rooted and unrooted tree- Methods to generate phylogenetic tree-Tools for multiple sequences alignment and phylogenetic analysis (PHYLIP)
Unit 4	**Drug Discovery**: History of Drug Discovery, Steps in Drug design - Chemical libraries – Role of molecular docking in drug design.
Unit 5	Protein prediction: Studyof internet resources in Bioinformatics - Tools for primary (Compute PT/Mw, Protparam), secondary (PROSITE), Tertiary (Swiss Model), Structure prediction of proteins, Homology modeling of proteins. Visualization tools (RASMOL), Gene prediction tools (Genscan, Grail).

Course Objectives	
Title	IMMUNOLOGY
Course Code	
CO-1	The students will gain knowledge about the immune response and reactions.
CO-2	A student also understands cells involved in immunity, vaccines and tissue rejection.
CO-3	Students will be able to describe the roles of the immune system
CO-4	To study the molecular and cellular interaction and principles of the immune system
CO-5	To know the concept of antigen and antibody interactions

Course Outcome	
Title	**IMMUNOLOGY**
Course Code	
CO-1	To gain the knowledge about the immune system and types of immunity
CO-2	To know characteristics and types of antigen and antibody
CO-3	To understand antigen antibody interactions and purification of antibodies
CO-4	To have a elaborate understanding on the complementary system
CO-5	To gain the knowledge about hypersensitivity reaction and types

Syllabus	
Title	IMMUNOLOGY
Course Code	
Unit 1	Introduction – Historical development in Immunology. Cells involved in immune response. Primary and Secondary lymphoid organs – Thymus, Bone marrow, Lymph nodes and Spleen. Hematopoiesis – development of B and T lymphocytes. Types of immunity – Innate and acquired.
Unit 2	Antigen: Characteristics and types. Antibody – Structure, Types, Properties and their Biological function. polyclonal - monoclonal antibody production and its biomedical applications.
Unit 3	Antigen – Antibody interactions, Immunodiffusion and Immuno electrophoresis. Principle and application of ELISA and RIA and Flourescent antibody technique. Purification of antibodies.
Unit 4	The complement system and activation and regulation. Types – Classical, alternative and Lectin pathway. Biological function of C' proteins. Cytokines- Structure and Function. Vaccines – Types , Production and application.
Unit 5	Hypersensitivity Reactions and Types. Major Histocompatability Complex – MHC genes, MHC in immune responsiveness, Structure and function of Class I and Class II MHC molecules. HLA tissue typing.

Course Objectives	
Title	**PHARMACEUTICAL BIOTECHNOLOGY**
Course Code	
CO-1	Students can understand the series of processes involved in drug development patenting and drug approval, therapeutic potentials
CO-2	Students also can understand adverse effects of drugs; focus on the demand and career opportunities in pharmaceutical industries
CO-3	To gain the knowledge on pharmacology and formulation of commonly used biopharmaceuticals
CO-4	Students can relate the formulation of drugs to their delivery and disposition in the body
CO-5	Students will know the carrier opportunities in pharmaceutical biotechnology

Course Outcome	
Title	**PHARMACEUTICAL BIOTECHNOLOGY**
Course Code	
CO-1	Students can understand the series of processes involved in drug development
CO-2	Students can gain knowledge in the special areas of pharmaceutical biotechnology and it products
CO-3	Students acquire knowledge in the biopharmaceutical products
CO-4	Students have insight on adverse effects of drug and toxicity analysis
CO-5	To aware on national and international drug approved agencies and pharmaceutical industries

Syllabus	
Title	**PHARMACEUTICAL BIOTECHNOLOGY**
Course Code	
Unit 1	**Pharmaceutical Biotechnology & Drug Development:** Objectives of Pharmaceutical biotechnology - Generic and biogeneric drugs. Stages in the drug development process - Drug discovery - Drug designing - Drug production - Preclinical trials - Clinical trials - Pharmacokinetics and Pharmacodynamics - Patenting & Drug Approval - Drug Marketing - Post clinical trials
Unit 2	**Special Areas of Pharmaceutical Biotechnology:** Production of recombinant proteins - Development of Nucleic acid based therapies - Biopharmaceutical considerations - Pharmaceutical regulations - Formulation of Biotechnology products - Drug delivery - Pharmacognacy - Biomimetics.
Unit 3	**Biopharmaceutical products and their uses:** Human Insulin (Humulin),, Growth hormones (Humatrope) - Blood coagulating factor (factor VIII - Kogenate) - Erythropoietin - (Epogen) Granolocyte colony stimulating factors (Neulasta) - Interferons (Avonex) - Antimicrobial peptides (β - defensin 2) - Vaccines (Pentavac), Biologics (Humira - Adalimumab), - Cancer based biologics (rituximab).
Unit 4	**Adverse effects of drugs:** Drug toxicity analysis - Common side effects of drugs and managements - Drugs of abuse - Life changing complications - Prevention and management
Unit 5	**Pharmaceutical Industries:** National and International Drug approval agencies - Top National and International pharmaceutical industries - Scope and carrier opportunities in pharmaceutical sectors

Course Objectives	
Title	**NANO BIOTECHNOLOGY**
Course Code	
CO-1	To introduce the broad outline of nanoscience and nanotechnology
CO-2	To foundational knowledge of the nanoscience and related fields
CO-3	This makes the students to understand the advancing research and fostering innovations in the synthesis and characterization of nanoparticles
CO-4	Students can get knowledge on Types of nanomaterial and their applications.
CO-5	To make the students acquire an understanding the nanoscience and application in medicine

Course Outcome	
Title	**NANOBIOTECHNOLOGY**
Course Code	
CO-1	To know the history and contributions of indian research institutes in the field of nanobiotechnology
CO-2	To gain knowledge about the synthesis and characterization of nanoparticle
CO-3	To have insight on nanobiomaterials
CO-4	To acquire knowledge in applications of nanobiotechnology the field of agriculture and medicine
CO-5	To aware on the nanobiosensors and Biomimetics

Syllabus	
Title	**NANOBIOTECHNOLOGY**
Course Code	
Unit 1	**History of Nanobiotechnology** Glimpse of Nanotechnology based material in ancient India: Wootz steel (ironcarbide) and the Delhi iron pillar (anticorrosive nanomaterial), Bhasma (nanomaterial as medicine). Contributions of Indian Research Institutes in the field of nanobiotechnology.
Unit 2	**Synthesis and characterization of nanoparticle** Metals: Silver nanoparticle synthesis and its analyses by UV-spectroscopy and FTRI. Self Assembly nanomaterial: Cell membrane and its analyses by SEM
Unit 3	**Types of Nanobiomaterials.** Nano-thin films: Chitosan thin film, Nanodevices (nanorobots), Nanotubes: Microtubules assembly and its importance, Nanoshells-Dendrimers: Liposomes, Nanofibers: Collagen, Fibronectin & elastin, nanofluidics: Extracellular matrix assembly and its importance.
Unit 4	**Application of Nanotechnology the field of agriculture and medicine** Agriculture: Crop production- Nanofertilizers technology, Biomaterial to improve shelf life of vegetables. Medicine: Collagen thin films in wound healing mechanism, Nanoscale devices – DNA microarray for disease diagnosis, Antibodies as drug delivery system.
Unit 5	**Applications of Bionanoparticles** Nanobiosensors (Firefly-luciferase) and its applications, Introduction to Biomimetics (Gecko foot effect, Lotus leaf effect: Paint and fabrics, Box fish based Car).

Course Objectives	
Title	**INDUSTRIAL BIOTECHNOLOGY**
Course Code	
CO-1	This programme will help the students to explore the beneficial potentials of microbes in the fermentation industry
CO-2	Students also get knowledge about recovery and purification of biomolecules and methods using biotechnological principles.
CO-3	Students will be able to apply biotechnology to industrial processes in transforming the manufacturing industry.
CO-4	To provide fundamental insights to exploit enzymes and microbes for the manufacturing of industrial products
CO-5	Students will gain the knowledge on operations of fermentor

Course Outcome	
Title	**INDUSTRIAL BIOTECHNOLOGY**
Course Code	
CO-1	Students can explore the beneficial porentials of microbes in fermentation industry
CO-2	Students can gain knowledge about designing and aspetic operation of bioreactor
CO-3	Students know about unit operators in downstream processing
CO-4	Students acquire knowledge about microbial biomass and enzymes
CO-5	Students understand the production, recovery and purification of biomolecules using biotechnological principles

Syllabus	
Title	**INDUSTRIAL BIOTECHNOLOGY**
Course Code	
Unit 1	Biotechnology & Bioprocess Engineering, steps in bioprocess development, Microbial culture, Screening and selection for fermentation processes; Preservation and improvement of industrially important microorganisms, Strain development. Media for industrial fermentations: Media ingredients, medium formulation, oxygen requirements, antifoams, medium optimization, Media sterilization, Batch Process, continuous sterilization process; sterilization of fermenter and other ancillaries, filter sterilization of air and media. Inoculum development. Types of fermentation – Aerobic & Anaerobic systems - Submerged, Semisolid, Solid and slurry fermentation processes.
Unit 2	Design of bioreactors: Basic objective of fermenter design, aseptic operation & containment, body construction, agitator and sparger design, baffles, stirrer glands and bearings. Bioreactor configurations and types: Bubble column, airlift reactor, packed bed, fluidized bed, trickle bed, Membrane reactor, Photobioreactor, Animal and plant cell bioreactors. Factors affecting broth viscosity, Mixing in Fermenters. Fermentation systems Batch culture, Continuous culture, Fed-batch culture,

Unit 3	Downstream processing Filtration, Centrifugation, Cell disruption, Liquid-liquid extraction, Chromatography, membrane processes, Drying, Crystallization, Whole broth processing. Different types of fermented foods produced from microorganisms- Idli, Soysauce, Sauerkraut - Dairy products- Cheese and Yoghurt.
Unit 4	Microbial biomass, Microbial enzymes– Amylase & protease, Immobilization of enzymes: Methods, Properties, Applications, Advantages and Disadvantages of Immobilization, Biosensors and Biochips-Types and applications. Microbial Polysaccharide production: Xanthan, Dextran, Alginate, Scleroglucan, Gellan, Pullulan, Curdlan. Bioplastic-Biopol, Microbial rubber and adhesive polymers.
Unit 5	Ore leaching (methods and examples), MEOR, Production of antibiotics – Penicillin - Alcoholic beverages: Wine, Beer – Biofertilizers- Rhizobium & Azotobacter. Biopesticides – *Bacillus thuringiensis* and microbial toxin production and their applications - Single cell protein, Biosurfactants, Vitamins- Folic acid & Vitamin B12, Organic acids. Biotechnology biosafety – Norms and measures

Course Objectives	
Title	**ENVIRONMENTAL BIOTECHNOLOGY**
Course Code	
CO-1	To introduce and elaborate the fundamental concepts and applications in all aspects of environment including its protection, restoration and sustainability
CO-2	To learn the utilization of microbial processes in wastewater treatment
CO-3	It offers the students to understand on how the modern biotechnology is developed to achieve better environmental protection
CO-4	This course is planned to provide an idea about Global environmental changes
CO-5	Biotechnological methods of handling recent environmental problems like wastewater treatment, solid waste management and bioenergy

Course Outcome	
Title	**ENVIRONMENTAL BIOTECHNOLOGY**
Course Code	
CO-1	Students aware on global environmental changes and environmental pollution
CO-2	Students can learn about waste water treatment using aerobic and anaerobic methods
CO-3	Students perceive knowledge about biodiversity, biodegradation and ecological conservation
CO-4	Students can know the various biotechnogicalapproches for bioremediation
CO-5	Students can able to learn the methods of handling recent environmental problems

Syllabus	
Title	**ENVIRONMENTAL BIOTECHNOLOGY**
Course Code	
Unit 1	Environmental Pollution – Sources and types - Water, Air, Thermal, Industrial and Radiation - Global environmental changes. Global warming, Green house effect, acid rain, ozone depletion, and photochemical smog. Environmental issues, management strategies and safety, Biotechnological approaches for management.
Unit 2	Waste water treatment: Aerobic and anaerobic methods (Primary, Secondary and Tertiary) –Use of aquatic plants in waste water treatment. Solid waste management. Bioenergy and SCP from waste. Drinking water treatment.
Unit 3	Biodiversity and Biodegradation: Biodiversity at global level, species diversity. Conservation - *insitu*and *exsitu*conservation. Loss of biodiversity and its causes. Ecological considerations, decay behaviour and degradative plasmids; hydrocarbons, oil pollution, surfactants, pesticides.
Unit 4	Bioremediation: Biotechnology approaches for industrial effluent (Paper, tannery and dye). Pesticide waste disposal and use of genetically engineered microbes. Biosorption and Bioaccumulation principles. Hazards of genetically engineered microbes, plants and animals to the environment and their recovery.
Unit 5	Environmental toxicology – Toxicants – Toxicity, Acute, sub acute, chronic, dose effect and LD_{50}. Dose response safe limits. Dose response relationship, detoxification of hazardous chemicals.

Course Objectives	
Title	**BIO-ENTREPRENEURSHIP**
Course Code	
CO-1	The student will be able to identify the challenges of being a bio entrepreneur
CO-2	To motivate students for entrepreneurship and the need for technological innovations
CO-3	They will also be able to generate a detailed business plan and identify various funding agencies.
CO-4	The technical skills in vermicomposting, Sericulture, aquaponics, mushroom cultivation and SCP Production will also be obtained.
CO-5	Students can know the current status of the bio industry globally.

Course Outcome	
Title	**BIO-ENTREPRENEURSHIP**
Course Code	
CO-1	Students will be able to identify the challenges of veing a bioentrepreneur and describe the current status of the bio industry globally
CO-2	Students able to generate a detailed business plan and identify various funding agencies
CO-3	Students gain knowledge or technical skills in vermicomposting
CO-4	Students know about phases of mushroom cultivation and aquaponics
CO-5	Students perceive knowledge on single cell protein and spiruline cultivation

Syllabus	
Title	**BIO-ENTREPRENEURSHIP**
Course Code	
Unit 1	Bio entrepreneurship: Basics of Bio entrepreneurship -biotechnology in a global scale; ; types of bio-industries – biopharma, bioagri and bioservices innovation – successful entrepreneur – creativity, leadership, managerial skills, team building, decision making; public and private funding agencies (MSME, DBT, BIRAC, Startup & Make in India)
Unit 2	Business Plan: Business plan preparation; business feasibility analysis by SWOT, business plan proposal for virtual startup company; statutory and legal requirements for starting a company/venture; basics in accounting practices. Market Conditions, Identifying the need of the customer
Unit 3	Vemicomposting and Sericulture: Vermicomposting –Earth worms-Ecological types-Vermiculture-Compost pit-Vermi bed-applications - Sericulture-Mulberry cultivation-silkworm rearing-Economics of silkworm production-Chawki rearing-Sericulture in India
Unit 4	Mushroom Cultivation &Aquaponics:Phases of Mushroom Cultivation; Selection of an acceptable mushroom species/strains, Management of mushroom development, Mushroom harvesting; Mushroom diseases, Medicinal and Nutritional properties of mushroom. Aquaponics- systems-Fish and Vegetables-Nutrients and Biofilters-Advantages and Disadvantages.
Unit 5	Single Cell Protein:Single Cell Protein Production: Source: Algae, Bacteria,Yeast – Cultivation of Single Cell protein: SPIRULINA Cultivation – Production site, Microorganism, Experimental design; harvesting and drying

Course Objectives	
Title	**MARINE BIOTECHNOLOGY (ELECTIVE)**
Course Code	
CO-1	Students learn about marine resources and byproducts, aquaculture and commercial development
CO-2	The students will gain knowledge about marine pharmacology
CO-3	To know the marine organisms of interest in biotechnology
CO-4	To develop an understanding of the foundations of marine biology and related sciences
CO-5	To find about the degree and career options along with this course

Course Outcome	
Title	**MARINE BIOTECHNOLOGY (ELECTIVE)**
Course Code	
CO-1	Students can gain knowledge on marine ecosystems
CO-2	Students can insight on marine microorganisms
CO-3	Students can understand the importance of marine pharmacology in current scenario
CO-4	Students can acquire detailed knowledge aquaculture technology
CO-5	Students can gain knowledge about aquaculture and commercial development and value creation of marine resources

Syllabus	
Title	**MARINE BIOTECHNOLOGY (ELECTIVE)**
Course Code	
Unit 1	**Introduction to Marine Ecosystems**: Marine Ecosystems & Its functioning, Ocean currents, Physical & chemical properties of sea water, Ecological divisions of the Sea- Euphotic- Mesopelagic- Bathopelagic- Benthos-Intertidal, Estuarine- Saltmarsh- Mangrove- Coral Reef.
Unit 2	**Marine Microorganism**: Marine microbial habitats- Screening for Secondary metabolites from marine microbes (Bacteria, Fungi, Actinomycetes and marine microalgae). Biofouling - Biofilm- Antifouling-Anticorrosion. Probiotic bacteria and their importance in aquaculture.
Unit 3	**Introduction to Marine Pharmacology**: Definitions- Medicinal compounds from flora (Seaweeds, Seagrass and Mangrove) and fauna (Sponges, Sea anemone and Corals)- marine toxins- antiviral and antimicrobial agents.
Unit 4	**Aquaculture Technology**: Culture aspect-Seaweed (*Kappaphycusalvarezii*), Fish chromosome manipulation in aquaculture- Hybridization- Gynogenesis-Androgensis- Polyploidy, Artificial Insemination, Eye stalk ablation- Trangensis and Cryopreservation.
Unit 5	**Marine By products**: Agar- Agrose – Algin- Alginate- Carragennan- Chitin- Chitosa- Heparin.

Course Objectives	
Title	**RESEARCH METHODOLOGY**
Course Code	
CO-1	This course aims to inculcate the clear idea of research among students.
CO-2	This course enables the students' community to understand the existing social issues to frame the research objectives, frame hypothesis, design the wet lab procedures and to properly execute the result interpretations.
CO-3	Understanding the nature of problem to be studied and identifying the related area of knowledge
CO-4	To identify and discuss the roles and importance of research in the sciences
CO-5	Students can gain knowledge on qualitative and quantitative research

Course Outcome	
Title	**RESEARCH METHODOLOGY**
Course Code	
CO-1	To inculcate the clear ideas of research among students
CO-2	To know about the basic concept sampling and data analysis
CO-3	To understand the research process and research designs
CO-4	To interpret the data and to write research papers
CO-5	To know various tools or techniques foe research

Syllabus	
Title	**RESEARCH METHODOLOGY**
Course Code	
Unit 1	Foundations of Research: Objectives, Motivation to perform research. Types of research (Descriptive vs analytical; applied vs fundamental; quantitative vs qualitative; conceptual vs empirical). Research methods vs methodology. Literature-review and its consolidation; Library research; field research; laboratory research.
Unit 2	Sampling and Data analyses: Basic concepts of Statistical sampling methods, Sample Size, Sampling Frame, Sampling Error, Characteristics of a good sample, Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages)
Unit 3	Research Process and design: Research Question & Investigation Question, Hypothesis, Qualities of a good Hypothesis, Features of a good research design, Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables.
Unit 4	Interpretation of Data and Paper Writing: Layout of a Research Paper, Journals in Life Science, Impact factor of Journals, Ethical issues related to publishing: Plagiarism and Self-Plagiarism. Use of Encyclopedias, Research Guides, Handbook etc., Academic Databases for Computer Science Discipline.
Unit 5	Use of tools / techniques for Research: Methods to search required information effectively, Reference Software like Zotero/Mendeley, Software for paper formatting like LaTeX/MS Office, Softwares for detection of Plagiarism

JAYA COLLEGE OF ARTS AND SCIENCE
(AFFILIATED TO UNIVERSITY OF MADRAS)
THIRUNINRAVUR – 602024
DEPARTMENT OF BIOCHEMISTRY

Program : B. Sc BIOCHEMISTRY

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	In-depth and detailed functional knowledge of the fundamental theoretical concepts and experimental methods of Biochemistry.
PO-2	Skills in planning and conducting advanced chemical experiments and applying structural-chemical characterization techniques.
PO-3	Apply/implement interface between, on the one hand, the history of Biochemistry and natural science and, on the other hand, issues pertaining to the areas of modern technology, health, and environment.
PO-4	Skill in examining specific phenomena theoretically and/or experimentally,
PO-5	Generation of new scientific insights or to the innovation of new applications of Biochemistry research.

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	After completion of the program the students are well poised to pursue careers in academic and industry in the areas of pharmaceutical and biotechnology.
PSO-2	Health care professionals for services in the fields of clinical biochemistry, laboratory management, hospital and community services.
PSO-3	The students will be able to demonstrate practical skills in handling biological specimens, analysis and their safe disposal.
PSO-4	Apply the knowledge and expertise in industries, diagnostic laboratories and various research fields.
PSO-5	Develop problem solving ability by utilizing the conceptual knowledge, analytical techniques, computational and statistical approaches.

Course Objectives	
Title	**Nutrition Biochemistry**
Course Code	**(SB21A)**
CO-1	The objective of this course is to learn and understand the basic concepts of nutritional biochemistry which comprises nutritional values of foods, dietary requirements of carbohydrates, lipids and proteins, nutritional significance of minerals.
CO-2	Course is also designed to understand the factors responsible for malnutrition and measures to overcome malnutrition in infants and adults.
CO-3	To know the knowledge of the National Human rights and its relations.
CO-4	To study the prevention signs and treatment of obesity.
CO-5	To study about the biological functions, deficiency of fat soluble and water soluble vitamins.

Course Outcome	
Title	**Nutrition Biochemistry**
Course Code	**(SB21A)**
CO-1	To create awareness about the role of nutrients in maintaining proper health to study effect of nutrients in the biochemical process
CO-2	Understand Basics of nutrition, RDA, balanced diet and BMR
CO-3	Learn the RDA for infants, children, adults and expecting mothers, the various nutritional policies and nutritional interventional programmes.
CO-4	Describe the various disorders like anorexia, kwashiorkor, Marasumus
CO-5	To understand the nutritional significance of carbohydrates, lipids and proteins

Syllabus	
Title	**Nutrition Biochemistry**
Course Code	**(SB21A)**
Unit 1	Concepts of food and nutrition.Basic food groups-energy yielding,body building and functional foods.Units of energy.Calorific and nutritive value of foods.Measurement of Calories by bomb calorimeter.Basal metabolic rate (BMR)- definition, determination of BMR and factors affecting BMR.Respiratory quotient (RQ) of nutrients and factors affecting the RQ. SDA-definition and determination-Anthropometricmeasurement and indices – Height, Weight, chest and waist circumference BMI.
Unit 2	Physiological role and nutritional significance of carbohydrates, lipids and protein. Evaluation of proteins by nitrogen balance method- Biological value of proteins- Digestibility coefficient, Biological value, ProteinEnergy Ratio and Net Protein Utilization. Protein energy malnutrition – Kwashiokar and Marasmus.
Unit 3	Balanced diet, example of low and high cost balanced diet- for infants, children, adolescents, adults and elderly people. ICMR classification of five food groups and its significance food pyramid. Signs of obesity(types, prevention and treatment)
Unit 4	Minerals- sources, requirement, physiological function, deficiency and toxicity of calcium, sodium, potassium, iron, magnesium, chromium. Cobalt, copper, manganese, molybdenum, selenium, iodine and zinc. Vitamins- definition and types of vitamins, sources, requirement, biological functions, deficiency symptoms of thiamine, riboflavin, niacin, pyridoxine, panthothenic acid, folic acid, biotin, cyanocobalamine, vitamins C, A, D, E and K. Hypervitaminosis.
Unit 5	Human rights- introduction – definition, scope and need for study of human rights and relations. Categories- civil and political rights, economic relations and social relations. Institutions: International and National –United Nations Human Rights Commissions, State Human rights Commission. International convention on civil and political rights.International convention on economic and social rights.National Human rights Act- National commission for minorities , SC/ST and Women Students activity – assignment, case study, term paper

Course Objectives	
Title	**Cell Biology**
Course Code	**(SB22A)**
CO-1	Describe the chemical and molecular foundations of cell and the role in biological systems.
CO-2	Define the structure, properties and roles of nucleus.
CO-3	Explain the protein sorting and its transport in biological system.
CO-4	Discuss cell signalling mechanism through various pathways.
CO-5	Classify the cell cycle, its regulation and development.

Course Outcome	
Title	**Cell Biology**
Course Code	**(SB22A)**
CO-1	To study the concept that the cell is the fundamental unit of life.
CO-2	To understand the communication between the cells
CO-3	To understand the structure and purpose of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes and organelles
CO-4	To gain insight about the membrane - transport mechanisms, membrane potentials and action potentials
CO-5	To understand the mechanism underlying about cancer, its prevention and treatment

Syllabus	
Title	**Cell Biology**
Course Code	**(SB22A)**
Unit 1	Cell theory, cell as basic unit of life. Cell size, shape, comparison of prokaryotic and eukaryotic cell types including cellular specialization and differentiation, differences in plant and animal cells.
Unit 2	Detailed description of eukaryotic cellular Organelles, Plasma membrane, rough and smooth Endoplasmic Reticulum, Nucleus, Mitochondria, Lysosomes, Golgi Apparatus, Ribosomes, Peroxisome, Chloroplast and Glyoxime.
Unit 3	Biomembrane – structure, organization and basic functions, fluid mosaic model, Transport across cell membrane-uniport, symport and antiport. Passive and active transport and water channel. Animal structure of cytoskeleton- Composition and function of microfilament and intranuclear filament, Proton and Na+ –K + Pumps - examples and metabolic significance.
Unit 4	Chromosomes, types, structure and function. Cell division, mitosis, meiosis, their significance. Cell cycle –phase of cell cycle.
Unit 5	Apoptosis, Cancer - differences between benign and malignant tumours. Characteristics of cancer cells. Agents causing cancer- Physical, chemical, Biological. Cancer therapy – Surgery, radiation, chemotherapy. Cancer prevention.

Course Objectives	
Title	**PRACTICAL – I**
Course Code	TAP21
CO-1	This study was to evaluate the changes in calcium activity in fresh milk using an ion-selective electrode and to assess the relationship between calcium activity and milk production in hot season.
CO-2	This study is the preparation and characterization of native starch's microfiber by electro wet-spinning technique.
CO-3	It's a screening tool a person underweights or healthy or excess weight to understand increased health risk factors.
CO-4	Spotters of Animal and Plant cell and cellular organelles begins to explore and understand the ways in which plant and animals are different.
CO-5	Describes the prevention of microbial growth with titrimetric method of vitamin c (Ascorbic acid).

Course Outcome	
Title	**PRACTICAL – I**
Course Code	TAP21
CO-1	To understand the concepts of titrimetric experiments
CO-2	To acquire knowledge about the biochemical preparation
CO-3	To identify the spotters related to cell organelles
CO-4	To improve knowledge, skills and changes in dietary, physical activity, and sedentary behaviors.
CO-5	To acquire knowledge about stages of cell division, renewing of damage cells.

Syllabus	
Title	**PRACTICAL – I**
Course Code	TAP21
Unit 1	Preparation of Standard buffers and determination of pH of a solution.
Unit 2	**Titrimetric Procedures** Estimation of glycine by Sorenson's formal titration Estimation of calcium from milk Estimation of Iron Estimation of Oxalate Estimation of Vitamin C (Ascorbic acid)
Unit 3	**Biochemical Preparation** Preparation of starch from potatoes Preparation of Casein and lactalbumin from milk Preparation of albumin from eggs
Unit 4	**Group Experiments** BMI - Measurement Stages of cell division onion peel (Mitosis and meiosis)
Unit 5	**Spotters (Slides)** Animal and Plant cell and cellular organelles Stages of cell division- (Mitosis& meiosis)

Course Objectives	
Title	**Biomolecules**
Course Code	**(SB23A)**
CO-1	Describe the chemical and molecular foundations of life and the role of energy rich compound in biological systems.
CO-2	Define the structure, properties and roles of carbohydrates.
CO-3	Explain the structure, properties and roles of lipids in biological system.
CO-4	Discuss structure, function and acid base properties of amino acids.
CO-5	Classify the nature, structure and importance of enzymes in living systems.

Course Outcome	
Title	**Biomolecules**
Course Code	**(SB23A)**
CO-1	Demonstrate the chemistry and the role of mono and disaccharides in living systems
CO-2	Elucidate the structural conformation of different types of polysaccharides
CO-3	Gain insight into the reactivity of aminoacids and nutritional importance of proteins
CO-4	Apply the relationship between the structure and functions of proteins in biological context.
CO-5	Elucidate the various levels of organization of Proteins and its biological importance

Syllabus	
Title	**Biomolecules**
Course Code	**(SB23A)**
Unit 1	Carbohydrates - classification and biological significance, physical properties, stereo isomerism, optical isomerism and mutarotation. Configuration of aldo and keto trioses, tetroses, pentoses and hexoses. Reactions of monosaccharides due to the presence of hydroxyl, aldehyde and ketone groups.Structure and properties of reducing disaccharides (lactose & maltose), non- reducing disaccharide (sucrose). Identification of ketose, pentose, reducing and non - reducing sugars.
Unit 2	Occurrence, structure and functions of polysaccharides- starch, glycogen and cellulose (structural elucidation is not needed). Structure and biological significance of mucopolysaccharides - hyaluronic acid, chondroitin sulphate and heparin.Structure of bacterial cell wall polysaccharides (peptidoglycan and teichoic acid), blood group polysaccharides and glycoproteins.Carbohydrates as informational molecules, importance of carbohydrates in biology.
Unit 3	Aminoacids - biological role. General structure of amino acids. 3 - and 1- letter abbreviations. Classification of amino acids based on nature of R group (polar, non polar, acidic, basic, neutral). Modified amino acids in protein, non protein amino acids.Physical properties of amino acids, isoelectric point, titration curve (alanine, lysine, glutamic acid), optical activity. Chemical reactions due to carboxyl group, amino group and side chains. Colour reactions of aminoacid.
Unit 4	Composition and biological importance of peptides.Examples of peptide hormones.Solid state peptide synthesis.Structure of oligopeptides like glutathione, vasopressin and oxytocin, Peptidases – exo and endo peptidases. Classification of proteins based on composition, solubility and functions. Properties of proteins- salting in and salting out, denaturation and renaturation, UV absorption.Estimation of protein by Biuret, Folin’s phenol and UVmethods.
Unit 5	Definition and biological significance of hydrogen bond, hydrophobic interactions and van der waals forces. Levels of organization of protein structure – primary structure – composition, Outline of protein sequencing, Secondary structure – α helix (egg albumin), β- pleated sheath (keratin), triple helix (collagen). Tertiary structure – forces involved in maintenance of tertiary structure like hydrogen bond, hydrophobic interactions, van der waals force, disulphide linkage and ionic bonds with reference to myoglobin. Quaternary structure with reference to haemoglobin.

Course Objectives	
Title	**Biomolecules & Biochemical Techniques**
Course Code	**(SB24A)**
CO-1	The students will learn about Centrifugation & Electrophoresis, and Protein Sequencing.
CO-2	The students will learn about structure and function of lipids, circulating lipids and inflammatory lipid mediators etc.
CO-3	The students will understand about the structure and function of nucleosides and nucleotides.
CO-4	To acquire the knowledge of types of RNA's and DNA's,protein synthesis completely provide information about genetic mutation
CO-5	To acquire the knowledge of analytical techniques in biochemistry to measure toxic wastages in our body systems.

Course Outcome	
Title	**Biomolecules & Biochemical Techniques**
Course Code	**(SB24A)**
CO-1	Gain insight into the classes of lipids and characterization of fats by their constants
CO-2	Establish the diverse role of lipids in biological system
CO-3	Relate the structure of lipids with their reactivity in biological membrane systems and life processes.
CO-4	Establish the role of purine and pyrimidine bases in nucleic acid structure
CO-5	Acquire knowledge about principle of various centrifugation types and its applications

Syllabus	
Title	**Biomolecules & Biochemical Techniques**
Course Code	**(SB24A)**
Unit 1	Lipids- Chemical nature, biological functions and classification. Fatty acids - definition, classification – saturated, unsaturated, hydroxy and cyclic fatty acids, nomenclature, structure and properties of fatty acids. Simple and mixed triglycerides – structure and general properties, Isolation of fats (Folch method) and identification. Characterization of fats – iodine value, saponification value, acid number, acetyl number,Polensky number, Reichert-Meissl number.
Unit 2	Sterols – structure of cyclopentanoperhydrophenanthrene nucleus. Animal sterol: cholesterol - properties and functions. Plant sterol :stigmasterol – Functions, Ergosterol:Functions. Lipoproteins: general structure, classification: chylomicrons, VLDL, LDL,IDL, HDL – composition and biological roles. Classification, structure, properties andbiological functions of phospholipids and sphingolipids.Lipids as signals,cofactors andpigment.
Unit 3	Structure of purine and pyrimidine bases, nucleosides and nucleotides and their biological importance. Function of nucleotides-source of energy, component of coenzymes, second messengers. Types of DNA: A, B, C, Z DNA, structure and biological significance, superhelicity. Types of RNA: mRNA, tRNA, rRNA, hnRNA, snRNA-location and role. Secondary and tertiary structure of tRNA.Isolation, purification,identification and estimation of DNA and RNA. Properties of DNA – hypochromic andhyperchromic effect, melting temperature, viscosity. Denaturation and annealing. Salientfeatures of prokaryotic and eukaryotic RNA. RNA as a genetic material.
Unit 4	Basic principles of sedimentation, centrifugal force, centripetal force, sedimentation rate.Types of centrifuges, types of rotors – fixed angle, vertical, swinging bucket, zonal, elutriatorrotors. Preparative centrifugation – differential centrifugation – fractionation of subcellularorganelles, density gradient centrifugation – gradient preparation, separation and recovery ofsample,isopycnic centrifugation, analytical centrifugation- techniques and applications.
Unit 5	Basic principles of electromagnetic radiation, energy, wavelength, wave number and frequency. Absorption and emission spectrum.Colorimetry – Principle- Beer –Lambertslaw, instrumentation and applications. Spectrophotometry- (UV and Visible) principle,instrumentation and applications.Spectrofluorimetry- principle, instrumentation and applications with reference to riboflavin.Atomic absorption spectroscopy and Flame photometry - principle,instrumentation and applications with reference to sodium and potassium analysis.

Course Objectives	
Title	**PRACTICAL-II**
Course Code	TAP41
CO-1	To inspire the understanding knowledge of colorimetric method in the field of determination of solution concentration, determination of reaction levels, analysis of blood, water, soil nutrients, and foodstuffs.
CO-2	To understand the knowledge of paper chromatography characterizing the relative mobility of various amino acids.
CO-3	To understand the knowledge of biuret test characterizing histidine amino acid peptides.
CO-4	To know the well-known acid value of all edible oil provide saturation condition and permissible level.
CO-5	To study the unsaturation level in edible oil completely predicted by iodine number.

Course Outcome	
Title	**PRACTICAL-II**
Course Code	TAP41
CO-1	To understand the qualitative analysis of carbohydrates and amino acids
CO-2	To determine the Saponification, iodine and acid value of oil
CO-3	To analyze the colorimetric estimations of protein, nucleic acids, carbohydrate and nucleic acids
CO-4	To understand the chromatographic techniques
CO-5	To understand the knowledge of Fiske-Subbarow method and its estimation of inorganic phosphorus.

Syllabus	
Title	**PRACTICAL-II**
Course Code	TAP41
Unit 1	**Qualitative tests for** Carbohydrate Amino acids
Unit 2	**Titrimatric methods** Determination of saponification value of an edible oil. Determination of acid number of an edible oil. Determination of iodine value of an edible oil.
Unit 3	**Colorimetry** Estimation of protein by Biuret method. Estimation of inorganic phosphorous by Fiske and Subbarow method. Estimation of aminoacids by Ninhydrin method. Estimation of DNA by diphenylamine method. Estimation of RNA by orcinol method. Estimation of carbohydrate by Anthrone method/ Dubois method.
Unit 4	**Group Experiment** Isolation and assay of glycogen from animal tissue. Separation and Identification of Amino acids and carbohydrate by paper chromatography.

Course Objectives	
Title	**Enzymes**
Course Code	**(BBC-DSC07)**
CO-1	Describe the classification and nomenclature of enzymes, specificity of enzyme action, enzyme catalysis and regulatory enzymes.
CO-2	Explain the mechanism of enzymes and the role of vitamins as coenzyme precursors.
CO-3	Express the Michaelis-Menten equation, single and double reciprocal plots, and graphical representation of various inhibitors.
CO-4	Discuss the factors affecting enzyme activity and enzyme isolation & purification.
CO-5	Describe the principles and methods of enzyme immobilization.

Course Outcome	
Title	**Enzymes**
Course Code	**(BBC-DSC07)**
CO-1	To understand the inhibition of enzymes
CO-2	To understand the kinetics of enzyme
CO-3	A thorough knowledge about the nature, classification, specificity of enzymes and coenzymes
CO-4	To study about the isolation, Purification and characterization of enzymes
CO-5	To gain knowledge about immobilization, and applications of enzymes

Syllabus	
Title	**Enzymes**
Course Code	**(BBC-DSC07)**
Unit 1	Enzymes- definition and chemical nature of enzymes. General properties; Nomenclature and classification Based on IUB with examples; enzymes as catalystsActivation energy. Enzyme specificity- absolute, Group, linkage and stereo specificities. Concept of Active site; Lock and key hypothesis and Induced fit theory.Regulatory enzymesallosteric enzymes with suitable examples.Isoenzymes: with reference to LDH and CK. Enzyme expression Units- IU, specific activity, Ktal.
Unit 2	Enzyme Kinetics: Rate of enzyme catalyzed reaction, Derivation of Michaelis - Menten equation. Lineweaver Burk plot and EadieHofstee plot. Factors affecting enzyme activity - pH, temperature,activators,cofactors, concentration of enzyme and substrate. Determination of Km value by any 3 methods.
Unit 3	Enzyme inhibition – reversible and irreversible inhibition – types of reversible inhibitors: competitive, noncompetitive, uncompetitive inhibitors. (Derivation not required) Mechanism of enzyme activity: covalent catalysis, proximity and orientation, acid – base catalysis. Mechanism of action of chymotrypsin.
Unit 4	Methods of isolation of enzymes: Homogenisation techniques, intracellular localization of enzymes; isolation of intracellular enzymes; separation procedure based on molecular size - dialysis, ultrafiltration, molecular exclusion chromatography methods based on solubility – isoelectric precipitation. Salting in and salting out – methods based on electric charge – electrophoresis, Ion exchange chromatography, isoelectric focusing. Characterisation of purified enzymes- Ultracentifugation and SDS-PAGE.
Unit 5	Coenzymes, function and action of TPP, PLP, NAD/NADP, FMN, FAD, coenzyme A, lipoic acid and Biotin.Multienzyme complexes – Pyruvate dehydrogenase complex.Metallo enzymes. Industrial uses of enzymes: Food, textile and pharmaceutical industries. Biosensors and their applications, immobilized enzymes and methods of immobilization

Course Objectives	
Title	**Metabolism**
Course Code	**BBC-DSC08**
CO-1	Describe the fundamentals of thermodynamics in biochemical processes.
CO-2	Acquire the knowledge of energy production in living systems by the degradation of fatty acids.
CO-3	Explain the various pathways of fatty acid synthesis in living systems.
CO-4	Describe the energy generated from the carbohydrate metabolism.
CO-5	Explain the mechanism of the machinery system involved in carbohydrate metabolism.

Course Outcome	
Title	**Metabolism**
Course Code	**BBC-DSC08**
CO-1	To understand the concepts of thermodynamics and the mechanism of energy transfer in ETC
CO-2	To understand the fate of the dietary carbohydrates
CO-3	To understand the fate of the dietary lipids
CO-4	To understand the fate of the dietary protein
CO-5	To study the metabolism of purine and pyrimidine nucleotides and the interrelation among the carbohydrates, fat and protein metabolism.

Syllabus	
Title	**Metabolism**
Course Code	**BBC-DSC08**
Unit 1	Bioenergetics - Free energy and the laws of thermodynamics; Role of high energy compounds as energy currency of the cell; free energy of hydrolysis of ATP and other organophosphates.The basic metabolic pathways, anabolic, catabolic and amphibolic pathways.Electron transport chain- Role of respiratory chain in mitochondria; in energy capture; respiratory control. Oxidative phosphorylation - Mechanism of oxidative phosphorylation;Chemiosmotic theory; uncouplers of oxidative phosphorylation.
Unit 2	Fate of absorbed carbohydrates- Glycolysis - Pathways and energetics; Oxidation of pyruvate to acetyl CoA. TCA Cycle - Pathway and energetics; anaplerotic reaction Pasteureffect. Gluconeogenesis, Glycogenesis and glycogenolysis. Pentose Phosphate Pathway (HMP shunt). Glucuronic Acid Cycle and glyoxylate cycle (Enter- Doudoroff pathway) Metabolism of other hexoses - Fructose and galactose.
Unit 3	Blood lipids and phase of dietary lipids. Oxidation of fatty acids: - Carnitine cycle; beta oxidation. Alpha oxidation and omega oxidation .Biosynthesis of propionyl CoA. Biosynthesis of saturated fatty acids: - Extra – mitochondrial in a microsomal system for synthesis of fatty acids. Biosynthesis of unsaturated fatty acids: - Monounsaturated and polyunsaturated fatty acids.Biosynthesis and degradation: - Lecithin, cephalin, inositol, phosphatidyl serine, cholesterol.
Unit 4	Fate of dietary proteins, metabolic nitrogen pool. Catabolism of amino acid: Oxidative deamination, non – oxidative deamination, transamination and decarboxylation. Catabolism of carbon skeleton of amino acids.Catabolism of glycine, phenylalanine and tyrosine.
Unit 5	Metabolism of purines: - de novo synthesis, salvage pathways; catabolism. Metabolism of pyrimidines: - de novo synthesis, salvage pathways; catabolism. Interrelation between carbohydrates, fat and protein metabolism.

Course Objectives	
Title	**Analytical Biochemistry**
Course Code	**BBC-DSC09**
CO-1	Describe various separation techniques for different molecules present in the cell.
CO-2	Discuss the theoretical principles of various separation techniques in chromatography and typical applications of chromatographic techniques.
CO-3	Define an adequate knowledge of the principles, instrumentation and applications of electrophoresis.
CO-4	Explain and understand the basic instrumentation of Centrifugation and radioisotope techniques for separation, identification and characterization of compounds.
CO-5	Explain the theoretical principles of selected instrumental methods within electroanalytical, spectrometric/spectrophotometric methods

Course Outcome	
Title	**Analytical Biochemistry**
Course Code	**BBC-DSC09**
CO-1	Understanding the concepts of acids, bases, buffers, various units used in expressing their strength and measuring their pH, buffers in body fluids.
CO-2	To understand the various techniques , types , operation and applications of chromatography
CO-3	To understand the in depth knowledge about the techniques, types, operation and applications of electrophoresis.
CO-4	Understanding radioactivity, its measurements and applications
CO-5	To study the basics of bioinformatics, nanotechnology and its applications in various fields.

Syllabus	
Title	**Analytical Biochemistry**
Course Code	**BBC-DSC09**
Unit 1	Definition of Molality, Molarity, Normality, Osmolarity, Definition of pH, pOH, determination of pH- Glass electrode, Buffers, Tonicity. Henderson– Hassel Balch equation.Buffers in body fluids, Red blood cells, tissues.Measurement of oxygen consumption - the Clark oxygen electrode. Light Microscopy: Principle, components and structure of compound microscope. Typesbasic concepts only. Electron microscopy – Principle, techniques and applications of Transmission and scanning electron microscopy.
Unit 2	General principles of chromatography – partition and adsorption chromatography, Paper chromatography – principle, sample application, development, Rf value calculation, Applications-separation and detection of amino acids and sugars. Thin layer chromatography – principle, instrumentation and applications (separation of alkaloids). Columnchromatography – principle, Techniques, Fraction collection and analysis.Basic principles and applications of Affinity chromatography, ion exchange chromatography, gel exclusion chromatography, HPLC and GLC.
Unit 3	General principle of electrophoresis, factors affecting migration rate – electrical potential, nature of the sample, nature of buffer, nature of the supporting medium.Tiselius moving boundary electrophoresis. Principle, procedure and application of paper, cellulose acetate, agarose and starch gel electrophoresis. Isoelectric focusing.Principle and applications of SDS -PAGE and 2 dimensional PAGE.
Unit 4	Radioisotope techniques- Natural and artificial radioactivity, Types of radioactive decay, units of radioactivity, Rate of radioactive decay, interaction of radioactive decay with matter. Detection of radioactivity by- GM counter, Scintillation counter and autoradiographyPrinciple, techniques and applications.Applications of radioisotopes in biological sciences, radio dating and in clinical diagnosis. Biological effects of radiations. Safety measures in handling radio isotopes.
Unit 5	Fundamentals of Bioinformatics, Biological databases – Nucleotide sequence data bases and protein sequence data bases – types and applications. Basic concepts of proteomics and genomics.Industrial and pharmaceutical applications of Bioinformatics. Introduction to nanotechnology - Definition and scope of nanotechnology, Nano particle and Nano materials - structure and properties, Nano scale.Types of Nano materials – metallic and nonmetallic, - Applications of nano materials – Medicine, Agriculture, Environment & Health.Possibilities for the future, Pitfalls in nanotechnology.

Course Objectives	
Title	**Physiology**
Course Code	**(BBC-DSE01)**
CO-1	Describe the homeostasis and organization of fluid compartments of the human body.
CO-2	Acquire the knowledge of the organization and physiology of the cardiovascular system and digestive system
CO-3	Describe the organization and mechanism of the respiratory stem.
CO-4	Explain the organization and chemistry of the nervous system.
CO-5	Describe the homeostasis and organization of fluid compartments of the human body.

Course Outcome	
Title	**Physiology**
Course Code	**(BBC-DSE01)**
CO-1	Have Knowledge about Blood composition and its function, blood clotting mechanism.
CO-2	Gain knowledge about blood pressure and to create awareness about cardiovascular diseases
CO-3	To inculcate knowledge about the muscular and nervous system, role of neurotransmitters in physiology.
CO-4	To acquire in depth knowledge about respiratory and to create awareness about lung disorders
CO-5	To learn about the reproductive system and to know about the reproductive disorders and to introduce the organization of endocrine system and classification of hormones,

Syllabus	
Title	**Physiology**
Course Code	**(BBC-DSE01)**
Unit 1	Structure of digestive system, digestion and absorption of carbohydrates, lipids and protein, Mechanism of HCl formation in stomach, role of various enzymes and hormones involved in digestive process and defecation. Excretory system – structure and function of kidney, structure of a nephron, mechanism of urine formation.
Unit 2	Composition of blood cells, plasma components, and lymph Arteries, Arterial BP and measurement, Capillaries and bulk flow across the capillary walls, Veins and determination of venous pressure and blood groups. Bleeding and clotting time. Mechanism of blood clotting.Circulatory system- basic anatomy of heart.Systemic, pulmonary and portal circulation.Heart beat, cardiac cycle and pacemaker.Long term and short term regulation of cardiac efficiency and BP.
Unit 3	Nervous system – Brain (parts of brain and ventricles), spinal cord, central and autonomous nervous system (sympathetic and parasympathetic).Structure of a neuron, synaptic transmission. Reflex action and neurotransmitters. Muscular system- types of muscles, structure and composition of skeletal muscle structure of a myofibril, mechanism of muscle contraction and theories of muscle contraction. Outline of neurotransmitters and cAMP.Synapses- chemical and electrical synapse, nerve impulse, action potentional and neuro transmitters.
Unit 4	Respiratory system- composition of air, significance of O2, carbon dioxide and nitrogen in biological system.Partial pressure of oxygen and carbon dioxide. Gaseous exchange in the lungs, tissue, arterial and venal capillaries, Role of kidney and lungs in maintaining the pH of blood, Pulmonary surfactants.
Unit 5	Reproductive Physiology: Sex determination and differentiation,Development of female and male genital tracts.Oogenesis,Spermatogenesis,capacitation and transport of spermblood testis barrier.Fertilization early development,Implantation,Placentation and Parturition.Hormones- classification of hormones, endocrine glands and their secretion. Insulin, thyroxine, growth hormone. Structure and function. Steroid hormones.Corticosteroids(Structure and Function only)- sex hormones – testosterone and estrogen, menstrual cycle.

Course Objectives	
Title	**Clinical Biochemistry**
Course Code	**(BBC-DSC10)**
CO-1	Describe the collection of specimens and their processing.
CO-2	Classify the blood glucose level, diabetes and anemia.
CO-3	Interpret the different level of bilirubin as well as liver function test.
CO-4	Interpret the different level of urea, creatinine, insulin as well as renal function test.
CO-5	Examine gastric contents, FTM stimulation test and gastric function test.

Course Outcome	
Title	**Clinical Biochemistry**
Course Code	**(BBC-DSC10)**
CO-1	To gain knowledge on scope of clinical biochemistry
CO-2	To understand the alteration in biochemical components during various clinical conditions
CO-3	To get acquainted with the role of enzymes in diagnosis of various diseases.
CO-4	To become aware with the variations in the levels of triglycerides and lipoproteins and their relationship with various diseases
CO-5	To highlight the importance of various biochemical parameters in the diagnosis of diseases .

Syllabus	
Title	**Clinical Biochemistry**
Course Code	**(BBC-DSC10)**
Unit 1	Maintenance of blood glucose by hormone with special reference to insulin and glucagon.Abnormalities in glucose metabolism. Diabetes mellitus-types, causes, biochemical manifestatious, diagnosis and treatment, Inborn errors of carbohydrate metabolism, Galactosemia, Fructosuria and Glycogen storage disease.
Unit 2	Liver function tests, Tests based on bile pigment metabolism. Enzymes pattern in health and diseases with special mention of plasma lipase, amylase, cholinesterase, alkaline and acid phosphatise, SGOT, SGPT, LDH and CPK. Clinical enzymology - enzymes of diagnostics importance: LDH, Creatininekinase, transaminases and pancreatic lipase.
Unit 3	RBC, WBC, epithelial cells, cast and calculi. Normal and abnormal constituent in urine, Inulin, urea and creatinineclearance tests.Concentration and dilution test. Phenol red test.Kidney function tests, measurnment of urine Ph, volume, specific gravity, Osmolality sediments in urine.Levels of plasma proteins and its significance related to kidney function. Proteinuria.
Unit 4	Levels of cholesterol, triglycerides, phospholipids, free fatty acids and lipoprotein in blood. Abnormal levels of these lipids in diseases. Atherosclerosis, hyper and hypoproteinemias, Sphingolipidoses, annNiempick disease, Gaucher's and Tay-ach's disease-causes and pathology. Inborn errors of aminoacid metabolism-alkaptonuria, Phenylketonuria, albinism, gout and hper-uricemiacauses , types and treatment.
Unit 5	Diagnostic tools: Principles and applications Clinical chemistry analyser - semi and fully automated Electrolyte analyser Blood gas analyser - ECG Glucometer - HbA1C analyser and other point care devices

Course Objectives	
Title	**Molecular Biology**
Course Code	**BBC-DSC11**
CO-1	This module deals with nucleic acids and proteins and how these molecules interact within the cell to promote proper growth, division, and development. It is a large and everchanging discipline. This course will emphasize the molecular mechanisms of DNA replication, repair, and protein synthesis.
CO-2	Molecular diagnostic test is used in the determination of precision of molecular biology and its revolution in clinical and public health laboratories investigations including human, viral, and microbial genomes.
CO-3	To study complete replication of DNA processing outcome the essential part of biological inheritance.
CO-4	The knowledge of genetic code provides the instruction contains in DNA package.
CO-5	The knowledge of protein blocking system and drug targets for new classes of broad-spectrum bacterial RNAP.

Course Outcome	
Title	**Molecular Biology**
Course Code	**BBC-DSC11**
CO-1	Gain knowledge about the various types of DNA, the organization of genes to chromosomes in prokaryotes and eukaryotes
CO-2	Understand the molecular basis of DNA synthesis, know the importance of the process, and the role of inhibitors of DNA as drugs
CO-3	Understand the process of RNA synthesis, post transcriptional modifications and apply the same to understand the role of antibiotics.
CO-4	To discuss about the genetic code, molecular basis of protein synthesis & modification
CO-5	To study the detailed mechanism of DNA mutation, Repair system and understand the use of molecular process in disease diagnosis.

Syllabus	
Title	**Molecular Biology**
Course Code	**BBC-DSC11**
Unit 1	DNA as the unit of inheritance. Griffith, Avery, McLeod, McCarthy, Hershey and Chase experiments and their significance. Definition of gene, organization of geneand non-coding sequence in prokaryotes, mitochondrial DNA, plasmid DNA. Viral genomebacteriophages (M13 and ΦX174), animal virus (influenza virus), plant virus (TMV).Organisation of genes in Eukaryotes,Satellite DNA
Unit 2	Prokaryotic replication- model of replication- semiconservative mode of replication- replication forks, semi-discontinuous replication, Okazaki fragments. Bacteriophages M13 andΦX174 replication, rolling circle model of replication. Enzymology of replication- role of DNA polymerases I, II, III, gyrase, topoisomerases, helicase, ligases and SSB proteins. Theta replication in E.Coli- initiation events at Ori C, elongation events on the replication fork and termination- fidelity of replicationInhibitors of replication and their applications as drugs.
Unit 3	Transcription- prokaryotic RNA polymerases- role of sigma factor. TATA box, promoter, closed and open promoter complexes- initiation, elongation and termination of transcription, post transcriptional modifications in prokaryotes (tRNA and rRNA). Inhibitors of Transcription and their applications as antibiotics.
Unit 4	Genetic code- characteristics of genetic code- Wobble hypothesis- protein biosynthesis- activation of amino acids, initiation, elongation and termination of translation in prokaryotes. Inhibitors of protein biosynthesis and their use as antibiotics.
Unit 5	DNA damage, Mutation- types of mutation with examples, causes- physical and chemical agents, site - specific mutagenesis and mutational hot spots.DNA repair by direct reversal of damage, photoreactivation, excision repair, recombination repair, SOS repair. Application oriented Topic: Molecular Diagnostic techniques in DNA,RNA and Protein.

Course Objectives	
Title	Immunology
Course Code	BBC-DSE02
CO-1	Describe cells and organs of the immune system.
CO-2	Explain innate immunity, cell adhesion molecules, cytokines and complement system.
CO-3	Describe the structure of antibody, B-cell development, receptor diversity and humoral immune response.
CO-4	Explain the T-cell biology and MHC restriction.
CO-5	Describe mucosal immune system.

Course Outcome	
Title	**Immunology**
Course Code	**BBC-DSE02**
CO-1	Understand about the types of immunity, lymphoid organs and the cellular basis of immunity
CO-2	Obtain knowledge on types of antigens, antibodies and activation of complements
CO-3	Gain insight into various in vitro reactions between antigen and antibody and its application in clinical diagnosis
CO-4	Apprehend the enormous scope of different types of vaccines
CO-5	Acquire knowledge on autoimmunity, hypersensitivity and transplantation immunology

Syllabus	
Title	**Immunology**
Course Code	**BBC-DSE02**
Unit 1	Types of immunity- innate and acquired.Determinants of innate immunity – anatomical, Biochemical and Cellular Factors- Phagocytosis, Inflammation.Humoral and cell mediated immunity. Immune system – functions and structural components - lymphoreticular system – lymphoid organs- primary and Secondary lymphoid organs. Types, structure and functions of lymphoid cells – B, T and null cells
Unit 2	Antigens – definition – types – haptens, isoantigens, neoantigens. Factors affecting antigenicity and immunogenicity of antigens. Antibodies – definition and classification. General structure andfunctions of IgM, IgD, IgA, IgG and IgE, Isohemeagglutinins and natural antibodies. Clonal selection theory of antibody formation. Complement – biochemical functions. Activation by classical and alternative pathways
Unit 3	Antigen – antibody interaction – types – precipitation and agglutination mechanism. Applications of agglutination reaction in diagnosis of diseases – Widal test – complement fixation test, Coombs test Blood grouping- major and minor blood groups. Erythroblastosisfetalis, Blood transfusion. Mismatched blood transfusion andits consequences, Principle and applications of RIA and ELISA, immunoelectrophoresis and immunofluorescence.
Unit 4	Immunization practices - passive and active immunization. Commonly used vaccines - killed and live attenuated vaccines. DNA vaccine, Recombinant vector vaccine.Vaccination schedule for children.Production of monoclonal antibodies- principle and applications.
Unit 5	Disorders of immune system – hypersensitivity – causes, types and pathology of type I, II, III and IV hypersensitivity – Auto immunity – causes and the pathology of Rheumatoid arthritis, systemic lupus erythematosus, Hashimotos thyroiditis, thyrotoxicosis, autoimmune hemolyticanemia. Immunomodulation.Transplantation immunology- graft acceptance and rejection.

Course Objectives	
Title	**Biotechnology**
Course Code	**BBC-DSE03**
CO-1	Develop the understanding of basics of Application of Bioinformatics
CO-2	Develop the understanding of sequence formats
CO-3	Develop the understanding of Data mining
CO-4	Develop the understanding of sequence alignment.
CO-5	Develop the application of bioinformatics.

Course Outcome	
Title	**Biotechnology**
Course Code	**BBC-DSE03**
CO-1	Basic knowledge of recombinant DNA technology, DNA manipulation in prokaryotes and eukaryotes, engineering of DNA
CO-2	Use of cloning and vectors, creation of genomic and cDNA libraries and their applications
CO-3	To understand the methods for production of proteins using recombinant DNA technology and their applications
CO-4	To understand the basics of tissue culture, Transgenesis and stem cell technology
CO-5	To understand the fermentation technology –. risks, and safety aspects and patenting in biotechnology

Syllabus	
Title	**Biotechnology**
Course Code	**BBC-DSE03**
Unit 1	Scope and importance of biotechnology. Recombinant DNA technology - Principles of gene cloning: restriction endonucleases and other enzymes used in manipulating DNA molecules. Ligation of DNA molecules, DNA ligase, linkers and adapters, homopolymer tailing. Plasmids and bacteriophages as vectors for gene cloning- Cloning vectors based on E. coli plasmids, pBR322, pUC8. Cloning vectors based on M13 and λ bacteriophage. Uptake of DNA by cells, Selection and identification for transformed cells- colony hybridization, screening with antibodies
Unit 2	Construction of genomic library. Synthesis of cDNA, Construction of cDNA library. Production of recombinant pharmaceuticals such as insulin, human growth hormone, factor VIII and Recombinant vaccines. PCR –Principle, Steps, Types and its application in clinical diagnosis and forensic science. Southern blotting, Northern blotting and DNA finger printing Technique and their applications
Unit 3	Plant genetic engineering: gene isolation, gene transfer systems, Ti plasmid, plant virus vectors, electroporation, microinjection, microprojectile technology, gene expression, regeneration. Applications- Resistance to biotic stress- insect resistance and virus resistance. Resistance to abiotic stress-Herbicide resistance. Improved nutrition- Golden rice. Production of low cost Pharmaceuticals- Production of edible vaccines.
Unit 4	Tissue culture – Culture media, Plant tissue culture, protoplast culture, protoplast fusion and regeneration, embryo rescue- techniques and applications. Animal cell lines and organ culture- culture methods and applications. Transgenic animals: transgenic mice Production and its applications. Stem cell technology: definition, types, culture and applications
Unit 5	Fermentation technology – Fermenters- general design, fermentation processes Media used, downstream processing. Production and applications of ethanol, streptomycin, and Proteases. Biotechnology and society: safety, legal, social and ethical aspects of biotechnology. Patenting biotechnological inventions

Course Objectives	
Title	**PRACTICAL- III**
Course Code	**BBC-DSC12**
CO-1	Describes the principle of protein-free filtrate preparation to know the health kidneys filter creatinine out of the blood.
CO-2	Describes the basic structure, function of Haemoglobin, physiological variants concentrations.
CO-3	Describes the function of ALT to convert alanine into pyruvate for cellular energy production in liver, heart and muscle cells.
CO-4	Describes the common factor pathway x, v, ii, I and xiii in blood clotting time.
CO-5	Describes the role of cholesterol, lipoproteins in health and disease, various causes of dyslipidaemias.

Course Outcome	
Title	**PRACTICAL- III**
Course Code	**BBC-DSC12**
CO-1	To attain knowledge about the collection and preservation of urine and blood samples
CO-2	To analysis the qualitative and quantitative analysis of urine and blood
CO-3	To analyse the enzyme studies
CO-4	To understand the fate of the dietary protein
CO-5	To study the basic of blood grouping, counting and sedimentation rate

Syllabus	
Title	**PRACTICAL- III**
Course Code	**BBC-DSC12**
Unit 1	**Quantitative Analysis of urine** Urea Uric acid Creatinine Calcium Collection and preservation of urine samples. Qualitative analysis of normal constituents of urine such as urea, Creatinine, Phosphorus, Calcium and abnormal constituents such as calcium, sugar, protein, amino acid ketone bodies and bile pigments with clinical significance Collection and preservation of blood sample
Unit 2	**Quantitative Estimation in blood** Haemoglobin Cholesterol Glucose Urea Creatinine Protein by Lowry's method Determination of albumin and A/G ratio in serum
Unit 3	**Enzyme assay** AST ALT Alkaline phosphatase.
Unit 4	**Experiments** RBC Counting Total and differential count of white blood cells Packed cell volume Erythrocyte sedimentation rate Blood clotting time Blood grouping

Course Objectives	
Title	**PROJECT**
Course Code	**BBC-DSC13**
CO-1	The main objective of this course is to acquaint the student with various techniques used in contemporary research in biochemistry that will be useful in successful completion of their project work in the fourth semester.
CO-2	Developing and executing biochemical and biophysical assays to support hit identification, validation and lead optimization.
CO-3	Developing working efficiency independently to design and execute research plans to ensure that critical project requirements, timelines and deliverables met.
CO-4	Developing skills to understand the industrial techniques.
CO-5	Developing skills using analytical thinking, problem solving, organization interpersonal relationships

Course Outcomes	
Title	**PROJECT**
Course Code	**BBC-DSC13**
CO-1	The students are encouraged to carry out small project work of their choice to quench their curiosity.
CO-2	To able to understand theory of research.
CO-3	In order to understand research, student can undertake a small dissertation work where he/she exhaustively performs the literature search and compiles them as a meaningful presentation.
CO-4	Apply knowledge, skills to develop detailed communication research framework using appropriate communications tools, qualitative and/or, quantitative methods.
CO-5	Develop knowledge to create alternate solutions to problems, examine current trends and provide justification for methods and analysis.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF ELECTRONICS AND COMMUNICATION SCIENCE

Program : **B. Sc (Electronics and Communication Science)**

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	**Design/Development of solutions**: Design solutions for complex Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental conditions.
PO-2	**Engineering knowledge:** Apply the knowledge of mathematics, Science, Engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO-3	**Conduct investigation of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO-4	**Problem analysis:** Identify, formulate, review research literature and analyse complex engineering problems reaching substantiated conclusion using principles of mathematics and Engineering sciences
PO-5	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	To familiarize students with the professional issues in Electronics and communication science including innovation, ethics, issues related to global economy and emerging technology.
PSO-2	Impact analytic and thinking skills to develop initiatives and innovative ideas for R&D, Industry and societal requirements.
PSO-3	Provide sound theoretical and practical knowledge of Electronics, managerial and entrepreneurial skills to enable students to contribute to the wellbeing of society with a global outlook.
PSO-4	Inculcate qualities of teamwork as well as social, interpersonal and leadership skills and an ability to adapt to evolving professional environments in the domains of engineering and technology.
PSO-5	Motivate graduates to become good human beings and responsible citizens for the overall welfare of the society.

Course Objectives	
Title	**CIRCUIT THEORY**
Course Code	SG21A
CO-1	To apply circuit theorems to simplify and find solutions to electric circuits.
CO-2	To solve simple circuits using ohm's law, Kirchhoff's laws and the properties of the elements.
CO-3	To build up basic problem solving skills through organizing available information and applying circuit laws.
CO-4	To Build up strong problem solving skills by effectively formulate a circuit problem into a mathematical problem using circuit laws and theorems.
CO-5	To Simplify circuits using series and parallel equivalents and using Thevenin's and Norton' Equivalents.
CO-6	To understand application of resistors capacitors, inductors and transient circuit response.

Course Outcome	
Title	**CIRCUIT THEORY**
Course Code	SG21A
CO-1	Simplify and identify solutions to electrical circuits.
CO-2	Implement the techniques to solve simple circuits using ohm's law, Kirchhoff's laws and the properties of the elements.
CO-3	Categorize series and parallel equivalents and using Thevenin's and Norton's equivalents.
CO-4	Recognize resistors capacitors, inductors and transient circuit responses.
CO-5	Study the properties of basic components.

Syllabus	
Title	**CIRCUIT THEORY**
Course Code	SG21A
Unit 1	**Resistors:** Introduction to linear and nonlinear components (active and passive) – Types of resistors (wire wound, carbon composition, film type, Cermets) – Resistor color coding – power rating of resistors – Series and Parallel combination of resistors. **Capacitors:** Capacitance-Factors controlling capacitance-Types of capacitors: Fixed Capacitors, Variable Capacitors – Non electrolytic and electrolytic capacitors. Voltage rating of capacitors – capacitors in series and parallel – Energy stored in capacitors.
Unit 2	**Inductors:** Inductors (air core, iron core, ferrite core) – comparison of different cores – Inductance of an Inductor – Mutual Inductance – Coefficient of coupling – Variable Inductors – Inductors in Series and Parallel without M – Reactance and Impedance offered by a coil – Q factor. **Transformer:** working – turns ratio – voltage ratio – current ratio – power in secondary – autotransformers – transformer efficiency – core losses – types of cores.
Unit 3	Ohm's law – Kirchoff's current law – Kirchoff's voltage law – voltage division technique - concepts of series circuit – current division technique – concepts of parallel circuits – internal resistance of sources – method of solving a circuit by Kirchoff's laws – loop analysis – nodal analysis – simple problems
Unit 4	**Network Theorems:** Super Position Theorem – Thevenin's Theorem – Norton's Theorem – Thevenin to Norton Conversion (Theorem Statement and Simple problems)
Unit 5	**Applications of Basic components:** Filters (Low Pass Filter, High Pass Filter using passive components.) **AC signal:** RMS value– average value–. AC analysis (Pure resistive, Pure inductive circuit and Pure capacitive circuit)

Course Objectives	
Title	**CORE PRACTICAL I**
Course Code	SG211
CO-1	To understand the fundamental principles of circuit theory.
CO-2	To make use of circuit laws and theorems and measuring the circuit parameters.
CO-3	To verity ohm's law.
CO-4	To understand the functions of CRO
CO-5	To know the functions of multimeter and other testing devices.

Course Outcome	
Title	**CORE PRACTICAL I**
Course Code	SG211
CO-1	Apply the concept of basic circuit and theorems
CO-2	Simplify the ohms law, Thevenin's circuits.
CO-3	Study RC circuit for series resonance.
CO-4	Use the oscilloscope for the display and measurements of signals.
CO-5	Study of superposition theorem

Syllabus	
Title	**CORE PRACTICAL I *(Atleast seven experiments should be done for the examination)***
Course Code	SG211
Unit 1	Study of CRO, Multimeter and other Testing Devises (Study Purpose).
Unit 2	Testing of components, Study of Kirchoff's law.
Unit 3	To verify Ohm's Law using voltmeter and Ammeter.
Unit 4	Resistance in Series and Parallel.
Unit 5	Capacitors in Series and Parallel.
Unit 6	Study of Super Position Theorem.
Unit 7	Verification of Thevenin's Theorem.
Unit 8	Study of RC Circuit – Series Resonance.

Course Objectives	
Title	**CORE PAPER 2 - ELECTRONIC DEVICES**
Course Code	SG22A
CO-1	To understand the use of diodes as power supply rectifiers.
CO-2	To understand the operation of transistors as switching circuits.
CO-3	To understand the fundamentals of operation of the semiconductor electronic devices.
CO-4	To understand the fundamentals of power devices

Course Outcome	
Title	ELECTRONIC DEVICE
Course Code	SG22A
CO-1	Recognize the diodes as rectifiers.
CO-2	Identify the operation of transistors and as switching circuits
CO-3	Compare the operation of transistors and FETs
CO-4	Describe the fundamental operation of semiconductor electronic devices.

Syllabus	
Title	ELECTRONIC DEVICE
Course Code	SG22A
Unit 1	**Semiconductor Basics:** Conductor – Semiconductor – Introduction to Intrinsic and Extrinsic semiconductor – P type and N type semiconductor – PN junction diode – V-I characteristics - Half wave, Full wave & Bridge rectifier – expression for efficiency and ripple factor - Construction of Basic logic gates using Diodes.
Unit 2	**Special Purpose Diodes:** Zener and Avalanche Break down, Zener diode - V-I characteristics regulated power supply using Zener diode- LED, Photodiode, PIN Diode, Varactor Diode, Tunnel Diode – Principle, Working& Applications.
Unit 3	**Transistors:** Transistor symbols NPN & PNP – Transistor biasing for active, saturation & cut off – Operation of a BJT - Characteristics of a transistor in CE, CB & CC modes – Early effect – Punch-through– Transistor testing– Transistor as a switch – - Construction of Basic logic gates using Transistors (qualitative analysis)- Transistor as an amplifier - UJT – Basic construction and working- Characteristics.
Unit 4	**Field Effect Transistors:** FET – Construction - Working - Static – Transfer characteristics –Parameters of FET – FET as an amplifier – MOSFET – Enhancement MOSFET – Depletion MOSFET – Construction & Working – Drain characteristics of MOSFET – Comparison of JFET & MOSFET.
Unit 5	**Power Devices:** Power Transistors- SCR – TRIAC – DIAC and IGBT – Characteristics and working.

Course Objectives	
Title	**PAPER II - CORE PRACTICAL II**
Course Code	SG221
CO-1	To understand and experiment the basic parameters of electronic devices.
CO-2	To construct few applications using semiconductor devices.

Course Outcome	
Title	**PAPER II - CORE PRACTICAL II**
Course Code	SG221
CO-1	Experiment the fundamental operations of the main semiconductor electronic devices.
CO-2	Design and construct electronic circuits using semiconductor devices.
CO-3	Understand the transistor characteristics.

Syllabus	
Title	**PAPER II - CORE PRACTICAL II (*(Atleast seven experiments should be done for the examination)***
Course Code	SG221
Unit 1	V-I Characteristics of Junction Diode.
Unit 2	Rectifier circuits – Half Wave, Center- tapped Full wave.
Unit 3	Bridge Rectifier.
Unit 4	V-I Characteristics of Zener Diode.
Unit 5	Regulated Power Supply using Zener Diode.
Unit 6	Transistor as a switch.
Unit 7	Transistor Characteristics of CE Configuration.
Unit 8	Logic gates using Diodes.
Unit 9	Logic gates using Transistor.

Course Objectives	
Title	**CORE PAPER 3 - ANALOG ELECTRONICS**
Course Code	**SG23A**
CO-1	To familiarize the student with the analysis and design of basic transistor amplifier circuits, feedback amplifiers and multi vibrator circuits.
CO-2	To understand the concepts of Multi Stage Amplifier.
CO-3	To study the operation of Hartley, Colpitts, RC Phase shift, crystal and wien bridge oscillators.
CO-4	To determine the operating characteristic of Uni junction Transistor Oscillator.
CO-5	To study the characteristics of Operational Amplifier.
CO-6	To study the various applications of Operational amplifier and IC 555.

Course Outcome	
Title	**CORE PAPER 3 - ANALOG ELECTRONICS**
Course Code	**SG23A**
CO-1	Design and analyze of electronic circuits,
CO-2	Recognize power amplifier circuits, their design and uses in electronics and communication circuits.
CO-3	Know the concept of Multistage and feedback amplifier and their characteristics.
CO-4	Design the different oscillator circuits for various frequencies.
CO-5	Design of circuits using Operational Amplifier and IC 555.

Syllabus	
Title	**CORE PAPER 3 - ANALOG ELECTRONICS**
Course Code	**SG23A**
Unit 1	**Amplifier:** General principles of small signal & large signal amplifiers. Classification of Amplifiers – Concept of Multistage Amplifier – RC coupled amplifiers - Working – Frequency response – Transformer coupled amplifiers – working – frequency response (Qualitative Analysis) – Direct coupled amplifier – Working - Emitter Follower.
Unit 2	**Power Amplifier & Feedback Amplifier:** Classification – Class A, B, C amplifiers class A – single ended amplifier – Transformer coupled amplifier – Cross over distortion (definition) – complementary symmetry class B Push pull amplifier – power dissipation and output power calculations. **Feedback:** Basic concepts of feedback – Derivation for transfer gain with feedback - effects of negative feedback on input and output resistances, gain, gain stability, distortion and bandwidth – Types of feedback (Voltage series, Voltage shunt, Current series, Current shunt)
Unit 3	**Sinusoidal and Non Sinusoidal Oscillators –**Barkhausen criterion for oscillation – RC and LC oscillators – Hartley, Colpitt's, Phase shift & Wien bridge oscillators – Working - frequency of oscillations – Crystal oscillator – UJT Relaxation Oscillator.
Unit 4	**Operational Amplifiers & Timer –** IC Identification – op-amp parameters – frequency response of an op-amp – Differentital amplifier – CMRR – Inverting amp – Non -inverting amp – voltage follower – IC 555 – pin functions – Internal Architecture.
Unit 5	**Applications - Opamp:** Summing amplifier – Comparator – Integrator – Differentiator – Square wave generators – Triangular wave generators. **IC 555:** Astable – Monostable – Schmitt trigger.

Course Objectives	
Title	**CORE PAPER 4 - NUMERICAL METHODS**
Course Code	**SG23B**
CO-1	To identify and classify the numerical problems to be solved.
CO-2	To choose the most appropriate numerical method for its solution based on characteristics of the problem.
CO-3	To understand the characteristics of the method to correctly interpret the results.
CO-4	To understand the basic methods, algorithms and programming techniques to solve mathematical problems.

Course Outcome	
Title	**CORE PAPER 4 - NUMERICAL METHODS**
Course Code	**SG23B**
CO-1	Demonstrate the mathematical skills of the students in the areas of numerical methods.
CO-2	Analyze the accuracy of common numerical methods.
CO-3	Categorize to solve the numerical problems.
CO-4	Define the most appropriate numerical method for its solution.

Syllabus	
Title	**CORE PAPER 4 - NUMERICAL METHODS**
Course Code	**SG23B**
Unit 1	Interpolation: Finite differences – operators Δ, δ**, E, D –** relation between operators – linear interpolation – interpolation with equal intervals – Newtons forward interpolation formula – Newton backward interpolation formula.
Unit 2	Numerical solutions of Algebraic, Transcendental and Differential equations: Bisection method – Regula falsi method- Newton Raphson method – Horner's method – Solution of ordinary differential equation – Euler's method (Only Basic)
Unit 3	Simultaneous Linear Algebraic Equations: Method of triangularisation – Gauss elimination method – Inverse of a matrix – Gauss Jordan method.
Unit 4	Methods of curve fitting: Principles of Least squares – fitting a straight line – linear regression – fitting an exponential curve.
Unit 5	Numerical integration: General Quadrature formula–Trapizoidal rule, Simpson's 1/3 rule and 3/8 rule –Applications – Weddle's rule.

Course Objectives	
Title	**CORE PAPER 5 - DIGITALEL ECTRONICS**
Course Code	**SG23C**
CO-1	To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
CO-2	To perform decimal, octal, hexadecimal, and binary conversions.
CO-3	To apply Boolean algebra to solve logic functions.
CO-4	To implement simple logical operations using combinational and sequential logic circuits.
CO-5	To identify and differentiate digital electronics applications**.**

Course Outcome	
Title	**CORE PAPER 5 - DIGITAL ELECTRONICS**
Course Code	**SG23C**
CO-1	Identify the structure of various number systems and its application in digital design.
CO-2	Analyse various combinational and sequential circuits.
CO-3	Analyse how to interface digital circuits with analog components.

Syllabus	
Title	**CORE PAPER 5 - DIGITAL ELECTRONICS**
Course Code	**SG23C**
Unit 1	**Number System and Codes:** Decimal, binary, octal, hex numbers, conversion from one to another – codes, BCD, excess 3, gray codes conversion from one to another – Error detection codes.
Unit 2	**Boolean Algebra and Theorems:** Basic, Universal logic gates – Boolean Identities - Boolean theorems, De Morgan's Theorem – sum of products, products of sums expressions, simplification by Karnaugh Map method, simplification based on basic Boolean theorems – don't care conditions.
Unit 3	**Combinational Digital Circuits:** Arithmetic Building blocks, Half & Full Adders and Half & Full Subtractors, BCD adders – multiplexers, De-multiplexers, encoders, decoders – Characteristics for Digital ICs - RTL, DTL, TTL, ECL CMOS (NAND & NOR Gates).
Unit 4	**Sequential Digital Circuits:** Flip-flops, RS, Clocked SR, JK, D, T, master-slave Flip flop – Conversion of Flip flop - shift registers – ripple counters – synchronous counters and asynchronous counters (4-bit counter).
Unit 5	**DAC:** Accuracy-Resolution- Variable Resistor Network, R-2R ladder Network **ADC:** Accuracy-Resolution-Successive Approximation-Dual Slope

Course Objectives	
Title	**PAPER II - CORE PRACTICAL III**
Course Code	**SG231**
CO-1	To understand the concept of working of regulated power supplies, rectifiers, amplifiers and oscillators.
CO-2	To experiment the modulation and detection techniques.

Course Outcome	
Title	**PAPER II - CORE PRACTICAL III**
Course Code	SG231
CO-1	Design Amplifier circuits.
CO-2	Design different Oscillator circuits
CO-3	Design different timer circuits.

Syllabus	
Title	**PAPER II - CORE PRACTICAL III** ***(Atleast five experiments should be done for the examination)***
Course Code	SG231
Unit 1	Single stage R-Coupled Amplifier.
Unit 2	Emitter Follower.
Unit 3	FET Amplifier.
Unit 4	Colpitt's Oscillator.
Unit 5	Hartley Oscillator.
Unit 6	Relaxation Oscillator.
Unit 7	IC Regulated Power Supply.
Unit 8	OPAMP - Inverting and Non Inverting modes, Unity Follower.
Unit 9	OPAMP – Summing Amplifiers (Inverting and Non Inverting Modes).

Course Objectives	
Title	**PAPER II - CORE PRACTICAL IV**
Course Code	SG232
CO-1	To know about the universal gates.
CO-2	To understand the concepts of flip-flops and counters.
CO-3	To impart how to design Digital circuits.

Course Outcome	
Title	**PAPER II - CORE PRACTICAL IV**
Course Code	SG232
CO-1	Design universality logic gates.
CO-2	Study the encoder, decoder and flip-flop circuits.
CO-3	Design the counters circuits.
CO-4	Illustrate realization of SOP.

Syllabus	
Title	**PAPER II - CORE PRACTICAL IV *(Atleast five experiments should be done for the examination)***
Course Code	SG232
Unit 1	Universality of NAND & NOR gates.
Unit 2	Verification of Boolean laws using NAND gates (Associative, Commutative & Distributive Laws)
Unit 3	Verification of Boolean laws using NOR gates (Associative, Commutative & Distributive Laws)
Unit 4	Sum of Products using NAND gates and Product of Sums using NOR Gates.
Unit 5	4-bit binary parallel adder and Subtractor IC 7483
Unit 6	Counter using IC 7473
Unit 7	Study of RS, D, T and JK Flip-Flops with IC's.
Unit 8	Study of Encoder & Decoder.
Unit 9	Study of Multiplexer & De-Multiplexer.
Unit 10	Half and Full Adder using Simple & NAND Gates.

Course Objectives	
Title	**CORE PAPER 6 – PRINCIPLES OF COMMUNICATION**
Course Code	SG24A
CO-1	To learn the basic principles of analog and digital communication system
CO-2	To familiarize the student with modulation techniques
CO-3	To recognize and understand common modulation schemes for continuous wave modulation
CO-4	including amplitude modulation, frequency modulation and phase modulation
CO-5	To recognize and understand common digital pulse modulation schemes including delta
CO-6	modulation and pulse-code modulation
CO-7	To understand the common analog pulse modulation schemes including pulse-amplitude modulation, pulse-width modulation and pulse-position modulation

Course Outcome	
Title	**CORE PAPER 6 – PRINCIPLES OF COMMUNICATION**
Course Code	SG24A
CO-1	Describe the basic principles of communication system
CO-2	Differentiate analog and digital communication systems
CO-3	Demonstrate the parameters for various types of modulation and demodulation techniques
CO-4	Identify basic communication problem
CO-5	Analyze transmitter and receiver circuits
CO-4	Compare design issues, advantages, disadvantages and limitations of communication systems
CO-5	Define satellite system

Syllabus	
Title	**CORE PAPER 6 – PRINCIPLES OF COMMUNICATION**
Course Code	SG24A
Unit 1	**Communication system:** Block diagram Introduction, components of communication system: amplifier, transmitter, channel receiver, band spectrum modulation, types of modulation, Noise, types of noise, noise calculation Transmitters & Receivers: AM transmitter, block diagram and working of Low Level and High Level Transmitters, FM transmitter Receivers: Block Diagram of Receiver, Receiver parameters: sensitivity, selectivity and fidelity, Super Heterodyne Receiver, Double Conversion Receiver. AM receivers, FM receivers.
Unit 2	**Modulation & Demodulation :** Pulse Code Modulation: Need for digital transmission, Quantizing, Uniform and Non-uniform Quantization, Quantization Noise, Coding, Digital Formats. Decoding, Differential Pulse Code Modulation, Delta Modulation, Adaptive Delta Modulation and Demodulation techniques.
Unit 3	**Digital Communication:** Time Division Multiplexing (TDM), Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), Binary Phase Shift Keying (BPSK) and Quadrature Phase Shift Keying (QPSK). Multiple Access Techniques: Concept of Frequency Division Multiple Access (FDMA), Code Division Multiple Access (CDMA).
Unit 4	**Fibre Optics**: Structure of optical fibers, classification of optical fibers, light propagation through an optical fiber, acceptance angle and numerical aperture, Fiber losses, calculation of fiber losses, optical fiber cable, step index fiber, graded index fiber, and modes of propagation ,light detectors.
Unit 5	**Satellite communication**: Introduction, need, satellite orbits, advantages and disadvantages of geostationary satellites. Satellite visibility, satellite system – space segment, block diagrams of satellite sub systems, up link, down link, cross link, transponders (C-Band), effect of solar eclipse, path loss, ground station, simplified block diagram of earth station, Fundamental of microwave and its applications.

Course Objectives	
Title	**CORE PAPER 7 (A) - PROGRAMMING IN C**
Course Code	**SG24B**
CO-1	To understand the different types of variables and operators in C programming and their use in different types of operations.
CO-2	To understand the decision making and looping structures in C and use it in program implementations.
CO-3	To understand the purpose of functions in C.
CO-4	To understand how data storage and access in arrays in C.
CO-5	To learn file operations and data manipulations using pointers in C.

Course Outcome	
Title	**CORE PAPER 7 (A) - PROGRAMMING IN C**
Course Code	**SG24B**
CO-1	Implement programs using Functions, Pointers and Structures in C language
CO-2	Implement files and perform file operations.
CO-3	Perform the execution of programs written in C language.
CO-4	Identify the C code for a given algorithm.

Syllabus	
Title	**CORE PAPER 7 (A) - PROGRAMMING IN C**
Course Code	**SG24B**
Unit 1	C fundamentals Character set – Identifier and keywords – data types – constants – variables – declarations – expressions – statements – arithmetic, unary, relational and logical, Assignment and conditional operators – Library functions
Unit 2	Data input output functions – Simple C Programs – flow of control – if, if-else, while, do-while, for loop, nested control structures – switch, break and continue, go to statements – comma operator
Unit 3	Functions – definition – proto-types – passing arguments – recursions, storage classes – automatic, external, static, register variables – multi-file programs
Unit 4	Arrays – defining and processing – passing arrays to functions – multi dimension arrays – arrays and string . Structures – user defined data types – passing structures to functions – self-referential structures – unions – bit wise operations
Unit 5	Pointers – declarations – passing pointers to functions – Operation in Pointers – pointer and arrays – arrays of pointers – structures and pointers. Files – creating, processing, opening and closing a data file.

Course Objectives	
Title	**CORE PAPER 7 (B) - PROGRAMMING IN C PRACTICAL**
Course Code	**SG241**
CO-1	To make the student learn a programming language.
CO-2	To learn problem solving techniques.
CO-3	To teach the student to write programs in C and to solve the problems.

Course Outcome	
Title	**CORE PAPER 7 (B) - PROGRAMMING IN C PRACTICAL**
Course Code	**SG241**
CO-1	Read and understand the execution of programs written in C language.

Syllabus	
Title	**CORE PAPER 7 (B) - PROGRAMMING IN C PRACTICAL** ***(Atleast six experiments should be done for the examination)***
Course Code	**SG241**
Unit 1	Addition of N number of data's.
Unit 2	Factorial of a Number.
Unit 3	Fibonacci Series.
Unit 4	Palindrome of a String.
Unit5	Temperature Conversion.
Unit 6	Armstrong of a Number.
Unit 7	Largest of a Number.
Unit8	Smallest of a Number.
Unit 9	Ascending order.
Unit 10	Descending order.

Course Objectives	
Title	**CORE PAPER 8 - MICROPROCESSOR – INTEL 8085**
Course Code	**SG24C**
CO-1	To know the microprocessor as a programmable digital system element.
CO-2	To illustrate some basic concepts of microprocessors through the use of assembly language programming.
CO-3	To develop an in-depth understanding of the operation of microprocessors and machine language programming & interfacing techniques.
CO-4	To design simple interfaces to Intel-8085.
CO-5	To Comprehend the various peripheral interface circuits that are necessary for the operation of Intel-8085.

Course Outcome	
Title	**CORE PAPER 8 - MICROPROCESSOR – INTEL 8085**
Course Code	**SG24C**
CO-1	Describe the architecture of 8085 microprocessor.
CO-2	Analyse assembly language programmes.
CO-3	Implement programmes efficiency using various addressing modes.
CO-4	Perform Interfacing of memory & various I/O devices with 8085 microprocessor.

Syllabus	
Title	**CORE PAPER 8 - MICROPROCESSOR – INTEL 8085**
Course Code	SG24C
CO-1	**Introduction of 8085 Microprocessor:** Architecture of 8085 microprocessor – Pin details of 8085 – Instruction cycle – machine cycle – T-state –Timing diagrams for Op-code Fetch Cycle Memory Read, Memory Write, I/O Read, I/O Write –Interrupts and its types.
CO-2	**Instruction set of 8085:** Dattransfer-Arithmetic-Logical-Branching-Machine control-Addressing modes- Stack –Subroutine – Time delay using register and register pair. **Programming Exercises:** Addition and Subtraction (8-bit and 16-bit), Multiplication, Division, Largest, Smallest, Block transfer, Ascending order and Descending order (all 8-bit data), Binary to BCD, BCD to Binary, Binary to ASCII, ASCII to Binary, BCD to ASCII, ASCII to BCD (all 8-bit data)
CO-3	**Memory:** Primary memory –Secondary memory-RAM- ROM-EPROM-EEPROM-Interfacing Memory- 2K X 8, 4K X 8 ROM, RAM to 8085, Interfacing an I/O Devices using Memory Mapped I/O and I/O Mapped I/O – Difference between I/O mapped and Memory Mapped I/O.
CO-4	**Peripheral Devices:** Programmable peripheral interface (Intel 8255), Programmable timer/counter (Intl 8253/8254), programmable Keyboard and Display Interface (Intel 8279)
CO-5	**Peripheral Devices:** Programmable peripheral interface (Intel 8255), Programmable timer/counter (Intl 8253/8254), programmable Keyboard and Display Interface (Intel 8279)

Course Objectives	
Title	**PAPER II - CORE PRACTICAL V**
Course Code	SG241
CO-1	To introduces the assembly language programming of Microprocessor.
CO-2	It develops the student's Assembly language programming skills and gives practical training with the Microprocessor.

Course Outcome	
Title	**PAPER II - CORE PRACTICAL V**
Course Code	SG242
CO-1	Learn assembly language programming of Microprocessor.

Syllabus	
Title	**PAPER II - CORE PRACTICAL V** ***(Atleast six experiments should be done for the examination)***
Course Code	SG242
CO-1	Addition & Subtraction (8 & 16-bits)
CO-2	Multiplication & Division (8 – bit)
CO-3	Square and Square root.
CO-4	Largest & Smallest number in the given array.
CO-5	Ascending & Descending order.
CO-6	Binary to ASCII & ASCII to Binary, BCD to ASCII & ASCII to BCD.
CO-7	Binary to BCD and BCD to Binary.

Course Objectives	
Title	**CORE PAPER 9 – MICROCONTROLLER**
Course Code	
CO-1	To familiarize with different types of micro controller.
CO-2	To know 8051 micro controller in detail.
CO-3	To learn programming and Interfacing with 8051 micro controller.
CO-4	To develop an in-depth understanding of the operation of microcontroller and interfacing techniques
CO-5	To understand and use various IO devices such as keypads, stepper motor, A to D.

Course Outcome	
Title	**CORE PAPER 9 – MICROCONTROLLER**
Course Code	
CO-1	Describe the architecture of 8051 microcontroller
CO-2	Describe the operation of microcontroller
CO-3	Implement the machine language programming
CO-4	Demonstrate keyboard, display, stepper motor, ADC & DAC interfaces

Syllabus	
Title	**CORE PAPER 9 – MICROCONTROLLER**
Course Code	
CO-1	Introduction to Microcontroller – comparison of Microcontroller & Microprocessor – 8051 Architecture – Block diagram – 8051 Pin details- Memory Organization– Counter and Timers – Serial Communication – Interrupts.
CO-2	8051 Instruction set – Addressing Modes – Data Transfer, Aritmatic, Logical, Branching Instructions, Bit level Instructions
CO-3	**Programming Exercise (8 Bit) :** Addition, Subtraction, Multiplication, Division, Data Transfer, Largest/Smallest Number, Ascending/Descending Order-Basic Time Delay
CO-4	**Interfacing :** Keyboards – Displays – ADC & DAC – Stepper motor.

Course Objectives	
Title	**CORE PAPER 10 - ELECTRICAL AND ELECTRONICS INSTRUMENTATION**
Course Code	
CO-1	To introduce the basic concepts related to the operation of Electrical and Electronics Measurement Instruments.
CO-2	To study the basics of design of analog and digital circuits used in electronic instrumentation.
CO-3	To understand basic electronic instrument terminology.
CO-4	To understand the proper application of electronic instruments.

Course Outcome	
Title	**CORE PAPER 10 - ELECTRICAL AND ELECTRONICS INSTRUMENTATION**
Course Code	
CO-1	Categorize DC and AC indicating instruments.
CO-2	Recognize various AC and DC bridges.
CO-3	Recognize the basic features of oscilloscope and different types of oscilloscopes.
CO-4	Identify the complete knowledge of various electronics instruments/transducers to measure the physical quantities in the field of science and technology.

Syllabus

Title	CORE PAPER 10 - ELECTRICAL AND ELECTRONICS INSTRUMENTATION
Course Code	
Unit 1	**Dindicating Instruments:** PMMC Galvanometer (D' Arsonal Movement) – Principle, Construction and Working — Conversion of Galvanometer into Ammeter, Voltmeter and Ohmmeter (Series and Shunt Types) – Multimeter – Loading Effect. **AC indicating Instruments:** Electrodynamometer – Principle, Construction and Working – Merits and Demerits – Rectifier Type Instruments – Watt-hour Meter.
Unit 2	**DC Bridges:** Wheatstone bridge – Determination of resistance – Kelvin Double Bridge – Determination of resistance. **AC Bridges:** Maxwell's Bridge – Determination of Self-Inductance – Wien's Bridge – Determination of Frequency – Schering's Bridge – Determination of Capacitance.
Unit 3	**Oscilloscopes:** Block Diagram – Deflection Sensitivity – Electrostatic Deflection – Electrostatic Focusing – CRT Screen – Measurement of Waveform frequency, Phase difference and Time Intervals – Sampling Oscilloscope – Storage Oscilloscopes (Introduction).
Unit 4	Instrumentation Amplifiers and Signal Analyzer: Instrumentation amplifier – Electronic Voltmeter –Digital Voltmeter– Block Diagram of Function Generatior – Wave analyzer – Fundamentals of Spectrum Analyzer.
Unit 5	**Transducers and Display Devices:** Strain Gauge – Unbonded Strain Gauge – LVDT – Resistance Thermometer – Thermocouple – Photoelectric Transducer – Seven Segment Display – LCD.

Course Objectives	
Title	CORE PAPER 11 - ANTENNAS THEORY AND RADAR SYSTEM
Course Code	
CO-1	To provide the basic knowledge about the fundamentals of antenna.
CO-2	To describe the electromagnetic radiation with application to antenna theory and design.
CO-3	To make the students understand the radio wave propagation phenomena in modern communication systems.
CO-4	To understand the applications of the electromagnetic waves in free space.
CO-5	To understand the advanced topics in digital television and High definition television.

Course Outcome	
Title	**CORE PAPER 11 - ANTENNAS THEORY AND RADAR SYSTEM**
Course Code	
CO-1	Define the concept of Antenna parameters and types.
CO-2	Explain the fundamental concepts of television transmission, reception and scanning methods.
CO-3	Define the fundamental concepts of Wave Propagation.
CO-4	Describe the working principles of latest digital TV and HDTV, LED and OLED.
CO-5	Recognize the concept of RADAR.

Syllabus	
Title	**CORE PAPER 11 - ANTENNAS THEORY AND RADAR SYSTEM**
Course Code	
Unit 1	**Fundamentals of Antenna:** Antenna parameters – Gain and directivity – Efficiency – Effective length – Bandwidth – Beam width – Radiation resistance – Polarization – Grounded and ungrounded antenna's – Effects of antenna height – Radiation Patterns
Unit 2	Types of Antennas: Microwave antenna's – Parabolic antenna – Horn antenna's – Lens antenna – Discone antenna – Rhombic antenna.
Unit 3	**Wave Propagation:** Electromagnetic radiation – Propagation of Waves – Surface wave propagation – sky wave propagation – space wave propagation – Tropospheric scatter propagation – Virtual height – MUF – skip distance – Ionospheric abnormalitics.
Unit 4	**Elements of TV system:** Block Diagram of Picture transmission and reception – Sound transmission and reception – Synchronization – Colour televisionTrans mission & Reception (Block Diagram) – Image continuity – Number of Scanning lines – Scanning – Sequential – Interlaced Scanning – Introduction to HDTV, LED TV, OLED TV.
Unit 5	**Radars:** Principle, Maximum Unambiguous Range, Radar Waveforms, Radar Block Diagram and Operation, Radar Frequencies, Uses.

Course Objectives	
Title	**CORE PAPER 11 - ANTENNAS THEORY AND RADAR SYSTEM**
Course Code	
CO-1	To provide the basic knowledge about the fundamentals of antenna.
CO-2	To describe the electromagnetic radiation with application to antenna theory and design.
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CO-5	To understand the advanced topics in digital television and High definition television.

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CO-3	Define the fundamental concepts of Wave Propagation.
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Syllabus	
Title	**CORE PAPER 11 - ANTENNAS THEORY AND RADAR SYSTEM**
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Unit 1	**Fundamentals of Antenna:** Antenna parameters – Gain and directivity – Efficiency – Effective length – Bandwidth – Beam width – Radiation resistance – Polarization – Grounded and ungrounded antenna's – Effects of antenna height – Radiation Patterns
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Unit 4	**Elements of TV system:** Block Diagram of Picture transmission and reception – Sound transmission and reception – Synchronization – Colour television Transmission & Reception (Block Diagram) – Image continuity – Number of Scanning lines – Scanning – Sequential – Interlaced Scanning – Introduction to HDTV, LED TV, OLED TV.
Unit 5	**Radars:** Principle, Maximum Unambiguous Range, Radar Waveforms, Radar Block Diagram and Operation, Radar Frequencies, Uses.

Course Objectives	
Title	**PAPER II -CORE PRACTICAL VI**
Course Code	
CO-1	To introduces the assembly language programming of Microcontroller.
CO-2	It develops the student's Assembly language programming skills and gives practical training with Microcontroller.

Course Outcome	
Title	**PAPER II - CORE PRACTICAL VI**
Course Code	
CO-1	Learn assembly language programming of Microcontroller.

Syllabus	
Title	**PAPER II - CORE PRACTICAL VI *(Atleast Eight experiments should be done for the examination)***
Course Code	
Unit 1	Addition.
Unit 2	Subtraction.
Unit 3	Multiplication.
Unit 4	Division.
Unit 5	Largest Number.
Unit 6	Smallest Number.
Unit 7	Block Transfer.

Course Objectives	
Title	**CORE PAPER 12 - COMPUTER NETWORKS**
Course Code	
CO-1	To learn the definition and basic terminology of Computer Networks
CO-2	To learn the different types of Computer Networks.
CO-3	To know the application of computer networks in different fields.
CO-4	To know Multiplexing, transmission media and signals.
CO-5	To learn the functioning of OSI model and describe the responsibilities of each layer.

Course Outcome	
Title	**CORE PAPER 12 - COMPUTER NETWORKS**
Course Code	
CO-1	Explain the OSI Reference Model
CO-2	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
CO-3	Describe the functions of Physical, Data Link, Network layers in OSI model.
CO-4	Define the transport, session and presentation layers.

Syllabus	
Title	**CORE PAPER 12 - COMPUTER NETWORKS**
Course Code	
Unit 1	Introduction to Computer Networks: User of Network – Network structure – The OSI reference model concepts – layers of the OSI model.
Unit 2	The Physical Layer: Different types transmission medium – CODEC – switching techniques – channel allocation methods – ALOHA protocol – LAN protocol (any one) – IEEE standards 802.3 (Ethernet), 802.4 (token ring), 802.5 (token bus).
Unit 3	The Data Link Layer: Design issues – concept of framing – different methods – error detection and correction (single error correction and cyclic redundancy check)
Unit 4	The Network Layer: Design issues – Internal organization of network layer – congestion control algorithm, leaky bucket algorithm and token bucket algorithm – Dijikstra routing algorithm
Unit 5	Repeaters, bridges, routers and gateways – brief introduction to the transport layer, session layer, presentation layer – basic concepts of internet – WWW

Course Objectives	
Title	**CORE PAPER 13 - REAL TIME EMBEDED SYSTEM**
Course Code	
CO-1	To familiarize with Arduino as IDE, programming language & platform.
CO-2	To provide knowledge of Arduino boards and basic components.
CO-3	Develop skills to design and implement various smart system application.
CO-4	To gain knowledge about Raspberry Pi
CO-5	To learn the basics of Internet of Things and IOT based application.

Course Outcome

Title	CORE PAPER 13 - REAL TIME EMBEDED SYSTEM
Course Code	
CO-1	Explain Arduino environment and its applications
CO-2	Design Smart systems applications.
CO-3	Implement circuits using Arduino.
CO-4	Perform Raspberry Pi using the programming language Python
CO-5	Analyze the IOT based applications.

Syllabus	
Title	CORE PAPER 13 - REAL TIME EMBEDED SYSTEM
Course Code	
Unit 1	**EMBEDDED SYSTEM DESIGN: BASICS** Introduction to embedded systems-Components of embedded system-Advantages and applications of embedded systems-Different Microcontroller Architectures (CISC, RISC, ARISC)-Introduction to ARDUINO-Types of Arduino boards- Architecture and Pin configuration.
Unit 2	**ARDUINO TECHNIQUES AND PROGRAMMING** Arduino IDE Setup and Installation. Introduction to Embedded C- Program structure- Data types-Variables and constants-Operators-Control Statements-Arrays-Library Functions. Programming in Arduino: Analog and Digital value read- Temperature and Humidity Sensor – Ultrasonic sensors-Flame sensors-Heart beat rate sensors-Light Sensitive sensor. Arduino Output displays-Serial monitor and plotter, LED blink, LCD Display.
Unit 3	**RASPBERRY PI** History of Raspberry Pi-Different Models of Raspberry Pi-Applications of Raspberry Pi- Architecture and Hardware specifications- Basic Linux commands on Raspberry Pi – Creating, editing, and saving files on Raspberry Pi-Creating and running Python programs.
Unit 4	**RASPBERRY PI PYTHON PROGRAMMING TECHNIQUES** Variables, Keywords, Operators and Operands- Data Types in Python-Flow Control, Condition Statement-Loops, Importing Libraries-Functions, Classes- Python and Hardware Access-LED Blinking using Python Raspberry Pi library- Temperature sensing using temp sensor-Motion detection using Raspberry Pi.
Unit 5	**IOT DESIGN USING ARDUINO AND RASPBERRY PI** Introduction to IoT-Introduction to Node MCU ESP8266- Interfacing of Arduino with ESP8266-IOT using Thing Speak-Sending sensor data to IOT cloud-Build IoT project weather forecast – IoT Applications based on Raspberry Pi-Installing and configuration IoT Framework-GPIO Control over Web Browser-Creating Custom Web Page for interfacing light emitting diodes (LEDs), switch, buzzer-Raspberry Pi sensor interfacing.

Course Objectives	
Title	**CORE PAPER 14 - BIOMEDICAL INSTRUMENTATION**
Course Code	
CO-1	To enable the students to learn about bio-potentials and medical instruments.
CO-2	To enable students to know various instruments used for diagnostics and treatment.
CO-3	To introduce an fundamentals of transducers as applicable to physiology.
CO-4	To explore the human body parameter measurements setups

Course Outcome	
Title	**CORE PAPER 14 - BIOMEDICAL INSTRUMENTATION**
Course Code	
CO-1	Describe the origin of bio-potentials and explain the role of bio-potential electrodes;
CO-2	Design and operate bio-potential amplifiers.
CO-3	Describe common biomedical signals and distinguish characteristic features.
CO-4	Measure biomedical information.
CO-5	Demonstrate the position of biomedical instrumentation in modern hospital care.

Syllabus	
Title	**CORE PAPER 14 - BIOMEDICAL INSTRUMENTATION**
Course Code	
Unit 1	**Basic Physiology:** Cells and their Structures – Transport of Ions through Cell Membrane – Resting and Excited State Transmembrane Potential – Action Potential – Propagation of Bioelectric Potential – Piezo electric and Ultrasonic Transducers.
Unit 2	**Bio-potential Recording:** Basic Electrode Theory - Micro electrodes, skin electrodes, needle electrodes – pH electrode – Blood gas electrode. ECG – EEG – EMG – ERG – different lead systems – their waveforms.
Unit 3	**Measurement of Biological Parameters & Treatment:** Measurement of heart beat rate – measurement of temperature – Sphygmomanometer – Blood Gas analysers, pH meter - blood flow meters EM and plesthsmographic technique – Applications of LASER in Medicine

Unit 4	**Diagnostic Equipments & Biotelemetry:** X-ray Imaging – Radio Fluoroscopy – Image Intensifiers – Angiography – Endoscopy – Diathermy – Shortwave, microwave & Ultrasonic Diathermy. BIOTELEMETRY AND PATIENT SAFETY: Need for Biotelemetry – Elements of Telemetry System – Applications of Telemetry in Patient care.
Unit 5	**Physiological assist Devices:** Need for Pacemakers – Pacemaker Parameters and Circuits – Different Modes of Operation – DC Defibrillator – Ventilators – Dialysis – Hemodialysis -. **Computer Applications**: Computerized Axial Tomography (CAT) Scanner – MRI – Ultrasonography – Computer Based Patient Monitoring System.

Course Objectives	
Title	**PAPER II - CORE PRACTICAL VII *(Atleast eight experiments should be done for the examination)***
Course Code	
CO-1	To learn the interfacing programs for 8085 microprocessor.
CO-2	To get familiarized to interfacing with Ardino.

Course Outcome	
Title	**PAPER II - CORE PRACTICAL VII**
Course Code	
CO-1	Understand the basics of programming for interfacing using 8085.
CO-2	Ability to explain Ardino environment and its application.

Syllabus	
Title	**PAPER II - CORE PRACTICAL VII**
Course Code	
Unit 1	**Interfacing with 8085** DAC
Unit 2	ADC
Unit 3	Traffic light interface
Unit 4	Clock Program
Unit 5	**Interfacing with Arduino** Blinking of an LED
Unit 6	IR Sensor
Unit 7	Gas Sensor

SEMESTER I
NONMAJOR ELECTIVES 1

Course Objectives	
Title	**HOME APPLIANCES AND WIRING**
Course Code	
CO-1	To understand the concepts of home appliances and basics of wiring.
CO-2	To know the components and methods of wiring.
CO-3	To practice house wiring, power calculation and energy management assignments.

Course Outcome	
Title	**HOME APPLIANCES AND WIRING**
Course Code	
CO-1	Define the basics of home appliances and wiring.
CO-2	Identify of various tradition and modern electronic gadgets.
CO-3	Implement the fundamentals of wiring.
CO-4	Demonstrate the utilization of home appliances, Electricity billing, installation and safety procedures.

Syllabus	
Title	**HOME APPLIANCES AND WIRING**
Course Code	
Unit 1	**Basics of Home appliances and Gadgets** Classification of home appliances – **Basics of Small and Major Appliances:** LED light, Smart Fan, Refrigerator, Electric Iron and cooker, Microwave oven, Heater, induction stove – **Basics of Gadgets**: LED, Smart TVs, Home theatre, Digital Cameras, Mobile / Smart phones and CCTV.
Unit 2	**Advanced concepts in management of Electronic Appliances** Smart home automation – UPS, Inverter and Solar Power Management – Security and Food processing appliances.
Unit 3	**Basic Electrical Parts & Components of House Wiring** **Parts & Components:** Electrical Wires & Cables, Electric Meter, Fuse, Distribution Box, Main Switch (MCCB), Trip Switch (RCCB), Working Principle of RCCB, Wall Switches, Plug Sockets

	– wire Jointing – Electricity – Hazards in electricity – overload and short circuit.
Unit 4	**Fundamentals of house electrical wiring** Basic Terms in electrical – Understanding of single and three phases – **Wiring methods:** series and parallel wiring, staircase wiring, Two Way Switch wiring – Common house electric circuit and circuit breakers.
Unit 5	**Practical application of home appliances and wiring** **General practices:** Wiring safety measures and grounding / earthing techniques. **Case studies:** Calculation of energy and Tariff of Electricity bill for Home – Designing Home Wiring Layouts and procedures – Solar Inverter installation procedures.

Course Objectives	
Title	**HISTORY OF ELECTRONICS**
Course Code	
CO-1	To understand the evolution of electronics
CO-2	To know the basics of semiconductor
CO-3	To understand the development of communication

Course Outcome	
Title	**HISTORY OF ELECTRONICS**
Course Code	
CO-1	Describe the development of electronics.
CO-2	Explain the various communication systems.
CO-3	Recognize the latest technology in electronics

Syllabus	
Title	**HISTORY OF ELECTRONICS**
Course Code	
Unit 1	**Electronics in 19th Century:** Lightening and Electricity – Legden Far-Thomson experiments – Graham Bell's experiments.
Unit 2	**Electronics in 20th Century:** Vacuum tubes – semiconductors – Diodes – Transistors – Simple calculating Machines – Evolution of Communication – Radio – for communication and entertainment – Integration of circuits – Microprocessors – Electronic controlling Instruments – Mobile communication – Satellite communication – Internet revolution.
Unit 3	**Electronics in 21st Century:** Miniaturization – Multipurpose gadgets – Microprocessor control in other industries; automobile etc – GPRS – Embedded Technologies – Electronic storage media – Nanoscience in Electronics.

SEMESTER II

Course Objectives	
Title	**HANDLING OF DOMESTIC APPLIANCES**
Course Code	
CO-1	To learn how to handle the domestic appliances
CO-2	To know the basics of switches, fuse and power rating.
CO-3	To understand the circuit connections of Fan and Tubelight

Course Outcome	
Title	**HANDLING OF DOMESTIC APPLIANCES**
Course Code	
CO-1	Identify the circuits of Fan and Tube
CO-2	Perform fuse replacement
CO-3	Describe switches and its power rating

Syllabus	
Title	**HANDLING OF DOMESTIC APPLIANCES**
Course Code	
Unit 1	**Fuse: T**ypes – Testing and replacement. Testing power cables
Unit 2	**Tubelight**: Fitting –checking – connection
Unit 3	**Fan**: Circuit – condenser checking – DOL starter connection
Unit 4	**Power rating of appliances:** Power calculations – energy consumption of various appliances – unit calculations.
Unit 5	**Meters:** Analog test meters, Digital multimeters
Unit 6	**Switch:** Types –connecting a switch – one way and two way connection - MCB -Switch rating (5 amps , 15 amps), Socket – rating (5 amps, 15 amps) – MCB rating (2,6,8,10,16,20 32 amps) metal clad socket 20 amps

Course Objectives	
Title	**TRENDS IN PERSONAL COMPUTERS**
Course Code	
CO-1	To understand the development of multipurpose machine
CO-2	To learn the speed and storage capacity of a PC
CO-3	To understand the concept of multitasking

Course Outcome	
Title	**TRENDS IN PERSONAL COMPUTERS**
Course Code	
CO-1	Describe the uses of multipurpose machine.
CO-2	Categorize laptop, desktop and general purpose PC
CO-3	Define multitasking
CO-4	Explain virtual storage and web storage.

Syllabus	
Title	**TRENDS IN PERSONAL COMPUTERS**
Course Code	
Unit 1	**Recent PC evolution:** From computational machine to a multipurpose machine – Desktop / Laptop – special purpose PCs general purpose PCs – PC peripheral evolution – in storage entertainment, printing etc, connectivity, communication, shopping
Unit 2	**Trends in PC power***:* speed, storage volume, memory – needs due to large consumer software – CPU trends – multiprocessors – removable storage – back up – multitasking and system memory – background – running programs: – antivirus, messengers etc.
Unit 3	**Virtual PCs:** Internet for computation – virtual storage – in mail boxes, web storage etc – virtual PC environment – online software usage – online entertainment etc

SEMESTER IV/V

Course Objectives	
Title	**SENSOR TECHNOLOGY**
Course Code	
CO-1	To acquire the knowledge about Sensors, Transducers fundamentals and its applications in biomedical instrumentation.
CO-2	To make students aware about the measuring instruments and the methods of measurement and the use of different transducers.
CO-3	To make students familiar with the constructions and working principle of different types of sensors and transducers

Course Outcome	
Title	**SENSOR TECHNOLOGY**
Course Code	
CO-1	Explain the working principle of sensors
CO-2	Identify appropriate sensors for various applications
CO-3	List type of sensors

Syllabus	
Title	**SENSOR TECHNOLOGY**
Course Code	
Unit 1	**Measurements and Sensing Fundamentals :** Measurements – Significance – Concept of Direct and Indirect Measuring Methods – Static and Dynamic Characteristics of Sensors – Mechanical, Thermal and Electrical Dynamic Models of Sensor Elements – Advantages of Sensors – Classifications of Transducers – Primary and Secondary Transducers – Characteristics of Transducers.
Unit 2	**Transducers and Primary Sensing Elements :** Introduction, Quartz Sensors, Strain Gauge Sensors: Strain-Gauge Based Measurements, Strain Gauge Sensor Installations, Sensor Types and Technologies, Introduction to temperature sensor, types and technologies, applications of temperature Sensors.
Unit 3	**Measurement of Non-Electrical Quantities :** Measurement of pressure: using electrical transducers as secondary transducers – Low pressure: Pirani gauges – Measurement of linear velocity (moving magnet type) – Measurement of angular velocity (D.C. Tachometer generators and Digital methods) – Measurement of vibrations – Seismic transducers – Measurement of liquid level – Measurement of thickness – Measurement of Humidity – Gas analyzer.
Unit 4	**Signal Conditioners :** Capacitive and Inductive Displacement Sensors, Introduction to Capacitive and Inductive Sensors, Capacitive and Inductive Sensor Types, Selecting and Specifying Capacitive and Inductive Sensors, Comparing Capacitive and Inductive Sensors, Applications
Unit 5	**Optical, Position and Biosensors :** Photosensors, Contact and Non-contact Position Sensors, Linear and Rotary Position and Motion Sensors, Biosensors: Overview of Biosensor, Applications of Biosensors, Origin of Biosensors, Bioreceptor Molecules, Transduction Mechanisms in Biosensors, Application Range of Biosensors.

Course Objectives	
Title	**MOBILE COMMUNICATION**
Course Code	
CO-1	To understand the basic cellular system concepts.
CO-2	To identify the requirements of mobile communication
CO-3	To learn the basic principles of the modern mobile and wireless communication systems

Course Outcome	
Title	**MOBILE COMMUNICATION**
Course Code	
CO-1	Explain the basic physical and technical settings functioning of mobile communications systems
CO-2	Define the basic principles of mobile communication system
CO-3	Describe the development and implementation of mobile communication systems
CO-4	Recognize the mobile system specification

Syllabus	
Title	**MOBILE COMMUNICATION**
Course Code	
Unit 1	**Modern Telecommunication Systems:** Telephone communication Electronics: manual and automatic switching networks – Overview of early systems of Strowger, Crossbar and Stored program switching - Exchanges: analog and digital exchanges – speech digitization and transmission – traffic engineering, numbering plan, - WLL, radio paging services.
Unit 2	**Cellular Communication**: Concept of cellular mobile communication-Cell and Cell splitting, frequency bands used in cellular communication, absolute RF channel numbers, frequency reuse, roaming and hand off, authentication of the SIM Card of the subscribers, IMEI numbers, concept of data encryption, architecture (block diagram) of cellular mobile communication network.
Unit 3	**GSM:** Channels and Services 8HrsTraffic and Logical Channels in GSM, GSM time hierarchy, GSM burst structure, Description of call setup procedure, Handover mechanism in GSM, Security in GSM. Data transmission in GSM: Data Services, SMS, HSCSD, GPRS, EDGE. Multiple Access Techniques-TDMA.
Unit 4	Satellite access, TDMA, FDMA, CDMA concepts, comparsion of TDMA and FDMA, GPS-services like SPS & PPS. Mobile IP, OSI model, Wireless LAN 37otator37nd37s-Concept of Bluetooth, Wi-Fi and WiMax.
Unit 5	**Evolution of Mobile Technologies**: LTE basics, LTE frame structure, LTE Design parameters with Standardization and Architecture of LTE. Overview of Networks : Comparison of4G and 5G technology.

Course Objectives	
Title	**INDUSTRIAL ELECTRONICS**
Course Code	
CO-1	To familiarize students to the principle of operation, design and applications of Thyhristor
CO-2	To learn the triggering mechanism and commutation
CO-3	To understand the basic operation of Invertors
CO-4	To know the applications of LASER, Ultrasonics and Radar

Course Outcome	
Title	**INDUSTRIAL ELECTRONICS**
Course Code	
CO-1	Explain the principle and application of Thyristor
CO-2	Implement the triggering mechanism in various applications
CO-3	Describe the basic operation of Invertors
CO-4	Analyse the applications of LASER, Ultrasonic's and Radar in various fields

Syllabus	
Title	**INDUSTRIAL ELECTRONICS**
Course Code	
Unit 1	**Thyristors and their Operations:** Principles and operations of SCR – Voltage amplifier gate characteristics of SCR – Characteristics of two transistor models – Thyrister construction – Rectifier circuit using SCR – GTO – Operation and characteristics of DIAC – TRIAC – Silicon Controlled Switch – Silicon Unilateral Switch – Silicon Bilateral Switch – Light activated SCR
Unit 2	**Turn On/Off Mechanism:** Types of turn on methods: AC gate triggering: R triggering – RC triggering – DC gate triggering – Pulse triggering – Types of turn off methods: Natural commutation – Forced Commutation: Self Commutation – Complimentary commutation – Auxiliary commutation – External pulse commutation – Line commutation – Thyristor rating
Unit 3	**Invertors:** Types of invertors – Single phase bridge inverter – Mc Murray impulse communication inverter – Single phase half bridge voltage source inverter – Single phase full bridge voltage inverter – Step down choppers – Step up choppers – Chopper classification

Unit 4	**Choppers:** Introduction – Basic chopper classification – Basic chopper operation – Control strategies – Chopper configuration – Thyristor chopper circuits – Jones chopper – Morgan chopper – A.C. chopper – Source filter – Multiphase choppers
Unit 5	**Industrial Applications:** Automatic Street light – Single Phase Inverter – DC Choppers (Step up and Step down) – R and RC Triggering – External Pulse Commutation – DC motor controller and Light Dimmer – Time delay circuit – Application of LASER in industry – Ultrasonic application – Radar application

Course Objectives	
Title	**CONSUMER ELECTRONICS**
Course Code	
CO-1	To familiarize with microwave ovens and types
CO-2	To learn the concepts in washing machines, airconditioners and refrigerators
CO-3	To understand the working of facsimile machine, xerographic copier and calculators
CO-4	To know ATM, set top box and digital cable TV
CO-5	To familiarize with online ticketing and electronic fund transfer

Course Outcome	
Title	**CONSUMER ELECTRONICS**
Course Code	
CO-1	Explain the functions of microwave oven
CO-2	Perform electronic fund transfer and online ticketing
CO-3	Describe the working of Air conditioner and Refrigerator
CO-4	Define the basics behind facsimile machine, calculators and digital clocks

Syllabus	
Title	**CONSUMER ELECTRONICS**
Course Code	
Unit 1	**MICROWAVE OVENS:** Microwaves (Range used in Microwaves Ovens) – Microwave oven block diagram – LCD timer with alarm – Single-Chip Controllers – Types of Microwave oven – Wiring and Safety instructions – Care and Cleaning.
Unit 2	**WASHING MACHINES:** Electronic controller for washing machines – Washing machine hardware and software – Types of washing machines – Fuzzy logic washing machines – Features of washing machines.
Unit 3	**AIR CONDITIONERS AND REFRIGERATORS:** Air Conditioning – Components of air conditioning systems – All water air conditioning systems – All air conditioning systems – Unitary and central air conditioning systems – Split air conditioners.
Unit 4	**HOME / OFFICE DIGITAL DEVICES**: Facsimile machine – Xerographic copier – Calculators – Structure of a calculator – Internal Organization of a calculators – Servicing electronic calculators – Digital clocks – Block diagram of a digital clock.
Unit 5	**DIGITAL ACCESS DEVICES:** Digital computer – Internet access – Online ticket reservation – Functions and networks – Barcode Scanner and decoder – Electronic Fund Transfer – Automated Teller Machines (ATMs) – SetTop boxes – Digital cable TV – Video on demand.

Course Objectives	
Title	**MICROWAVE AND FIBEROPTIC COMMUNICATION SYSTEMS**
Course Code	
CO-1	To study the principles of generation, transmission and application of microwaves
CO-2	To explore the optical communication systems techniques and compare with other methods of transmission
CO-3	To study the properties and design of oscillator and amplifier
CO-4	To understand the concepts of multi-mode and single-model
CO-5	To understand how fiber-optic communication systems work
CO-6	To understand the applications of Radar

Course Outcome	
Title	**MICROWAVE AND FIBEROPTIC COMMUNICATION SYSTEMS**
Course Code	
CO-1	Define the principles of generation, transmission and applications of microwave
CO-2	Demonstrate the design of oscillator and amplifier
CO-3	Describe the working of fiber-optic communication system
CO-4	List the applications of Radar

Syllabus	
Title	**MICROWAVE AND FIBEROPTIC COMMUNICATION SYSTEMS**
Course Code	
Unit 1	**INTRODUCTION TO MICROWAVES:** Introduction – Maxwell's equation – Amperes law – Faradays law – Gauss law – Wave equation – Types of wave guides – TE and TM modes – Propagation of TM waves in rectangular wave guide – TM modes in rectangular wave guides.
Unit 2	**MICROWAVE AMPLIFIERS AND OSCILLATORS**: Microwave tubes: - Two cavity Klystron – Multi cavity Klystron – Reflex Klystron – Traveling wave tube (TWT) – Backward wave Oscillator (BWO) – Magnetron – Applications.
Unit 3	**MICROWAVE DEVICES**: Microwave transistors – Gallium Arsenide (GaAs) metal semi-conductor FET – Varactor Diode – PIN diode – Scotty diode – Tunnel diode – Gunn diode – IMPATT diode – TRAPATT diode – BARITT diode – Maser principle – Applications.
Unit 4	**RADAR:** Introduction – Block diagram – Classification – Radar range equation – Factors affecting the range of a radar receivers – Line pulse modulator – PPI (Plane Position Indicator) – Moving Target Indicator (MTI) – FM CW Radar- Applications.
Unit 5	**OPTICAL FIBER COMMUNICATION**: A basic fiber optic system – Frequencies – Fiber optic Cables – Refraction – Numerical Aperture – Graded index cables – Single mode – Multi mode – Cable Constructions – Cable losses – Connectors – Light Sources – Light Detector – Systems Components – Advantages and Disadvantages.

Course Objectives	
Title	**THEORY OF ROBOTICS AND AUTOMATION**
Course Code	
CO-1	To understand the concepts, types of robots and automation.
CO-2	To impart fundamental theory of various components and parts of robots
CO-3	To provide the basics and advance theory concepts in Automation using PLC, SCADA and DCS.
CO-4	To be aware of the basic components and systems in Automotive Electronics.
CO-5	To develop skills in design and programming robots for automation using Arduino.

Course Outcome	
Title	**THEORY OF ROBOTICS AND AUTOMATION**
Course Code	
CO-1	Explain concepts, types and various components of robots
CO-2	Describe the basics of Automation and exposure to PLC, SCADA and DCS
CO-3	Define the basic theory and comfort & safety systems in Automotive Electronics.
CO-4	Recognize programming knowledge to build up applications in robots.

Syllabus	
Title	**THEORY OF ROBOTICS AND AUTOMATION**
Course Code	
Unit 1	**Basic Theory of Robotics and Parts** History of Robotics – Definition and Basics of Robotics – Laws and knowledge base of Robotics **Types :** Industrial Robot – Fixed, Mobile Robots, Autonomous and Unmanned Robot – Manipulators – pitch, yaw, joints, speed of motion and payload – Sensors – End effectors – Motors and Grippers for Robots.
Unit 2	**Electronic control and Programming for Robots** Introduction to Robot Programming Languages – VAL programming and commands for simple program – **Controllers for Robot action and programming:** Arduino Uno board and Raspberry Pi board – **Programming tools:** Arduino IDE and ROS.
Unit 3	**Introduction to Automation theory** Introduction to Automation – Laws and Principles – Types – Circuits – Electric and Electronic Controls – Programmable Logic Controller (PLC): Introduction, definition, block diagram - Introduction to SCADA and DCS – Introduction to Artificial Intelligence (AI) and machine learning. **Case study:** Robot in industrial and medical automation.
Unit 4	**Fundamentals of Automotive Electronics** Development of automotive electronics – batteries and charging – ignition system – Electronics fuel system – Engine control unit – Sensors and Actuators – Brushless D.C motors - lighting – instrumentation – Infineon MCU – wiring – Network protocols: CAN, LIN & A^2B Bus.
Unit 5	**Simple & Smart Robot design using Arduino:** Line followers – Obstacle avoidance – pick and place robot – RF, Bluetooth & IoT based design – **Comfort & safety Applications**: Anti lock braking (ABS), central locking, Electric window and power steering, Air bag system, keyless entry.

Course Objectives	
Title	**PROGRAMMING IN C++**
Course Code	
CO-1	To introduce the concepts of Object Oriented Programming language.
CO-2	To learn the object oriented concepts of C++ .
CO-3	To handle exceptions in C++
CO-4	To learn and program the concepts of Files, Templates, Containers and Iterators

Course Outcome	
Title	**PROGRAMMING IN C++**
Course Code	
CO-1	Implement the object oriented concepts using C++
CO-2	Describe polymorphism, inheritance and virtual functions in C++.
CO-3	Perform exceptions that arise in a C++ program.
CO-4	Implement applications using files, templates, containers and iterators.

Syllabus	
Title	**PROGRAMMING IN C++**
Course Code	
Unit 1	**Basics of C++:** Introduction to OOPs concepts - C++ Programming features – Data Types – Control Structures – Arrays and Strings – Functions – Pointers – This Pointer
Unit 2	**Oriented Programming Fundamentals:** Class – objects - Constructors – Copy constructors – Destructors – static members – constant members – member functions
Unit 3	**Polymorphism and Inheritance:** Polymorphism – Function Overloading – Operator Overloading – dynamic memory allocation – Nested classes – Inheritance.
Unit 4	**Object Oriented Programming Advanced Concepts:** Virtual functions – Abstract Classes – Exception Handling – C++ Stream classes – Formatted IO
Unit 5	**Files and Templates:** File classes and File operations – Templates – Class Template – Function Template - Standard Template Library – Containers – Iterators.

Course Objectives	
Title	**SOLAR TECHNOLOGY**
Course Code	
CO-1	To understand basic terminology in solar technology
CO-2	To learn the use of solar cells in various applications
CO-3	To gain knowledge about storage systems

Course Outcome	
Title	**SOLAR TECHNOLOGY**
Course Code	
CO-1	Explain the technical and physical principles of solar cells
CO-2	Analyse the and advantages and disadvantages of photo-voltaic conversion.
CO-3	Compare different solar energy systems.

Syllabus	
Title	**SOLAR TECHNOLOGY**
Course Code	
Unit 1	***Solar radiation:*** Properties of sunlight. Absorption by the atmosphere. Calculation of solar irradiance at surfaces. Movement over the day, shadowing effects,
Unit 2	Photovoltaic Cell. Advantages & disadvantages of photo-voltaic conversion. Use of solar cell in various instruments. Photo -voltaic array & its connections, arrangements of array according to the voltage. Module & its connections. Faults & their effects in photo-voltaic cell, array & module (connection of cell, connection of array, connection of module)
Unit 3	Solar Photovoltaic energy conversion and utilization – solar power generation systems – off-grid systems – grid connected systems – power control and management systems – economics of solar photovoltaic systems – World Energy Requirement – Energy and Role of Photovoltaic,
Unit 4	Types of PV Installation, Common Systems type, GRID-TIED System, Hybrid Systems, Photovoltaic in Energy Supply, atmospheric effects, seasonal effects, environmental effects on standard test conditions, Solar PV production and cost.
Unit 5	Electrical Storage: Battery technology, Batteries for Photovoltaic systems, DC – DC converters, Charge Controllers, DC – AC inverters; single phase, three phase, MPPT.

SEMESTER III
ALLIED

Course Objectives	
Title	**BASIC PHYSICS I**
Course Code	**SG33A**
CO-1	Physics is a systematic study of the natural world, a discipline that measures reality through application of observation with logic and reason. In order to make use of such a discipline we need certain foundational information.
CO-2	To provide basic principles and fundamentals of Physics.
CO-3	To 48 otator48 nd What is Physics and the different fields of Physics.
CO-4	To understand the fundamental laws and their applications in measuring many physical quantities.
CO-5	To prepare students for careers where Physics principles can be applied to the development of Technology.
CO-6	To understand basic Principles of physics and their applications in every day life.

Course Outcome	
Title	**BASIC PHYSICS I**
Course Code	**SG33A**
CO-1	Define the basics of properties of matter, how Young's modulus and rigidity modulus are defines and how they are evaluated for different shapes of practical relevance
CO-2	Describe the fundamentals of harmonic oscillator model, including damped and forced oscillators and grasp the significance of terms like quality factor and damping coefficient
CO-3	Describe the general equation of wave motion in general and TM waves in stretched strings and longitudinal waves in gases
CO-4	Recognize the general terms in acoustics like intensity, loudness, reverberation etc, and study in detail about production, detection, properties and uses of ultrasonic waves.

Syllabus	
Title	**BASIC PHYSICS I**
Course Code	**SG33A**
Unit 1	**Rotation**: Moment of inertia – Radius of gyration – Moment of inertia of a circular ring, circular disc, solid sphere – Kinetic energy of a rolling object – Acceleration of a body rolling down an inclined plane – Uniform circular motion – Centripetal force – Banking of curved tracks.
Unit 2	**Elastivity:** stress – strain diagram – factors affecting elasticity – Young's modulus – Bending moment – Bending of beams – Young's modulus by non-uniform bending – Rigidity Modulus – Torsion in a wire – Torsional Pendulum – Definition of Poisson's ratio.
Unit 3	**Viscosity:** Streamline and turbulent flow – Comparison of viscosities by burette method –Stoke's law – Terminal velocity – Viscosity of a highly viscous liquid – Lubrication. **Surface Tension:** Molecular theory of surface tension – Excess of pressure inside a soap bubble – surface tension by drop weight method – interfacial surface tension.
Unit 4	**Heat and Thermodynamics:** Thermal conductivity – Lee's Disc methods – Radial flow of heat – Thermal insulation in buildings – Laws of thermodynamics – Carnot's cycle as heat engine and refrigerator – Carnot's theorem – Concept of entropy.
Unit 5	**Acoustics:** Acoustics of buildings – Absorption coefficient – Intensity – Loudness – Reverberation time – Ultrasonics – production – Piezoelectric methods – Applications of ultrasonics in Engineering and Medicine – solar energy – Applications of Solar energy in everyday life – Satellites – Orbital Velocity – Uses of Satellite.

SEMESTER IV
ALLIED

Course Objectives	
Title	**BASIC PHYSICS II**
Course Code	**SG33B**
CO-1	To provide basic principles and fundamentals of Physics.
CO-2	To understand What is Physics and the different fields of Physics.
CO-3	To understand the tools and methods that Physicists use range from balance scales to
CO-4	Ultrasonics, laser beam emitters.
CO-5	To understand the fundamental laws and their applications in measuring many physical quantities.
CO-6	To prepare students for careers where Physics principles can be applied to the development of Technology.

Course Outcome	
Title	**BASIC PHYSICS II**
Course Code	**SG33B**
CO-1	Define the basic concepts behind Optics, Nuclear Properties and Radio Activity.
CO-2	Describe the basics in Laser.
CO-3	Implement the applications of Fibre Optics.

Syllabus	
Title	**BASIC PHYSICS II**
Course Code	**SG33B**
Unit 1	**Optics:** Interference – Newton's rings – Measurement of wavelength and radius of curvature by Newton's rings with theory – Diffraction – Elementary theory of formation of spectra by transmission grating (normal incidence) – Determination of wavelength – Polarization – Optical activity – Brewster's law – Determination of specific 49 otator power – Half shade polarimeter – Uses of polarized light.
Unit 2	**Modern Physics:** Photo electricity: Photoelectric emission – Einstein's theory – Millikan's experiment – Photoelectric cell – Photovoltaic cell – Photoconductive cell. **Nuclear Physics:** Properties of nuclei – size, charge, mass & spin – Binding Energy – Nuclear fission and fusion – liquid drop model – Semi empirical mass formula – Shell model – magic numbers. **Radio Activity:** Natural radioactivity – Artificial radioactivity – Radio isotopes – Uses of radio isotopes – Nuclear reaction – Q value of a reaction.
Unit 3	**Laser Physics:** Introduction- Principle of spontaneous emission and stimulated emission. Population inversion, pumping. Eienstein's A and B coefficients-derivation. Types of Lasers-Ruby Laser, Nd-YAG, Semiconductor lasers-Applications of lasers.
Unit 4	**Fiber Optics:** Introduction – Principle and structure of optical fibers – Propagation of light through optical fibers – types of optical fibers – Optical fiber communication system (block diagram)
Unit 5	Fiber Optic Sensors – Medical Applications of Optical fibers-Endoscope- Engineering Applications of Optical fibers-Telecommunications-Computer Networks- Cable television – Advantages.

SEMESTER IV
ALLIED

Course Objectives	
Title	**BASIC PHYSICS PRACTICAL**
Course Code	**SG341**
CO-1	To gain practical knowledge by applying the experimental methods to correlate with the physics theory.
CO-2	To apply the analytical techniques and graphical analysis to the experimental data.

Course Outcome	
Title	**BASIC PHYSICS PRACTICAL**
Course Code	**SG341**
CO-1	Apply the various procedures and techniques for the experiments.
CO-2	Use the different measuring devices and meters to record the data with precision.
CO-3	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results.

Syllabus	
Title	**BASIC PHYSICS PRACTICAL (At least Seven experiments should be done for the Examination)**
Course Code	**SG341**
Unit 1	Young's Modulus by non-uniform bending – pin and microscope (Thickness and Breadth may be given)
Unit 2	Young's Modulus by uniform bending – Optic Lever and Telescope (Thickness may be given)
Unit 3	Rigidity modulus by Torsional pendulum
Unit 4	Surface tension and interfacial surface tension by drop weight.(Density of water = 1000, Density of Kerosene=800)
Unit 5	Comparison of viscosities of liquids using un graduated burette. (Density of water = 1000, Density of Kerosene=800)
Unit 6	Thermal conductivity of a bad conductor by Lee's disc method
Unit 7	Melde's string – frequency of a vibrator

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF HOTEL AND CATERING MANAGEMENT

Program : HCM

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	COOKING SKILLS : To know more about the various methods of cooking and to know about the basic principles of food production.
PO-2	Service skills : To get an knowledge about the food and beverage department, staff organization ,food service areas and Equipments.
PO-3	Cuisine knowledge: To know about the international cuisine and gain knowledge about bakery and confectionary items .
PO-4	Office works To know about the functions of front office department and to enhance the income of the hotel industry .
PO-5	Presenting skills : To know about the various rooms in a hotel and the ways to present the rooms to a guest .

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	To become an established professional in the hospiltality industry.
PSO-2	To be a greater professional in the hotel abroad jobs .
PSO-3	To get jobs in the airline industry and attain greater position.
PSO-4	To get jobs in cruise line industry and attain higher position.
PSO-5	To get jobs in travel agencies.

Course Objectives	
Title	**BASIC COURSE IN FOOD PRODUCTION – I**
Course Code	SH21A
CO-1	To get knowledge on objectives of cooking effects of heat on cooking nutritions
CO-2	To get well knowledge on food safety management facts and figures and key concepts of food hygiene
CO-3	To know the kitchen equipments and fuels used in cooking in catering industry
CO-4	Basic principles of cooking and care precaution while cooking each method
CO-5	The wide subject code knowledge on meat cookery fishmonger egg cookery stocks sauces soup salad etc

Course Outcome	
Title	**BASIC COURSE IN FOOD PRODUCTION - I**
Course Code	SH21A
CO-1	Students will acquire knowledge on functions of hotel kitchen
CO-2	Students will able to develop culinary skills in the Vegetables and Meat cutting. Students gain knowledge on preparing and Stocks and Sauces Students will able to identify ingredients used in kitchen
CO-3	Students will interpret knowledge on the different types of appetizer used in cooking
CO-4	• Students will acquire knowledge on food plating and presentation based on Hotel Industry Students will get in depth sight on Methods of cooking and Food Presentation.

Syllabus	
Title	**BASIC COURSE IN FOOD PRODUCTION - I**
Course Code	SH21A
Unit 1	**INTRODUCTION TO THE ART OF COOKERY** 1.1Introduction, Aims and Objectives of Cooking, effects of heat on cooking nutrients 1.2Definition: Cookery, Cuisine, Gastronomy 1.3Culinary History – Origin of Cookery, Classes in Professional Cookery, 1.4Level and Skill of Experiences, Personal Qualities of Kitchen personnel's 1.5Safety at work place – Prevention, precaution, Evacuation and first aids.
Unit 2	**FOOD SAFETY MANAGEMENT** • Introduction to Food Safety Management • Definition, Origin of Food Safety Management Systems • Basics of Food Safety Concept – Fact & Figures and Key concepts • General Principles of Food Hygiene Personal hygiene and it necessity, Protective Clothing (Uniforms) and its importance.
Unit 3	**KITCHEN EQUIPMENT'S & FUELS AND METHODS OF COOKING** 3.1.Classification of Kitchen Equipment's – Mechanical / Electrical / Manual, Large / Medium / Small, Ancillary Equipment's – Knives & Utensils, Modern equipment's in commercial kitchen. SOP's and Safety of Handling Equipment, Care and maintenance of Equipment. 3.2.Various Fuels used in the Catering Industry, Advantage and Disadvantages of Each fuels. 3.3.Methods of Heat Transfer – Conduction, Convection, Radiation, Induction. 3.4.Methods of Cooking – Roasting, Grilling, Frying, Baking, Broiling, Poaching, Boiling, Stewing, Steaming, Braising, Peeling, Bar Be Cueing, Encasserole, Encotte, Rechauffe, Microwave. 3.4.1. Principles of cooking each method

	3.4.2. Care and precaution while cooking each method 3.4.3. Selection and process of raw materials for each method 3.5. Cooking of Various Textures and Consistencies, Pre-preparation of Ingredients
Unit 4	**BASIC PRINCIPLES OF FOOD PREPARATION – I** 4.1.Introduction to meat cookery – Cuts of Beef / Veal, Cuts of Lamb / Mutton, Cuts of Pork, Variety Meats (Offal) 4.2.Meat cookery – Cuts of Poultry and Game, Cooking of poultry and game. 4.3.Introduction to Fish monger – Classification of Fish – Cuts of Fish, Selection of Shell Fish – Cooking of Fish (Effects of Heat). 4.4.Introduction to Egg Cookery – Structure of Egg – Selection of Egg – Uses of Egg Cookery – Methods of Cooking Egg.
Unit 5	**BASIC PRINCIPLES OF FOOD PREPARATION – II** **5.1.** Vegetables and Fruit cookery – classification of vegetables – effects of heat on vegetables – cuts of vegetables – classification of fruits – uses of fruits in cookery 5.2 Stocks – definition of stock – types of stock – preparation of stock recipes – storage of stock – uses care and precautions in stock making 5.3 Sauce – Definition, Roux – meaning and its type, Mother Sauces and its recipes, Derivatives and Contemporary Sauces from various Cuisines, Importance of Sauces in food Preparation 5.4 Soup – Definition, Classification, Preparation and serving of Soups, common garnishes for soups. 5.5 Salad – Salads and its types, Salad dressings

Course Objectives	
Title	**BASIC COURSE IN FOOD AND BEVERAGE SERVICE –I**
Course Code	SH21B
CO-1	An introduction to hotel industry role of catering establishment in tourism
CO-2	To learn about the organizational chart and staffing of fmb department in hotel French term related to staff
CO-3	To learn about food and beverage outlets in hotel in brief
CO-4	To get knowledge on ancillary departments like food pickup area land store kitchen stewarding dispense bar
CO-5	An overview on non alcoholic beverages like tea coffee juices Coco and malted beverages

Course Outcome	
Title	**BASIC COURSE IN FOOD AND BEVERAGE SERVICE –I**
Course Code	SH21B
CO-1	Introduction to the basic of hospitality and catering industry
CO-2	Interpret the commitment and obligation of F&B employee and the departmental staffing and organization
CO-3	Understanding about different food service areas
CO-4	Develop adequate knowledge of different service equipments
CO-5	Through knowledge about the non alcoholic beverages

Syllabus	
Title	**BASIC COURSE IN FOOD AND BEVERAGE SERVICE –I**
Course Code	SH21B
Unit 1	**THE HOTEL &CATERING INDUSTRY** Introduction to the Hotel Industry and Growth of the hotel Industry in India - Role of Catering establishment in the travel/tourism industry- Types of F&B operations - Classification of Commercial, Residential/Non-residential- Welfare Catering- Industrial/Institutional/Transport such as air, road, rail, sea, etc.- Structure of the catering industry-a brief description of each
Unit 2	**DEPARTMENTAL ORGANISATION &STAFFING** Organization of F&B department of hotel with elaborate chart- Principal staff of various types of F&B operations.French terms related to F&B staff- Duties & responsibilities of F&B staff- Attributes of a waiter- Inter-departmental relationships (Within F&B and other departments)
Unit 3	**ANCILLIARY DEPARTMENTS** Dispense bar- Food pick-up area / hot plate - Store- Linen room- Kitchen stewarding Specialty Restaurants- Coffee Shop- Cafeteria- Fast Food (Quick Service Restaurants) - Grill Restaurants – In Room Dining (IRD) - Lounge Banquets- Bar- Pub- Food courts -Off premises catering- Buffet restaurants- Mice department
Unit 4	**F&B SERVICE EQUIPMENT** Familiarization &Selection factors of: Cutlery – Crockery- Glassware –Flatware- Hollowware - Electrical f&b equipments- Buffet ware- All other equipment used in F&B Service
Unit 5	NON-ALCOHOLIC BEVERAGES Classification (Nourishing, Stimulating and Refreshing beverages) • Tea - Origin &Manufacture- Types &Brands • Coffee - Origin &Manufacture- Types &Brands • Juices and Soft Drinks • Cocoa & Malted Beverages- Origin &Manufacture Mocktails – types

Course Objectives	
Title	**BASIC COURSE IN FRONT OFFICE**
Course Code	SH21C
CO-1	An overview to them tourism hospitality and hotel industry and its growth and evolution in world and India
CO-2	They learn about the classification of hotels according to the basis of size location level of service duration of stay ownership alternative accommodations
CO-3	To get knowledge on types of rooms and their terminology
CO-4	They learn about the responsibilities of bell desk department
CO-5	They get knowledge on front office organizational chart according to the size of the hotel functions duties and responsibilities

Course Outcome	
Title	**BASIC COURSE IN FRONT OFFICE**
Course Code	SH21C
CO-1	Comprehend the origin and growth of hospitality industry, travel and tourism and hotel industry
CO-2	Interpret the commitment and obligation of some FO employees, departments and its functional areas
CO-3	Understand the need and criteria of standard classification of hotels
CO-4	Study the hierarchy in front office and their roles in the industry
CO-5	Understand the infrastructure of the hotel (layout), its functions and its importance **Contents (Theory)**

Syllabus	
Title	**BASIC COURSE IN FRONT OFFICE**
Course Code	SH21C
Unit 1	Introduction to Tourism, Hospitality and Hotel industry Hospitality industry – Origin and growth, Evolution and growth of the hotel industry – World and India, Tourism industry – Importance, impact and industries related to tourism.
Unit 2	**Classification of hotels** Criteria for Standard classification hotel, Classification on the basis of size, location, clientele, level of service, Duration of stay, Classification on the basis of ownership, Alternative accommodations.
Unit 3	**Types of rooms** Different types of standard, Room status terminology
Unit 4	**Front office organization** Organization chart of FO department – small, medium and large hotel, Importance, functions and sections of front office, Lobby – layout, Duties and responsibilities of FOM, reservation, reception, concierge, travel desk – Paging system, Personal attributes of FO staffs
Unit 5	**Bell desk** Duties and responsibilities of Bell desk functions and different reports in bell desk.

Course Objectives	
Title	**NUTRITION & FOOD SCIENCE**
Course Code	SH31A
CO-1	They get overview on health nutrition and its classifications
CO-2	They get knowledge on macro nutrients like carbohydrates proteins water
CO-3	They study about crossing the phone treatments used in food processing and its benefits
CO-4	To get knowledge on emulsions and colloids and the reaction in foods
CO-5	To get knowledge on flavour and brownie and their role in food preparation and prevention

Course Outcome	
Title	**NUTRITION & FOOD SCIENCE**
Course Code	SH31A
CO-1	To enable the students to understand the basics knowledge of nutrition
CO-2	To enhance their knowledge about various nutrients and its uses.
CO-3	To enable students to obtain knowledge of vitamins and minerals present in foods.
CO-4	To make them aware of the challenges and strategies in managing food allergy
CO-5	To update them on planning nutritious meals.

Syllabus	
Title	**NUTRITION & FOOD SCIENCE**
Course Code	SH31A
Unit 1	**Basic Aspects** Definition of the terms - Health, Nutrition and Nutrients - Classification of nutrients, five basic food groups. **Balanced Diet** Definition - Importance of balanced diet **RDA** – for various nutrients, age, gender, physiological state
Unit 2	**Macro Nutrients** **Carbohydrates** Definition – Classification (Mono, Di and Polysaccharides)- Dietary Sources-Functions **Lipids** Definition – Classification – Dietary Sources – Functions **Proteins** Definition – Classification based upon amino acid composition – Dietary sources – Functions **Methods of improving quality of protein in food** (Special emphasis on Soya proteins and whey proteins) Energy –Definition of Energy and Units of its measurement (Kcal) – Energy contribution from macronutrients (Carbohydrates, Proteins and Fat) – Factors affecting energy requirements- Concept of BMR, SDA

	Dietary sources of energy –Concept of energy balance and the health hazards associated with Underweight, Overweight Water – Definition – Dietary Sources (visible, invisible) – Functions of water – Role of water in maintaining health (Water balance)
Unit 3	**FOOD PROCESSING** Definition, Objectives, Types of treatment. FUNCTIONAL FOODS – Introduction and benefits **EVALUATION OF FOOD** Objectives, Sensory assessment of food quality, Methods - Introduction to proximate analysis of Food constituents.
Unit 4	**EMULSIONS** Theory of emulsification, Types of emulsions Emulsifying agents role of emulsifying agents in food emulsions **COLLOIDS** Definition, Application of colloid systems in food preparation
Unit 5	**FLAVOUR** Definition, Description of food flavours (tea, coffee, wine, meat, fish spices) **BROWNING** Types (enzymatic and non-enzymatic),Role in food preparation-Prevention of undesirable browning

Course Objectives	
Title	**BASIC COURSE IN FOOD PRODUCTION -II**
Course Code	SH22A
CO-1	They learn about the hierarchy and kitchen staffing and the French terms
CO-2	They learn about the basic commodities of kitchen like rice wheat floor cereals pulses small grains pastas nuts sugar fats and oils etc
CO-3	They also learn about the buttercream milk cheese and culinary terms with explanation and examples
CO-4	They get knowledge on indenting purchasing and storing or portioning
CO-5	They learn about the HACCP the definition history scope and significance

Course Outcome	
Title	**BASIC COURSE IN FOOD PRODUCTION -II**
Course Code	SH22A
CO-1	On Learning kitchen commodities and Kitchen staff organization, Kitchen Operations.
CO-2	Students will acquire insight about Kitchen Ingredients.
CO-3	Students will interpret knowledge Students will acquire knowledge on different Kitchen outlets.
CO-4	Students gain knowledge Indenting, Portioning, Receiving Area and Quality control Students will acquire knowledge on food plating and presentation based on Hotel Industry.
CO-5	Students will hone the skills and innovate and create new dishes.
CO-6	Students gain knowledge on Production of Chocolate and Cheese.

Syllabus	
Title	**BASIC COURSE IN FOOD PRODUCTION -II**
Course Code	SH22A
Unit 1	**KITCHEN ORGANISATION** **1. Hierarchy & Kitchen Staffing** 1.1.French Classical Brigade 1. 2. Staff organization Chart of various Kitchens –Hotel Kitchens – Large / medium, Small, Standalone restaurants, Industrial, Institutional, Welfare and Commercial Kitchens. 1. 3. Duties and responsibilities of Various Chefs, job description and Specifications. 1. 4. Co-ordination with other departments in the hotel. 2. **Kitchen Layout** 2. 1. General layout of kitchen in various catering organization, Different layouts of kitchen, Layout of Storage area, Service / Pantry, Wash-up, Receiving areas, Layout of Bakery and Larder Kitchens. 2. 2. Planning of Kitchen Layout – Work area, Work triangle, Ventilation, Lighting, Flooring and drainage.

Unit 2	**BASIC COMMODITIES OF KITCHEN – I** 2.1 Rice, Cereals & Pulses – Classification and identification of rice, varieties of rice, Processing and cooking and cooking of rice. 2. 1. 1 Cereals, Pulses and Small grains – Classification and identification and other cereals and its uses & its cooking process. 2.2 Wheat – Structure of Wheat, Types of Wheat, 2.2. 1 Flour – Various flour used in food production, uses of flour in food production, processing of wheat flour, cooking of flour. 2.3 Nuts – Various nuts and its uses. 2.4. Pasta – Types of Pastas, Process of Pastas, cooking of pastas 2.5. Shortenings (Fats and Oils) – Role of shortenings, varieties of shortenings, advantages and disadvantages of using different shortening. 2. 5. 1. Fats and oil – Types and varieties. 2.6. Raising Agents – Classification of raising agents, role of raising agents- action and reactions. 2.7. Sugar – Importance of sugar, Types of sugar, Processing of Sugar, Cooking of Sugar – uses of sugar in cooking.
Unit 3	**BASIC COMMODITIES OF KITCHEN – II** 3.1. Cocoa / Chocolate – Introduction, production of cocoa, cocoa producing regions / countries, manufacture of chocolates, types of chocolates, tempering of chocolates, white chocolates 3.2. Milk – Introduction, processing of milk, pasteurization – homogenization types of milk, e.g., skimmed, condensed, nutritive value, Use of milk in cooking. 3.3. Cream - Introduction, processing of cream, types of cream, uses of cream. 3.4. Butter – Introduction, processing of butter, types of butter and its uses. 3.5. Cheese – Introduction, processing of cheese, Classification & types of cheese, cooking of cheese, Storing of cheese, uses of cheese. 3.6. Culinary terms – list of culinary (common & basic) terms, explanation with examples.

Unit 4	**INDENTING, PURCHASING, STORING & PORTIONING** 4.1. Indenting – Introduction, Definition, advantage and disadvantages, Needs 7 importance, indent (sheet) writing & preparation, indenting control and checking. 4.2. Purchasing – Purchasing order preparation, ordering the suppliers, direct purchasing, purchase specification & receiving. 4.3. Storing – Types of stores, Issuing and issuing control – LIFO & FIFO method, BIN Card & BIN number, stores control, storing, advantages and disadvantages and needs of storing, register and form. 4.4. Portion & Portion control – Introduction, Definition, Advantage and disadvantages of portioning, equipments used for portioning, Needs of portioning, Portion Control.
Unit 5	**HACCP** 1.1. Introduction to HACCP, Definition, history, Scope and significance of HACCP, Advantages of HACCP, Principle of HACCP.

Course Objectives	
Title	**BASIC COURSE IN FOOD AND BEVERAGE SERVICE – II**
Course Code	SH22B
CO-1	They get knowledge on meals and menu planning and types of meals
CO-2	They get a brief knowledge on French classical menu
CO-3	They learn about the types of food service and preparation for it
CO-4	We will know about the sales control system like KOT triplicate check in system duplicate checking system cash handling equipments point of sale record keeping
CO-5	They will study about the history processing types and brands of tobacco

Course Outcome	
Title	**BASIC COURSE IN FOOD AND BEVERAGE SERVICE – II**
Course Code	SH22B
CO-1	Comprehend the basic of Meals and Menu Planning.
CO-2	Develop the knowledge of extensive seventeen course French classical menu.
CO-3	Understand the of different types of food service
CO-4	Develop extensive knowledge on Sales and the control system Develop the basic knowledge about tobacco and its products.

Syllabus	
Title	**BASIC COURSE IN FOOD AND BEVERAGE SERVICE –II**
Course Code	SH22B
Unit 1	**MEALS & MENU PLANNING** Origin of Menu- Objectives of Menu Planning- Types of Menu- Types of Meals- Early Morning tea, Breakfast(English, American, Buffet breakfast, Continental, Indian, Healthy or Organic Breakfast) – Brunch, Lunch, Afternoon/High tea, Dinner, Supper
Unit 2	**FRENCH CLASSICAL MENU** Courses of French Classical Menu- Sequence, Examples from each course, Cover of each course, Accompaniments. – French name of dishes
Unit 3	**PREPARATION FOR SERVICE** Organizing Mis-en-scene, Organizing Mis-en-place **TYPES OF FOOD SERVICE** Silver Service, Pre-plated Service, Cafeteria Service, Room Service, Buffet Service, Gueridon Service, Bar Service, Pass around Service, Butler Service
Unit 4	**SALE CONTROL SYSTEM** Kot/ bill control system (manual)- Triplicate Checking system, Duplicate Checking System, Single Order Sheet, Quick Service menu and customer bill- Making bill – Cash handling equipments – Record

	keeping(restaurant cashier)- Loyalty Programs – Credit Facilities – POS (point of sale)– introduction, usage in F & B Operations.
Unit 5	**TOBACCO** History- Processing for cigarettes, pipe tobacco and cigars. Cigarettes – Types and Brand names. Pipe Tobacco– Types and brand names. Cigars – Shapes, Sizes, colour and brand names. Care and storage of cigarettes and cigars

Course Objectives	
Title	**BASIC COURSE IN ACCOMMODATION OPERATIONS**
Course Code	SH22C
CO-1	They get knowledge on carrot cleaning of different surface of floor
CO-2	They study about the records maintained in housekeeping department in daily routine
CO-3	They learn about the cleaning procedures of different areas
CO-4	Study about keys control
CO-5	They study about pest control

Course Outcome	
Title	**BASIC COURSE IN ACCOMMODATION OPERATIONS**
Course Code	SH22C
CO-1	Understand care and cleaning procedures for different surfaces Discuss various tasks of desk control.
CO-2	Demonstrate step by step action plan for cleaning procedures of public areas Discuss various activities in housekeeping department such as key control
CO-3	Knowledge on effective pest control.

Syllabus	
Title	**BASIC COURSE IN ACCOMMODATION OPERATIONS**
Course Code	SH22C
Unit 1	**COMPOSITION, CARE AND CLEANING OF DIFFERENT SURFACES** Floor finishes, Protective finishes on Metals, Glass,Polish, Wood, Stone, ceramics
Unit 2	**DAILY ROUTINE SYSTEMS AND RECORDS MAINTAINED IN HOUSE KEEPING** **DEPARTMENT – Desk Control** Reporting Staff Placement; Room Occupancy Report, Discrepancy report; Guest Room Inspection; Entering Checklists, Floor Register, Work Orders, Log Sheet; Lost And Found Register And Enquiry File; Maid's Report And Housekeeper's Report; Handover Records; Guest's Special Requests Register; Record Of Special Cleaning; Call Register; VIP Lists.
Unit 3	**CLEANING PROCEDURES – PUBLIC AREAS** Entrance – Doors – Lobbies – front desk Elevators – Staircase – guest corridor Public Rest rooms – Banquet Halls Dining rooms – Leisure areas – health club, swimming pool
Unit 4	**KEYS AND KEY CONTROL** Types of Keys; Computerised Key Cards; Key Control
Unit 5	**PEST CONTROL** Areas of Infestation; Preventive Measures and Control Measure

Course Objectives	
Title	**TOURISM MANAGEMENT**
Course Code	SH32A
CO-1	To learn about the introduction of tourism and different types of tourism included
CO-2	They learn about the elements of tourism topology and 5A of tourism
CO-3	They learn about the modes of transport
CO-4	Learn about the tourism products of India
CO-5	They get knowledge on tourism has business

Course Outcome	
Title	**TOURISM MANAGEMENT**
Course Code	SH32A
CO-1	Understand the concepts and typology and elements of tourism.
CO-2	Understand the role and significance of transportation in tourism
CO-3	Understand and appreciate the difference between travel agency and tour operator, functions of a travel agency.
CO-4	Understand the Geography of tourism
CO-5	Understand and learn the different organization that helps tourism business

Syllabus	
Title	**TOURISM MANAGEMENT**
Course Code	SH32A
Unit 1	**Introduction to Tourism** Definition and concept of tourism, Leisure and Recreation, Excursionist, Business tourism, VFR, Mass tourism, Adventure tourism, Sports tourism, Rural&Agri- tourism, Tourism education.
Unit 2	**Types and Elements ofTourism** Typology of tourism, Difference between visitors, tourists and excursionist, Tourism as an industry, 5A`s of tourism.
Unit 3	**Transportation in Tourism** Modes of transport- Rail, Road, Air and sea, Elements of transportation, Political influences on transport for tourism, Regulation of competitions, Role of Railways in promotion of domestic tourism, Important tourist trains in India.

Unit 4	**Tourism products of India** Physical features of India (mountains, plains, rivers, major lakes, inland waterways, estuary, and marine); National park, wildlife sanctuary, birds sanctuary, biosphere, Tourism resource, fairs and festivals, cultural festivals,
Unit 5	**Tourism Business** Definition of Travel agency and Tour operators, Itinerary planning and Costing, Approval of travel agency by department of tourism Government of India, Rules and Regulations for approval, Classification of Travel agents ,Functions of Travel agency and Tour operators, Tour planning, Tour escort, roles and responsibilities of Tour Manager, TAAI,IATO,IATA,ITDC,PATA,UNWTO.

Course Objectives	
Title	BASIC COURSE FOOD PRODUCTION LAB –I
Course Code	SH221
CO-1	Identification of equipments and food commodities
CO-2	identification of vegetables and fruits preparation of salad dressing
CO-3	Learn about the stocks and sauces
CO-4	Practical menu
CO-5	Practical menu

Course Outcome	
Title	BASIC COURSE FOOD PRODUCTION LAB –I
Course Code	SH221
CO-1	Students will gain knowledge on classic French cuisine which includes method of preparation and plating techniques.
CO-2	Students will acquire knowledge on food safety and personal Hygiene during the course of practical.
CO-3	Students will hone the skills and innovate and prepare basic dishes with standard recipes.
CO-4	Students gain knowledge in handling different kitchen equipments.

Syllabus	
Title	BASIC COURSE FOOD PRODUCTION LAB –I
Course Code	SH221
Unit 1	A. Equipments – Identification, Description, Uses & handling B. Identification of food commodities C. Hygiene – Kitchen etiquettes, Practices & knife handling Safety and security in kitchen
Unit 2	Identification of vegetables and fruits Cuts of vegetables (juliennr, jardinière, macedoines, brunoise, paysanne) Blanching of Tomatoes, Preparation of concasse Preparation of salad dressings
Unit 3	**STOCKS** i) Types of stocks (White and Brown stock ii) Fish stock (Court bouillon) **SAUCES – BASIC MOTHER SAUCES** Bechemal = White sauce Espagnole – Brown Sauce Veloute – Blond Sauce Hollandaise – Warm Sauce Mayonnaise – Cold Yellow Tomato - Red Kitchen Sauce
Unit 4	**Menu – I**

	Tossed Salad, Cream of Tomato, Fish Colbert, French fries **Menu – II** Waldrof Salad, Puree of Pumkin, Chicken Fricasse, Butter tossed vegetables **Menu – III** Hawain Salad, Veloute dam Blanche, Fish Orly, Pommes Alumettes.
Unit 5	**Menu – IV** Salad Nicoise, Cabbage Chowder, Grilled Fish with Lemon butter Sauce, Vegetable Au Gratin **Menu – V** Caesar Salad, Prawn Bisque, Chicken Chasseur, Grilled Vegetables **References:** 1.Basic Food Production Operations, P. Bali, Oxford Publications, 2.2nd Edition Theory of Cookery, Krishna Arora, 2008 Fran Brothers & Company (Pub) Pvt. Ltd.

Course Outcome	
Title	.BASIC COURSE IN FOOD BEVERAGE LAB – II
Course Code	SH222
CO-1	Students will gain knowledge on regional cuisine which includes method of preparation, standard recipes and plating techniques
CO-2	• Students will acquire knowledge on food safety and personal Hygiene during the course of practical.
CO-3	Students will hone the skills and innovate and create new recipes

Syllabus	
Title	BASIC COURSE IN FOOD BEVERAGE LAB – II
Course Code	SH222
Unit 1	Cuts of Beef / Veal, Cuts of Lamb / Mutton, Cuts of Pork, Variety Meats (Offal)
Unit 2	Classification of Fish – Cuts of Fish
Unit 3	**Menu – I** Caprese Salad, Minestrone soup, Chicken Cacciatore, Pasta Au Gratin **Menu – II** Coleslaw, ConsommeBrunoise, Irish Stew, Garlic Pilaf
Unit 4	**Menu – III** Greek Salad, Scotch Broth, Fish menuire, Ratatouille **Menu – IV** Fruit Salad, Gazpacho, Roast Chicken, Parsley Potatoes
Unit 5	**Menu – V** Bread Fabrications – Bread Rolls Role of each ingredient in bread making Basic Faults I Bread Making

Course Outcome	
Course Code	SH222
CO-2	Develop the knowledge of extensive seventeen course French classical menu.
CO-3	Understand the different types of food service.
Co-4	Develop extensive knowledge on Sales and the control system
CO-5	Develop the basic knowledge about tobacco and its products.

Syllabus	
Title	.BASIC COURSE IN FOOD AND BEVERAGE SERVICE LAB – II
Course Code	**SH222**
Unit 1	REVIEW OF SEMESTER- 1
Unit 2	**TABLE LAY-UP & SERVICE** A La Carte Cover- 7DEOH'¶+RWHO&RYHU- English Breakfast Cover- American Breakfast Cover- Continental Breakfast Cover ± Indian Breakfast Cover ± Afternoon Tea Cover ± High Tea Cover Tray/ Trolley Set-Up & Service Room Service Tray Setup- Room Service Trolley Setup.
Unit 3	Breakfast: - Significance and sequence of services Preparation for service (restaurant) Organizing Mis-en-scene, Organizing Mis-en-Place, Opening, Operating & Closing duties.
Unit 4	**PROCEDURE FOR SERVICE OF A MEAL** Taking Guest Reservations- Receiving & Seating of Guests- Order taking & Recording- Order processing (passing orders to the kitchen) ± Sequence of Service ± Presentation & Encasing the Bill ± Presenting & collecting Guest Comment cards ± Seeing off the Guests.
Unit 5	**SOCIAL SKILLS** Handling Guest Complaints ± Telephone manners **SPECIAL FOOD SERVICE- (Cover, Accompaniments & Service)** &ODVVLFDO +RUV G¶oeuvre- Oysters, Caviar, Smoked Salmon, Patede Foie Gras, Snails, Melon, Grapefruit, Asparagus. **SERVICE OF TOBACCO** Cigarettes & Cigars.

Course Objectives	
Title	**BASIC COURSE IN ACCOMMODATION OPERATIONS LAB**
Course Code	SH223
CO-1	Servicing guest room
CO-2	Cleaning the various surfaces
CO-3	Guest room supplies and placements
CO-4	Record maintenance
CO-5	mini bar maintenance

Course Outcome	
Title	**BASIC COURSE IN ACCOMMODATION OPERATIONS LAB**
Course Code	SH223
CO-1	• Possess skill in Step by step room cleaning procedures
CO-2	• Knowledge on various surfaces and understand their characteristics and cleaning procedures
CO-3	• Understand the placement of guest room supplies in rooms Accurate maintain of records and report making

Syllabus	
Title	**BASIC COURSE IN ACCOMMODATION OPERATIONS LAB**
Course Code	SH223
Unit 1	**SERVICING GUEST ROOM** Checkout/ Occupied and Vacant room
Unit 2	**CLEANING OF VARIOUS SURFACES** Floor finishes, Metal polishing, Glass, Wood, Stone, ceramics
Unit 3	**GUEST ROOM SUPPLIES AND PLACEMENT** Standard Room, Suite, VIP Room Special Amenitie
Unit 4	**RECORDS** Room Occupancy Report – Checklist - Floor Register - Work/ Maintenance Order] - Lost And Found - Maid's Report - Housekeeper's Report - Log Book - Guest Special Request Register - Record Of Special Cleaning - Call Register - VIPs List - Floor Linen Book/ Register
Unit 5	**MINIBAR MANAGEMENT** Issue - Stock Taking - Checking Expiry Date

Semester :III

Course Objectives	
Title	**FOOD PRODUCTION OPERATIONS**
Course Code	SH32A
CO-1	Introduction to Indian food spices and culinary terms
CO-2	Study about the volume feeding
CO-3	Indenting portion control
CO-4	Menu planning and quantity purchase and storage
CO-5	Study about the regional Indian states communities discussions

Course Outcome	
Title	**FOOD PRODUCTION OPERATIONS**
Course Code	SH32A
CO-1	To develop professional competence on quantity food production.
CO-2	To enable students develop their skill in Indian cuisines based on different regions/states of India.
CO-3	To provide in-depth knowledge on various sectors of volume feeding.
CO-4	To have thorough knowledge on various kitchen management skills.
CO-5	Have insight in selection of quantity food production equipments and its maintenance.

Syllabus	
Title	**FOOD PRODUCTION OPERATIONS**
Course Code	SH32A
Unit 1	**QUANTITY FOOD PRODUCTION - BASIC INDIAN COOKERY** Continental & Spices -Introduction to Indian Food - Spices used in Indian food - Role of Indian cookery - Indian cooking techniques - Indian culinary terms. **EQUIPMENT** Equipment required for mass/volume feeding - Heat and cold generating equipment -Care and maintenance of this equipment - Modern developments in equipment manufacture. **VOLUME FEEDING** A. Institutional and Industrial Catering Types of Institutional & Industrial Catering - Problems associated with this type of catering- Scope for development and growth B. Hospital Catering- Highlights of Hospital Catering for patients, staff, visitors - Diet menus and nutritional requirements B. Off Premises Catering Reasons for growth and development - Menu Planning and Theme Parties - Concept of a Central Production Unit- Problems associated with off-premises catering.

	C. Other Catering Establishments Characteristics of Railway, Flight and Cruise line Catering - Branches of Mobile Catering. Entrepreneur
Unit 2	**INDENTING AND PORTION CONTROL** Principles of Indenting for Volume Feeding Practical difficulties while Indenting for Volume Feeding Portion Control - advantages of Portion control Tools/Equipments Used for Portion Control
Unit 3	**QUANTITY PURCHASE AND STORAGE** Introduction to Purchase Methods of Purchase STORAGE - Methods of Storage 1. Dry Storage 2. Cold Storage Refrigera ted Storage Frozen Storage. **MENU PLANNING** Basic principles of menu planning – recapitulation- Points to consider in menu planning for various volume feeding outlets such as Industrial, Institutional, Mobile Catering Units- Planning menus for School/college students - Industrial workers –Hospitals - Outdoor parties - Theme dinners - Transport facilities, cruise lines, airlines, railway- Nutritional factors for the above.
Unit 4	**REGIONAL INDIAN CUISINE** Introduction to Regional Indian Cuisine -Heritage of Indian Cuisine- Factors that affect eating habits in different parts of the country- Cuisine and its highlights of different states/regions/communities to be discussed under -Geographic location- Historical background- Seasonal availability- Special equipment - Staple diets- Specialty cuisine for festivals and special occasions.
Unit 5	**STATES:** Cuisines of Andhra Pradesh, Bengal, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, North Eastern States, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh/Uttaranchal **COMMUNITIES:** Parsee, Chettinad, Hyderabadi, Lucknowi, Avadhi, Malbari/Syrian Christian and Bohri **DISCUSSIONS:** Indian Breads, Indian Sweets, Indian Snacks

Course Objectives	
Title	**FOOD & BEVERAGE OPERATIONS**
Course Code	SH32B
CO-1	An introduction to alcoholic beverages definition production fermentation and distillation process
CO-2	Classification of wines new wine and old wine grapes and its region
CO-3	Study about the beer production
CO-4	Spirits
CO-5	Aperitifes

Course Outcome	
Title	**FOOD & BEVERAGE OPERATIONS**
Course Code	SH32B
CO-1	To introduce the students to the basic of Alcoholic Beverages and Dispense Bar
CO-2	To teach the students about Wines.
CO-3	To make them aware of different types of Beer.
CO-4	To teach the students about Spirits.
CO-5	To equip the students about the basic knowledge about Aperitifs & Liquors.

Syllabus	
Title	**FOOD & BEVERAGE OPERATIONS**
Course Code	SH32B
Unit 1	**ALCOHOLIC BEVERAGES** Introduction and definition - Production of Alcohol - Fermentation process, Distillation process. Chart and Classification of Alcoholic Beverages- Fermented, Distilled and Compound. **WINES** Definition & History. Old World wines (Principal wine regions, wine laws, grape varieties, production and brand names) France, Germany, Italy, Spain, Portugal. New World Wines (Principal wine regions, wine laws, grape varieties, production and brand names) USA, Australia, India, Chile, South Africa, Algeria, New Zealand.
Unit 2	**CLASSIFICATION OF WINES** Factors affecting quality of wine, Table/Still/Natural-making process and Brand names Sparkling- Champagne- making process and Brand names Fortified- Sherry, Port, Madeira and others, making process and Brand names Aromatized - Vermouth and other Aromatized wines including Dubonnet, Saint Raphel, ByrrhFood& wine harmony - Storage of wines - Wine terminology (English & French)
Unit 3	**BEER** Introduction & Definition -Types of Beer, Production of Beer, Storage. International brands. Draught beer, Cider, Perry, Sake.
Unit 4	**SPIRITS** Introduction &Definition - Production of Spirit - Pot still method - Patent still method Production of Whisky, Rum,Gin, Brandy,Vodka,Tequila, Other spirits include Aquavit, Arrack, Absinthe, Tiquira, Fenny, Ouzo, Different Proof Spirits-American Proof-British Proof (Sikes scale) - Gay Lussac (OIML Scale)
Unit 5	**APERITIFS** Introduction and Definition-Types of Aperitifs -Vermouth (Definition, Types & Brand names), Bitters (Definition, Types & Brand names) **LIQUEURS** Definition & History -Production of Liqueurs,Broad Categories of Liqueurs (Herb, Citrus, Fruit/Egg, Bean & Kernel) Popular Liqueurs (Name, colour, predominant flavour&country of origin)

Course Objectives	
Title	**FRONT OFFICE OPERATIONS**
Course Code	SH32C
CO-1	Learn about computer application and software used in front desk
CO-2	They learn about the maintaining guest accounts types of vouchers types of folios
CO-3	The study about the checkout procedure and settlement of in house guest
CO-4	They get knowledge on night auditing
CO-5	They come to know about the guest and staff security in hotel

Course Outcome	
Title	**FRONT OFFICE OPERATIONS**
Course Code	SH32C
CO-1	• FO accounting and its functions, different kinds of vouchers, various folios, ledgers, types of accounts and FO accounting cycle
CO-2	• Fourth stage of guest cycle, departure procedures, modes of bill settlement, potential check out problems and its solutions
CO-3	Process of night audits, duties and responsibilities and its purpose
CO-4	Role of hotel staff in ensuring the safety and security of the guest
CO-5	Handle various guest situations(Complaints, concerns, guest request, special occasions etc

Syllabus	
Title	**FRONT OFFICE OPERATIONS**
Course Code	SH32C
Unit 1	Computer application in front office operation Role of information technology in the hospitality industry Factors for need a PMS in the hotel Factors for purchase of PMS by the hotel Introduction to Fidelio & Amadeus
Unit 2	**Guest accounts** Hotel revenue centers, accounting formula, types of accounts (guest and non guest accounts), Guest accounting cycle, Types of vouchers, Types of folios (guest weekly bill, VTL, high balance report)
Unit 3	**Check out and settlement** Steps in check out and settlement, mode of settlement of bills(cash, credit, charge card, Indian and foreign currency exchange procedure, BTC), Types of guest bills(interim, final and split bill), Early check out/ECO/self check out, Late check out, late charges, balance transfer and charge transfer
Unit 4	**Night audit** Night auditing (auditors, types, functions, advantages, duties and responsibilities, flow chart of night audit process), Basic FO formula(occupancy %, house count, ADR, ARR, ARG, REVPAR, Rate spread, yield, identical yields, Achievement factor, break even analysis
Unit 5	**Guest and staff security** Hotel guest and staff security and its Importance, role of FO, Security and control of room keys(Safe deposit), Operation of walkie – talkie, Types of keys, Surveillance and access control, Protection of funds

Course Objectives	
Title	**ACCOMMODATION OPERATIONS**
Course Code	SH32D
CO-1	They study about the Lenin room classification and characteristics of fabric
CO-2	Study about the maintaining and providing uniforms to Staffs
CO-3	Study about the job specification of seamstress or Tailor
CO-4	Play study about the laundry operations equipments and machines used
CO-5	Study about the flower arrangements materials required for flower arrangements styles of floor arrangements principle and design

Course Outcome	
Title	**ACCOMMODATION OPERATIONS**
Course Code	SH32D
CO-1	Enumerate areas of coordination between Linen & Laundry.
CO-2	Will possess knowledge of various linen used in hotels, effective handling of linen par stock and possess purchase techniques of linen
CO-3	Will be able to effectively reuse discarded linen
CO-4	Will be able to design uniforms with the use of appropriate fabrics in accordance with latest trends in uniform designing.
CO-5	Will be able to perform daily activities of sewing room.
CO-6	Knowledge and operating skills of various laundry equipments, handle laundry flow process, effectively possess skill to remove stains from various types of fabric, to handle guest laundry issues effectively.
CO-7	Will possess skill to create various styles of flower arrangement with knowledge of flowers used in hotel.

Syllabus	
Title	**ACCOMMODATION OPERATIONS**
Course Code	SH32D
Unit 1	**FABRIC CARE UNIT-LINEN ROOM** Classification and Characters Of Fabric; Activities Of The Linen Room; Layout And Equipment used in The Linen Room; Selection Criteria For Various Linen Items & Fabrics Suitable For This Purpose; Purchase Of Linen; Calculation Of Linen Requirements; Linen Control, Linen Exchange - Procedures And Records; Recycling Of Discarded Linen; Linen Hire; PAR Stock Calculation.
Unit 2	**UNIFORMS** Advantages of Providing Uniforms to Staff; Issuing And Exchange Of Uniforms; Type Of Uniforms; Selection And Designing Of Uniforms; Layout Of The Uniform Room
Unit 3	**SEWING ROOM** Activities; Equipment provided; Job specification of a Seamstress/tailor
Unit 4	**LAUNDRY OPERATIONS** Types of Laundry; Layout Of The Laundry; Laundry Equipment And Machines; Flow Process Of Industrial Laundering-OPL; Stages In The Wash Cycle; Laundry Agents; Dry Cleaning Guest Laundry/Valet Service; Stain Removal.
Unit 5	**FLOWER ARRANGEMENT** Flower Arrangement in Hotels; Equipment and Material Required For Flower Arrangement; Styles Of Flower Arrangements; Principles Of Design As Applied To Flower Arrangement. **Indoor Plants** Selection and Care

Course Objectives	
Title	**HOTEL ACCOUNTING SYSTEM**
Course Code	SH33A
CO-1	Study about the hotel accounting cycle and process let the trial balance and practical problems
CO-2	They learn about the uniform system of accounts preparation of income statements and balance sheets
CO-3	Definition of objectives internal control
CO-4	Learn about the audit types of audit
CO-5	The study about the departmental accounting methods and allocations expenses

Course Outcome	
Title	**HOTEL ACCOUNTING SYSTEM**
Course Code	SH33A
CO-1	• Students will come with a detailed knowledge about uniform system of accounts in hotel industry
CO-2	Students about the preparation of Income statement and balance sheet in a hotel □Students will aware of the importance of Internal Control □Students will know about auditing in hotel industry

Syllabus	
Title	**HOTEL ACCOUNTING SYSTEM**
Course Code	SH33A
Unit 1	INTRODUCTION: Meaning and definition – Book – Keeping – Accounting - Objectives & Process of Accounting - Accounting cycle –Journal – ledger - Trial balance - practical problems
Unit 2	Introduction to Uniform system of accounts - components of Income Statement- preparing Cost of sales- preparation of Income statements- Practical Problems. Meaning of balance sheet-components of Balance Sheet (under uniform system) –preparation of Balance sheet- Rearranging Horizontal into vertical format - Practical problems

Unit 3	Definition and objectives of Internal Control - Characteristics of Internal ControlImplementation and Review of Internal Control - Inter-Firm and Intra-Firm Comparison- Internal Check.
Unit 4	Meaning of Audit- Introduction and objectives of Internal and Statutory Audit - Role of Internal Auditor - Tools of Internal Audit -Implementation and Review of internal audit --Distinction between Internal Audit and Statutory Audit.

Course Objectives	
Title	**HOTEL FINANCIAL MANAGEMENT**
Course Code	SH33B
CO-1	The study about the scope objectives of financial management
CO-2	They get white knowledge on taxes certificates required for hotels
CO-3	They learn analyse find the techniques of financial analysis
CO-4	They get knowledge on equity shares preference shares term loan retained earnings
CO-5	Learn about the process steps importance of financial planning

Course Outcome	
Title	**HOTEL FINANCIAL MANAGEMENT**
Course Code	SH33B
CO-1	Students learn basics of financial management
CO-2	Students know how to analyses financial statement analysis
CO-3	Gain knowledge of implementing ratio
CO-4	Knowledge of financial sources and financial planning

Syllabus	
Title	**HOTEL FINANCIAL MANAGEMENT**
Course Code	SH33B
Unit 1	Hotel Financial Management: Introduction, Meaning, Scope, Objectives, Goals.
Unit 2	Financial statements meaning and types- Techniques of financial analysis- Limitation of financial analysis.Practical problems.
Unit 3	GST-Meaning, types, rates in Hotel, GSTR-3B.Hotel business licenses and permits. Meaning of TDS TAN, PAN , Luxury Tax, FSSAI, Service tax, Entertainment tax, Property tax, Water tax, Professional tax, Foreign exchange, Multistoried building tax, Weights and Measures certificate, Hygiene and Sanitary certificate, Structural Safety certificate.
Unit 4	Sources of long term finance: Equity Shares-Features, Merits, Limitation. Preference shares- Features, Types, Merits, Limitations. Debentures – features, Types, advantages, limitations. Term loan- Meaning, features, Advantages, Limitations. Retain Earnings-Meaning, advantages, Limitations. Dividend Policy- Meaning, Determinants of dividend policy, forms of dividend. Bonus shares- Meaning, Advantages.Stock split, Right issue- meaning, features, advantages. (Only theory)
Unit 5	Financial Planning: Meaning, process, steps, Importance, Objectives, Scope, Characteristics of sound financial plan, factors affecting financial plan, Limitations. Capital structure: Meaning, Objectives, factors determining capital structure. Working capital: Meaning, importance, sources, types, factors determining working capital. (Only theory)

Course Objectives	
Title	**FOOD AND BEVERAGE CONTROL AND MANAGEMENT**
Course Code	SH33C
CO-1	They study about the food cost control objectives and various stages in control cycle
CO-2	They learn about the purchase control of the department and job description of purchase manager
CO-3	They study about budgetary control and variance analysis
CO-4	They get knowledge on menu merchandising and menu engineering
CO-5	They come to know about marginal costing and MIS

Course Outcome	
Title	**FOOD AND BEVERAGE CONTROL AND MANAGEMENT**
Course Code	SH33C
CO-1	On completion of this semester the Student will get awareness of the following
CO-2	Basic Cost Control with respect to the Hospitality Industry
CO-3	To provide knowledge about basic Material Management Functions, Responsibilities & controlling measures
CO-4	To be familiar with Inventory Management
CO-5	To understand the importance of Production Control & Yield Management
CO-6	Provide knowledge with regards to Sales Control. & Importance of Sales Control

SYLLABUS	
Title	**FOOD AND BEVERAGE CONTROL AND MANAGEMENT**
Course Code	SH33C
Unit 1	**Food Cost Control** Introduction to Cost Control – Define cost control – The objectives and Advantages of cost control – Basic Costing – Food Costing – Various Stages in the Control Cycle and interrelationship of the Control Cycle
Unit 2	**Purchase Control** Aim of Purchase Policy – Job Description of Purchase Manager / Personnel – Types of Food Purchase – Quality Purchasing , Food quality factors for Different Commodities – Definition of Yield , Test to arrive at standard yield – Definition of standard purchase specification, Advantage of Standard Yield and Standard Purchase Specification – Purchasing Procedure, Different methods of Food Purchasing – Sources of Supply – Purchasing by Contract – Periodical Purchasing , Open Market Purchasing , Standing Order Purchasing , Centralized Purchasing – Method of Purchasing in Hotels - Purchase Order Forms- Ordering Cost, Carrying Cost, Economic Order Quantity – Practical Problems
Unit 3	**Budgetary Control& Variance Analysis** **Budgetary Control** Definition – Aim & Objectives of Budget – Definition of Budgetary Control – Key Factors – Budget Frame Work – Types of Budget – Various Steps Involved in Budgetary Control and its advantages **Variance Analysis** Standard Cost – Standard Costing – Cost Variances – Material Variance – Labour Variance – Overhead Variance – Fixed Overhead Variance – Sales Variance – Profit Variance.
Unit 4	**Menu Merchandising & Menu Engineering** **Menu Merchandising** Menu Control – Menu Structure – Menu Planning – Pricing of Menus – Types of Menus – Menu as Marketing Tool – Layout – Constraints of Menu Planning **Menu Engineering**

	Definition – Aim & Objectives of Menu Engineering – Methods and Advantages of Menu Engineering – Four Box Analysis of Menu Engineering
Unit 5	**Marginal Costing & MIS** Marginal Costing Breakeven Chart – P V Ratio – Contribution – Aim & Objectives of Marginal Cost – Graph **MIS** Aim & Objectives of MIS – Reports – Calculation of Actual Cost – Daily Food Cost & Monthly Food Cost – Statistical Revenue Report – Cumulative and Non-Cumulative

Course Objectives	
Title	**ENVIRONMENTAL STUDIES**
Course Code	ENV4B
CO-1	This study about the ecosystem natural resources renewable and non renewable resource
CO-2	Biodiversity and conservation
CO-3	Environmental pollutions types causes and its effects
CO-4	Environmental policies and practices
CO-5	Human communities and the environment

Course Outcome	
Title	**ENVIRONMENTAL STUDIES**
Course Code	ENV4B
CO-1	Learn about the ecosystem structure and function
CO-2	They get knowledge on natural resources such as renewable and non renewable
CO-3	Biodiversity and conversion

SYLLABUS	
Title	**ENVIRONMENTAL STUDIES**
Course Code	ENV4B
Unit 1	**Introduction to Environmental Studies** • Multidisciplinary nature of environmental studies; Scope and importance; concept of sustainability and sustainable development
Unit 2	What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: Food chains, food webs and ecological succession, Case studies of the following ecosystem: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystem (ponds, stream, lakes, rivers, ocean, estuaries)
Unit 3	**Natural Resources : Renewable and Non – renewable Land resources and landuse change: Land degradation, soil erosion and desertification.** Deforestation : Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations • Water : Use and over –exploitation of surface and ground water, floods, droughts, conflicts over water (international and inter-state). Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies
Unit 4	**: Biodiversity and Conservation** • Levels of biological diversity: genetics, species and ecosystem diversity, Biogeographic zones of India: Biodiversity patterns and global biodiversity hot spots India as a mega-biodiversity nation, Endangered and endemic species of India. • Threats to biodiversity: Habitat loss, poaching of wildlife, man- wildlife conflicts, biological invasions; Conservations of biodiversity: In-situ and Ex-situ Conservation of biodiversity.

	• Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.
Unit 5	**Environmental Pollution Environmental pollution: types, causes, effects and controls: Air, Water, soil and noise Pollution.** • Nuclear hazards and human health risks • Solid waste management: Control measures of urban and industrial waste • Pollution case studies.
UNIT-6	**Environmental Policies & Practices** • Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture • Environment Laws: Environment Protection Act, Air (Prevention & Control of Pollution) Act; Water (Prevention and Control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD). **Nature reserves, tribal populations and rights, and human Wildlife conflicts in Indian context**
UNIT-7	**Human Communities and the Environment** • Human population growth, impacts on environment, human health and welfare. • Resettlement and rehabilitation of projects affected persons; case studies. • Disaster management: floods, earthquake, cyclone and landslides. • Environmental movements : Chipko, Silent Valley, Bishnois of Rajasthan. • Environmental ethics : Role of Indian and other religions and cultures in environmental conservation. • Environmental communication and public awareness, case studies(e.g. CNG Vehicles in Delhi)

UNIT-8	**: Field Work** • Visit to an area to document environmental assets: river / forest/ flora/ fauna etc. • Visit to a local polluted site – Urban / Rural/ Industrial/ Agricultural. • Study of common plants, insects, birds and basic principles of identification. **Study of simple ecosystem- pond, river, Delhi Ridge etc**

Course Objectives	
Title	**FOOD PRODUCTION OPERATIAONS LAB**
Course Code	SH421
CO-1	This study about the ecosystem natural resources renewable and non renewable resource
CO-2	Biodiversity and conservation
CO-3	Environmental pollutions types causes and its effects
CO-4	Environmental policies and practices
CO-5	Human communities and the environment

Course Outcome	
Title	**FOOD PRODUCTION OPERATIAONS LAB**
Course Code	SH421
CO-1	Introduction to Indian cookery
CO-2	Spices used in Indian cookery
CO-3	Masalas - Concepts of masalas- Classification of masalas- Types of masalas Demonstration of Basic Indian Gravy- Makhni gravy- Curry gravy- Shahi gravy- Hara gravy- Kadai masala- Chettinad masala

SYLLABUS	
Title	**FOOD PRODUCTION OPERATIAONS LAB**
Course Code	SH421
Unit 1	**Formulate 12 set of menus from the following cuisines.** • Awadhi • Bengal • Goa • Gujarat • Hyderabad • Kashmiri • Maharastra • Punjabi • Rajasthan • South India (Tamilnadu, Karnataka, Kerala) **SUGGESTED MENUS MAHARASTRIAN** • Masala Bhat • Kolhapuri Mutton • BatataBhajee □Masala Poori • Koshimbir • Coconut Poli **AWADHI** • YakhniPulao • MughlaiParatha • Gosht Do Piaza • Badin Jaan Kulfi with Falooda
Unit 2	**BENGALI** • Lucchi □ChannaPulao □Doi Mach. • PanchPhoronChori • BhajaMoong dal • Sandesh **GOAN** • Coconut Pulao • Mutton Vindaloo

	• Prawn Balchao • Chicken Xacuti • Vegetable Kaldeen • Bibinca **PUNJABI** • AmritsariMacchi • Bhatura • KadaiChole • MethiMurgh • SarsonKaSaag • GajarKaHalwa
Unit 3	**KASHMIRI (Optional)** • LacchaParatha • YakhniPulao • MurghDhaniwalKurma • Rajma Masala • KesarKheer **PARSI** • Dhansak • Kavab • PatraniMacchi • Lagan Nu Custard • Brown Rice **MAHARASHTRA** • Koshambir • BatataBhaji • Masala Bhat • Chicken KolhPur • Varam / Amti Shrikand
Unit 4	**TAMILNADU** • Steamed Rice • Drumstick Sambar

- Chicken Nilgiri Kurma
- Carrot & Beans Poriyal
- Pepper Rasam
- Semiya Payasam

CHETTINADU

- Nadu Rasam
- Karruveppilai Podi Sadam
- Chicken Chettinadu
- Keerai Masiyal
- SennaiVaruval
- Sarkarai Pongal

KERALA

- Malabar Parotta
- NeiChoru
- Nadan Chicken Curry
- Vegetable Stew
- Paalada Pradhaman

ANDHRA PRADESH

- Steamed rice
- Vendakkai Pulusu
- Tomato Pappu
- KodiVapudu
- Gongora Pachadi

Gummadikkai Halwa

Unit 5

RAJASTHANI

- Lal Maas
- Missi Roti
- Mutter Pulao
- Gavarafli Ki Subzi
- MoogdalHalwa

HYDERABADI

- ShikumpuriKabab
- Sofyani Biryani
- TawaParatha
- MirchiKaSalan

- GoshtDalcha
- ShahiTukra

DEMONSTRATION OF NORTH INDIAN & SOUTH INDIAN BREAKFAST-

- North Indian-AlooParatha- PooriBhajji
- South Indian- VenPongal- MedhuVada- Dosa- Sambar- Coconut Chutney
- Demonstration of Indian regional snacks
- Samosa- Bajji- Vada- Pakora- KuliPanayaram- Chat Items Demonstration of variety rice- Coconut – Tamarind- Lemon

Course Objectives	
Title	**FOOD & BEVERAGE OPERATIONS LAB**
Course Code	SH422
CO-1	This study about the ecosystem natural resources renewable and non renewable resource
CO-2	Biodiversity and conservation
CO-3	Environmental pollutions types causes and its effects
CO-4	Environmental policies and practices
CO-5	Human communities and the environment

Course Outcome	
Title	**FOOD & BEVERAGE OPERATIONS LAB**
Course Code	SH422
CO-1	To introduce the students to the basic of Alcoholic Beverages and Dispense Bar
CO-2	To teach the students about Wines service.
CO-3	To make them aware of different types of Beer service
CO-4	To match the food with wine
CO-5	To equip the students about the basic knowledge about Aperitifs & Liqueurs.

SYLLABUS	
Title	**FOOD & BEVERAGE OPERATIONS LAB**
Course Code	SH422
Unit 1	**Bar– Mise-en-place and Equipments.** Task-01Wine service equipment Task-02 Beer service equipment Task-03 Cocktail bar equipment Task-04 Liqueur / Wine Trolley Task-05 Bar stock –alcoholic & non-alcoholic beverages Task-06 Bar accompaniments & garnishes Task-07 Bar accessories & disposables. **Wine & Drinks List** Task: 01 Wine Bar Task:02 Beer Bar Task: 03 Cocktail Bar
Unit 2	**Service of Wines** Task-01 Opening the wine bottles (Table wine and Sparkling wine) Task-02 DecantingTask-03 Service of Red Wine - Task-04 Service of White/Rose wine Task-05 Service of Sparkling wines - Task-06 Service of Fortified Wine - Task-07 Service of Aromatized Wine.
Unit 3	**Matching Wines with Food** Task-01 Menu Planning with accompanying Wines with Continental Cuisine& Indian Regional Cuisine Task-02 Table Laying & Service of menu with accompanying Wines- Continental Cuisine& Indian Regional Cuisine
Unit 4	**Service of Spirits** Task-01 Service styles – neat/on-the-rocks/with appropriate mixers - Task-02 Service of Whisky - Task-03 Service of Vodka - Task-04 Service of Rum - Task-05 Service of Gin - Task-06 Service of Brandy - Task-07 Service of Tequila Appropriate glasses used for each spirit.

Unit 5	**Service of Beer** Task-01 Service of Bottled & canned Beers - Task-02 Service of Draught Beers Task-03 Service of Cider, Perry & Sake **Service of Aperitifs** Task-01 Service of Bitters - Task-02 Service of Vermouths **Service of Liqueurs** Task-01 Service styles – neat/on-the-rocks/ with cream/ en frappé- Task-02 Service from the Bar Task-03 Service from Liqueur Trolley Appropriate glasses used for different Liqueurs

Course Objectives	
Title	**FRONT OFFICE OPERATIONS LAB**
Course Code	SH423
CO-1	This study about the ecosystem natural resources renewable and non renewable resource
CO-2	Biodiversity and conservation
CO-3	Environmental pollutions types causes and its effects
CO-4	Environmental policies and practices
CO-5	Human communities and the environment

Course Outcome	
Title	**FRONT OFFICE OPERATIONS LAB**
Course Code	SH423
CO-1	• Perceiving the front office accounting system followed in the hotel
CO-2	• Be acquainted with the procedures adopted during check out
CO-3	• Initiating the night auditing process
CO-4	• Ensure guest safety measures in the hotel
CO-5	• Acquire knowledge in guest relations
CO-6	• Basic FO formulas and closing invoice methods

SYLLABUS	
Title	**FRONT OFFICE OPERATIONS LAB**
Course Code	SH423
Unit 1	Hands on practice of computer applications related to Front Office procedures such as Reservation Registration Guest History Daily transactions
Unit 2	Front office accounting procedures Manual accounting Machine accounting Payable, Accounts Receivable, Guest History, Yield Management
Unit 3	Role Play
Unit 4	Situation Handling
Unit 5	How to attend the interview, Group discussion

Course Objectives	
Title	**ACCOMMODATION OPERATIONS LAB**
Course Code	SH424
CO-1	This study about the ecosystem natural resources renewable and non renewable resource
CO-2	Biodiversity and conservation
CO-3	Environmental pollutions types causes and its effects
CO-4	Environmental policies and practices
CO-5	Human communities and the environment

Course Outcome	
Title	**ACCOMMODATION OPERATIONS LAB**
Course Code	SH424
CO-1	• Effectively design the layout of linen room and laundry
CO-2	Operational knowledge of various laundry equipments and machineries Understand and practice various stain removal techniques Develop skills in various styles of flower arrangement

SYLLABUS	
Title	**ACCOMMODATION OPERATIONS LAB**
Course Code	SH424
Unit 1	Layout of linen and uniform room/Laundry
Unit 2	Laundry machinery and equipment
Unit 3	Stain Removal procedures
Unit 4	Flower Arrangement –Various styles of flower arrangement
Unit 5	Handling Room Linen/ Guest Supplies Maintaining Register/ Record; Replenishing Floor Pantry; Stock Taking; Par Stock Calculation

Course OBJECTIVE	
Title	**INDUSTRIAL EXPOSURE TRAINING**
Course Code	-
CO-1	Students to choose (or) apply for IET in any reputed BRAND Hotels
CO-2	After joining the IET, Students to get involved actively and to be part of the Hotel Operation Team.
CO-3	Students quickly learn the SOP of the Hotel Brand / Group.
CO-4	To adopt themselves according to the Hotel Culture / Values
CO-5	To acquire the Basic knowledge of all Key operational departments
CO-6	Always be open with a positive mindset that “We Can”
CO-7	Always display a passion towards learning of the job.
CO-8	Everyday students should enter the work place with a goal / dream to become professional hoteliers.

CO-9	To learn and practice the Hotel professional grooming standards at all times.
CO10	To start your training with a good note and finish it with your own success story in the same hotel.

Course Objectives	
Title	**ADVANCED FOOD PRODUCTION OPERATIONS –I**
Course Code	SH52A
CO-1	Introduction of larder kitchen Functions duties and responsibilities
CO-2	To learn about sausages forcemeats brines ham bacon
CO-3	They get knowledge on cold buffets and cold cuts
CO-4	They study about the food plating and granishes
CO-5	They will know about the patter presentation

Course Outcome	
Title	**ADVANCED FOOD PRODUCTION OPERATIONS –I**
Course Code	SH52A
CO-1	• Students will acquire knowledge on functions of cold kitchen.
CO-2	• Students will able to develop culinary skills in the charcutierie
CO-3	• Students gain knowledge on preparing and presenting cold cuts
CO-4	• Students will able to identify and use different cooking equipments in larder department
CO-5	• Students will interpret knowledge on the different types of appetizer and wines used in cooking
CO-6	• Students will acquire knowledge on food plating and presentation based on Hotel Industry □Students will get in depth sight on Food photography and food Journalism

SYLLABUS	
Title	**ADVANCED FOOD PRODUCTION OPERATIONS – I**
Course Code	SH52A
Unit 1	**LARDER** INTRODUCTION TO LARDER - Introduction of Larder Work- Layout of a typical larder with equipment and various sections - Equipment found in the larder - Larder control- Functions of larder- Duties & Responsibilities of larder chef
Unit 2	**CHARCUTIERIE** A. SAUSAGES- Sausage - Casings & Fillings – Types & Varieties B. FORCE MEATS – Types, Preparation & Uses C. BRINES, CURES & MARINADES – Types, Preparation, Uses & Differences D. HAM, BACON & GAMMON – Cuts & Differences between these
Unit 3	**COLD BUFFET & COLD CUTS** A. GALANTINES & BALOTINE – Definition, Preparation, Types & Uses. B. PATES & TERRINES - Definition, Preparation, Types, Uses and Differences C. MOUSSE & MOUSSELINE - Definition, Preparation, Types, Uses and Differences D. CHAUD FROID – Definition, Preparation, Types & Uses E. ASPIC & GELEE – Definition, Preparation, Types & Uses and Differences F. QUENELLES & TRUFFLE - Definition, Preparation, Types, Uses and Differences G. PARFAITS & ROULADES - Definition, Preparation, Types, Uses and Differences H. EDIBLE & NON EDIBLE DISPLAYS - Definition, Preparation, Types, Uses and Differences I :FOOD PLATING, MIRROR AND PLATTER PRESENTATION: Definition, Techniques and

Unit 4	A. APPETIZERS & GARNISHES – Types, Preparation, Examples, Uses & Differences B. SANDWICHES - Parts of Sandwiches - Types of Bread - Types of filling – classification- Spreads and Garnishes - Types of Sandwiches - Making of Sandwiches - Storing of Sandwiches C. USE OF WINE AND HERBS IN COOKING Ideal uses of wine in cooking - Classification of herbs - Ideal uses of herbs in cooking.
Unit 5	Food plating and platter presentations- Food styling-Food photography-Food JournalismMolecular Gastronomy.

Course Objectives	
Title	**ADVANCED FOOD & BEVERAGE OPERATIONS –I**
Course Code	SH52B
CO-1	Introduction menu planning
CO-2	They learn about the Function catering banquets
CO-3	The study about the planning and organization of function catering buffet
CO-4	They study in detail about guardian service service
CO-5	They learn about kitchen stewarding important opportunities record maintenance

Course Outcome	
Title	**ADVANCED FOOD & BEVERAGE OPERATIONS –I**
Course Code	SH52B
CO-1	To introduce the students to the basic of Planning and Operating various F & B Outlet.
CO-2	To teach the students about Banquets, Banquets protocols.
CO-3	To make them aware of different types of Buffets.
CO-4	To teach the students about Gueridon Service.
CO-5	To equip the students about the basic knowledge about Kitchen Stewarding.

SYLLABUS	
Title	**ADVANCED FOOD & BEVERAGE OPERATIONS – I**
Course Code	SH52B
Unit 1	**PLANNING &OPERATING VARIOUS F&B OUTLET** Physical layout of functional and ancillary areas – Objective of a good layout -Steps in planningFactors to be considered while planning - Calculating space requirement - Various setups for seating - Planning staff requirement - Menu planning - Constraints of menu planning - Selecting and planning of heavy duty and light equipment - Requirement of quantities of equipment required like crockery, Glassware, Cutlery –steel or silver etc.Suppliers &manufacturers - Planning Décor, furnishing fixture etc.
Unit 2	**FUNCTION CATERING BANQUETS** History -Types&Organization of Banquet Department – Staffs duties & responsibilities -Sales Booking procedure - Banquet menus – MICE concept. **BANQUET PROTOCOL** Space Area requirement - Table plans/arrangement -Misc-en-place-Service - Toast &Toast procedures **INFORMAL BANQUET** Reception - Cocktail parties – Convention-Seminar –Exhibition – Fashion shows - Trade Fair Wedding - Outdoor catering
Unit 3	**FUNCTION CATERING BUFFETS** Introduction -Factors to plan buffets - Area requirement - Planning and organization -Sequence of food -Menu planning - Types of Buffet –Display-Sit down,Fork, Finger, Cold BuffetBreakfast Buffets,Equipment - Supplies - Checklist
Unit 4	**GUERIDON SERVICE** History ofGueridon- Definition -General consideration of operations –Advantages &Disadvantages - Types of trolleys - Factor to create impulse buying– visual merchandising, Trolley, open kitchen.Gueridon equipment - Gueridon ingredients

Unit 5	**KITCHEN STEWARDING** Importance-Opportunities in kitchen stewarding -Record maintaining -Machine used for cleaning and polishing- Inventory –organization hierarchy of kitchen stewarding, roles and responsibilities of each staff.

Course Objectives	
Title	**ACCOMMODATION MANAGEMENT**
Course Code	SH52C
CO-1	Study about planning organization of the housekeeping department
CO-2	Budgeting for housekeeping department inventory control stocktaking
CO-3	Operations of energy and water conservation in housekeeping department
CO-4	Safety and securities and accident prevention fire safety and fire fighting crime prevention acts
CO-5	They study about contract services guidelines advantages and types

Course Outcome	
Title	**ACCOMMODATION MANAGEMENT**
Course Code	SH52C
CO-1	Demonstrate step by step planning and organizing process for ensuring efficient, effective and economic operations of Housekeeping department.
CO-2	Understand and analyze housekeeping standards together with safety and security aspects
CO-3	To understand different concepts in budgeting.
CO-4	To understand different types and styles of flower arrangements.
CO-5	

SYLLABUS	
Title	**ACCOMMODATION MANAGEMENT**
Course Code	SH52C
Unit 1	**PLANNING AND ORGANISING THE HOUSE KEEPING DEPARTMENT** Area Inventory List; Frequency Schedules; Performance And Productivity Standards; Standard Operating Manuals – Job Procedures; Job Allocation And Work Schedules; Calculating Staff Strengths & Planning Duty Rosters, Team Work And Leadership In House Keeping; Training In HKD, Devising Training Programmers' For HK Staff
Unit 2	**BUDGETING FOR HOUSEKEEPING** Inventory control and stock taking; Types of budgets (operational and capital); Cost Control In Specific Areas (Guest Room, Public Areas, Linen Room, Stores, Cleaning Material And Supplies, Flowers); Purchasing
Unit 3	**ENERGY AND WATER CONSERVATION IN HOUSEKEEPING OPERATIONS**
Unit 4	**SAFETY AND SECURITY** Safety Awareness and Accident Prevention; Fire Safety And Fire Fighting; Crime Prevention And Dealing With Emergency Situation; First Aid
Unit 5	**CONTRACT SERVICES** Types of contract services, guidelines for hiring contract services, Advantage and disadvantage of contract services.

Course Objectives	
Title	**HUMAN RIGHTS AND RELTIONS EDUCATION**
Course Code	SH55A
CO-1	Introduction to human rights and human relation scopes categories and need for study
CO-2	They study about the human rights institutions both international and national
CO-3	The study about the economic relations and human rights civil and political rights
CO-4	The study about the rights for women and children physical assault and harassment violence at workplace
CO-5	The study about role of UN Convention of rights for child

Course Outcome	
Title	**HUMAN RIGHTS AND RELTIONS EDUCATION**
Course Code	SH55A
CO-1	It provides the student with the capacity to identify issues and problems relating to the realization of human rights
CO-2	It helps to identify different aspects of human right of children and women
CO-3	Students learn not only their basic rights but also can understand the duties to be carried out in the day to day.
CO-4	It also develops investigative and analytical skills.

SYLLABUS	
Title	**HUMAN RIGHTS AND RELTIONS EDUCATION**
Course Code	SH55A
Unit 1	**Introduction:** Definition of Human Rights & Human Relations. Scope of Human Rights – Need for the study of Human Rights. Categories of Human relations and Human rights.
Unit 2	**Human Rights Institutions – International & National:** United Nations Human Rights Commission – National Human Rights Commission – State Human Rights Commission.
Unit 3	Civil and Political rights – Economic Relations & Human Rights, Social Relations & Human Rights. Human Rights and License – Health /Eating House License,Shops and Establishment Act,Lodging and Establishment Act,PF/ESIC.
Unit 4	**Instruments:** UDHR, International convenient on civil and political rights, International convenient on economic and social rights, National Human rights act – National Commission for minorities, S.C, S.T and Woman.

Unit 5	**Rights of women and children:** Rights of women – Female feticide and Infanticide– Physical assault and harassment – Violence at work place – Remedial Measures. Rights of children – Protection rights, survival rights – Participation rights – Development rights – Role of UN convention on rights of children.

Course Objectives	
Title	**MARKETING AND SALES MANAGEMENT**
Course Code	SH55B
CO-1	The study about the fundamentals of marketing in hotel and catering industry
CO-2	Introduction to marketing mix product price place promotion
CO-3	They study about the promotional activities sales management
CO-4	Learn about the international marketing
CO-5	They get knowledge on social responsibilities of business

Course Outcome	
Title	**MARKETING AND SALES MANAGEMENT**
Course Code	SH55B
CO-1	It introduces the student a insight to marketing mix
CO-2	It helps the student to understand the four keys of marketing It helps the Students to understand the sales and Management.
CO-3	student will learn about international marketing

SYLLABUS	
Title	**MARKETING AND SALES MANAGEMENT**
Course Code	SH55B
Unit 1	**Fundamentals of Marketing** Overview of service sector and hospitality – The hotel and the catering industry – definition of market, marketing and selling – The marketing concept – methods and scope of marketing research – sources of information – marketing environment. Market Segmentation Market segmentation – benefits – bases for market segmentation – types – different between consumer behavior and buyer behavior – consumerism – marketing information research (MIS) – characteristics of MIS – differences MIS and Marketing Research.
Unit 2	**Introduction to the Marketing Mix – 4 P's** **Product** Definition of product and service – the hotel product and its components of physical aspects service and image – new product development – brand names – overview of a marketing plan – Product life cycle – Product differentiation in Hotel and Catering Industry **Price** Principles of prices – influences upon prices decision making – pricing techniques – initiating price changes – cost oriented and market oriented pricing strategies. **Place** Distribution – Scope of distribution – channel functions an flow – organizational patterns in hospitality marketing channels – location of services – current trends in hotel and catering industry. **Promotion** Promotion – promotion mix – promotion process – kinds of sales promotion advertising – salesmen – selection, training – advertising agency – media selection, training – advertising agency- media selection – types of media – sales promotion.
Unit 3	**Introduction to promotional activities**: The role of promotion – promotion mix in terms of advertising / selling / sales promotion / direct mail / sponsorship /

	merchandising / public relations / publicity – communication problems – budgeting the promotion mix. Advertising: - Introduction – Aim of advertising – The advertising industry – Advertising style – Advertising objectives historical view – pre testing / post testing – media planning – other testing methods **Sales and Sales Management:** Definition – sales task – determining the sales force structure – selecting sales person – role of sales manager public relation.
Unit 4	**International Marketing** International marketing – emergence of global marketing – significance of international marketing for developing countries – liberalization – role of foreign MNCUnit – V Social responsibilities of Business Social responsibilities of business – Introduction – changing trends in social responsibilities of business toward different group. Marketing of Services – Business – goals of business – growth of service marketing – classification of service marketing - business ethics – current trend in marketing

Course Objectives	
Title	**ADVANCED FOOD PRODUCTION OPERATIONS –II**
Course Code	SH62A
CO-1	They learn about international cuisine its geographical location historical backgrounds speciality recipes
CO-2	They learn about bakery and confectionery
CO-3	They study how to make bread chocolate
CO-4	The study about research development and production management
CO-5	They get knowledge on standard recipe

Course Outcome	
Title	**ADVANCED FOOD PRODUCTION OPERATIONS –II**
Course Code	SH62A
CO-1	Students will acquire knowledge on different International cuisine with geographical location, Historic back ground, and different recipes
CO-2	Students gain knowledge on Bread fabrication with preparation method and different toppings, icings used in bakery and confectionary department
CO-3	Students will acquire insight about classical frozen dessert
CO-4	Students will interpret knowledge production planning, Budgeting, scheduling and Quality control
CO-5	Students will acquire knowledge on food plating and presentation based on Hotel Industry Students will hone the skills and innovate and create new dishes and standard recipes.
CO-6	Students gain knowledge on Nouvelle cuisine with regional influences

SYLLABUS	
Title	**ADVANCED FOOD PRODUCTION OPERATIONS –II**
Course Code	SH62A
Unit 1	**INTERNATIONAL CUISINE** A. Geographic location B. Historical background C. Staple food with regional Influences D. Specialities Recipes E. Methods of cooking Equipment in relation to: • Great Britain • Italy • Spain & Portugal • Scandinavia • Germany Middle • East • Oriental • Mexican Arabic

Unit 2	**BAKERY & CONFECTIONERY** **ICINGS & TOPPINGS -** Varieties of icings - Using of Icings - Difference between icings & Toppings - Recipes **FROZEN DESSERTS** Types and classification of frozen desserts – Ice Creams – Definitions - Methods of preparation - Additives and preservatives used in Ice-cream manufacture **MERINGUES** Making of Meringues - Factors affecting the stability - Types of Meringues - Uses of Meringues.
Unit 3	**BREAD MAKING:** Role of ingredients in bread making - Bread Faults - Bread Improvers **CHOCOLATE:** History- Sources - Manufacture & Processing of Chocolate - Types of chocolate –White & Dark (Applications) - Tempering of chocolate - Uses of chocolate - Cocoa butter &Ganache.
Unit 4	**PRODUCTION MANAGEMENT** A. Kitchen Organisation B. Allocation of Work – Job Description, Duty Rosters C. Production Planning D. Production Scheduling E. Production Quality & Quantity Control F. Forecasting & Budgeting G. Yield Management **PRODUCT & RESEARCH DEVELOPMENT** A. Testing new equipment, B. Developing new recipes C. Food Trails D. Organoleptic & Sensory Evaluation
Unit 5	**A. STANDARD RECIPE** a) Definition b) Importance of using standardized recipe c) Key components of standardized recipe d) Developing standardized recipe e) Characterized features of standardized recipes f) Procedures to be followed for standardization of recipe **B. NOUVELLE CUISINE** a)Definition b) Father & Founders of Nouvelle cuisine c) Popularity of Nouvelle cuisine d) Effect of regional influences on Nouvelle cuisine e) Equipments used in Nouvelle cuisine

Course Objectives	
Title	**ADVANCED FOOD AND BEVERAGE OPERATIONS- II**
Course Code	SH62B
CO-1	Learn about the food food and beverage staff organization duty roaster and hierarchy
CO-2	Managing food and beverage outlets standard operating procedure
CO-3	They learn about the bar operations types of bar area of birth bar stock maintain records
CO-4	They study about cocktails and mixed drinks all over the world
CO-5	They learn about sales promotion

Course Outcome	
Title	**ADVANCED FOOD AND BEVERAGE OPERATIONS- II**
Course Code	SH62B
CO-1	To introduce the students to the basic of F&B Staff Organization.
CO-2	To teach the students about managing Food and Beverage Outlet.
CO-3	To make them aware of different types of Bar Operations.
CO-4	To teach the students about Cocktails and mixed drinks.
CO-5	To equip the students about the basic knowledge about sales promotion

SYLLABUS	
Title	**ADVANCED FOOD AND BEVERAGE OPERATIONS- II**
Course Code	SH62B
Unit 1	**FOOD&BEVERAGE STAFF ORGANISATION** Categories Of Staff – Hierarchy – Job description and specification – Duty Roaster – Duty Rota's

Unit 2	**MANAGING FOOD AND BEVERGE OUTLET** Supervisory Skills- Developing efficiency- Standard Operating Procedure
Unit 3	**BAR OPERATIONS** Types of Bar- Cocktail, Dispense- Area of Bar- Bar Layout - Front Bar, Back Bar, Under Bar,(Speed Rack, Garnish Container, Ice well etc.) Bar Stock, Bar Control, Bar Staffing- maintaining bar records.
Unit 4	**COCKTAILS & MIXED DRINKS** Definition and history – classification – Recipe, Preparation and service of Popular Cocktails Martini—Dry & Sweet – Manhattan –Dry& Sweet – Dubonnet – Rob-Roy- Bronx – White lady – Pink Lady –Side Catr – Bacardi – Alexandra – John Collins – Tom Collins – Gin Fizz – Pimms Cup no 1,2,3,4,5 – Flips – Noggs – Champagne Cocktail, Between the Sheets, Daiquiri, Bloody Mary, Screw Driver, Tequila Sunrise, Gin-Sling, Planters Punch, Singapore Sling, Pinacolada, Rusty Nail, B&B, Black Russian, Margarita, Gimlet – Dry &Sweet, Cuba Libre, Whisky Sour, Blue Lagoon, Harvey Wall Banger, Bombay Cocktail – innovative cocktails
Unit 5	**SALES PROMOTION** Food festivals- loyalty programs - Wine dinners or whisky dinners -Happy hours (ladies night, DJ night)- Corporate discounts - social media, partnership with home delivery services.

Course Objectives	
Title	**FRONT OFFICE MANAGEMENT**
Course Code	SH62C
CO-1	They study a about yield management software
CO-2	They get knowledge on timeshare resort condominium
CO-3	They get knowledge on concept benefits strategies of yield management
CO-4	They learn about marketing and human resources
CO-5	They get knowledge on social media marketing

Course Outcome	
Title	**FRONT OFFICE MANAGEMENT**
Course Code	SH62C
CO-1	Different PMS (Micros, Fidelio, IDS, Shawman, Opera
CO-2	Yield management strategies in case of high and low demand periods
CO-3	Classification on the basis of ownership
CO-4	Process the conception, pricing, promotion, and distribution of ideas, goods and services in the industry
CO-5	HR challenges in the hospitality industry
CO-6	Realize the current and future in FO activities

SYLLABUS	
Title	**FRONT OFFICE MANAGEMENT**
Course Code	SH62C
Unit 1	Yield management Concept of yield management, Benefits of yield management, Strategies used for increasing revenue of a hotel, measuring yield (formulas)
Unit 2	Yield management software Elements of yield management Yield management software, Yield management team and meeting
Unit 3	**Timeshare, Condominium, AIDRA:** Definition and types of Timeshare options, advantages and disadvantages of timeshare business, Exchange companies, Resort condominium international, AIDRA advantages, Role of government and industry
Unit 4	Marketing &Human Resources: Marketing: Introduction to marketing – Basic concepts in marketing, Market segmentation, Sales in marketing of

	hospitality products, Sales and marketing team and techniques,Role of FO personnel in maximizing revenue, HR: HRM planning, HR development, Job analysis, recruitment, selection, orientation and training, HR challenges
Unit 5	**Social media marketing:** Creating a Face book page, Business opportunities and Instagram options , Business tools on LinkedIn, business accounts on YouTube, whatsapp marketing

Course Objectives	
Title	**APPLICATION OF COMPUTERS**
Course Code	SH661
CO-1	They learn about the basics of computer data processing concepts
CO-2	They get knowledge and hardware and software concepts
CO-3	They learn about operating software
CO-4	The study about networks
CO-5	They get knowledge on Internet

Course Outcome	
Title	**APPLICATION OF COMPUTERS**
Course Code	SH661
CO-1	The learners will understand the evolution of computer and application in business industry
CO-2	Identify categories of programs, system software and applications. Organize and work with files and folders
CO-3	The learners will get knowledge about Operating system enables you to solve complex, challenging problems in data operation.
CO-4	They can able to analysis and use network devices
CO-5	They learners will learn the Internet Concepts and use internet technology wisely.

SYLLABUS	
Title	**APPLICATION OF COMPUTERS**
Course Code	SH661
Unit 1	**INTRODUCTION TO COMPUTERS** Computer, generations of computers, advantages and disadvantages of computer, Classification of Computers, - Data Processing Concepts - Role of Computers in Society
Unit 2	**- HARDWARE AND SOFTWARE CONCEPTS** Components of a Computer - Data Entry Devices - Data Output Devices, Primary and Secondary Storage Concepts - Definition of software, types of software -System Software - Application Software - Language Classification - Compilers and Interpreters
Unit 3	**OPERATING SYSTEM:** Operating System, Fundamentals Of OS, Basics Of MS-DOS, Internal Commands-External Commands, Basics Of Windows Operating System Features their Functions
Unit 4	**NETWORKS:** Features of Network - Data Communication Channel- Network Topology: Bus, Star, Ring- Network Applications - Types of Network: LAN, MAN, WAN.
Unit 5	**INTERNET**Introduction- Basic Internet Service, Uses Of Inernet, Components Of World Wide Web, Internet Security,Intranet – Email – Internet Security-Hospitality Portal.

Course Objectives	
Title	**HACCP**
Course Code	SH662
CO-1	Learn about food safety and security authority of India
CO-2	They get knowledge on food safety and standard act procedures licence
CO-3	They learn about potential benefits disadvantages and advantages of FSSAI
CO-4	They learn about the HACCP roles functions principles and relevant standards
CO-5	They get knowledge on critical control points record keeping monitoring and corrective action

Course Outcome	
Title	**HACCP**
Course Code	SH662
CO-1	To understand the basic concept of food safety in National (FSSAI) & International standards (HACCP)
CO-2	To understand the different types of food safety and standards Act
CO-3	To understand about the international food safety standards , HACCP
CO-4	To determine the relationship of HACCP with other relevant national and international management

SYLLABUS	
Title	**HACCP**
Course Code	SH662
Unit 1	FSSAI – Introduction - Food Laws- Role – Functions – Initiatives
Unit 2	FSSAI - The Food Safety and Standards Acts – Food safety and standard regulations – Procedures -license – Procedure to get FSSAI

Unit 3	FSSAI – Potential Benefits – Advantages & Disadvantages – Develop & Maintain
Unit 4	HACCP – Role – Functioning – Principles - Relationship with other relevant standards - HACCP Terminology
Unit 5	Critical Control Points - Critical limits - Monitoring - Corrective Action- Verification- Record Keeping- Advantages & Disadvantages – New Normal – Standard operating Procedures followed in Kitchens, Food & Bevarage Service Outlets, Front Office & House Keeping Areas (Corridors, Rooms & Public Areas)

Course Objectives	
Title	**APPLICATION OF COMPUTER LAB**
Course Code	SH624
CO-1	Ms office
CO-2	Ms excel
CO-3	Ms PowerPoint
CO-4	Ms access
CO-5	

Course Outcome	
Title	**APPLICATION OF COMPUTER LAB**
Course Code	SH624
CO-1	Recognize when to use each of the Microsoft Office programs to create professional and academic documents.
CO-2	Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards.

SYLLABUS	
Title	**APPLICATION OF COMPUTER LAB**
Course Code	SH624
Unit 1	**MS OFFICE:** Creating a new document, opening existing documents, saving and editing a document. 1. Usage of header and footer 2. Adding background pictures & aligning 3. Paragraph alignment, adding borders in paragraph 4. Inserting pictures and clipart in a document
Unit 2	**MS EXCEL:** 1. Creating new worksheet, cell editing 2. Data Sorting 3. Data Filtering 4. Inserting charts in excel sheet 5. Performing different built in functions
Unit 3	**MS POWERPOINT:** 1. Presentation Basics 2. Insert Picture and Clip Art 3. Working with Charts 4. Working with Tables Slide Effects
UNIT 4	**MS ACCESS:**
	1. Creation of database, designing a database. 2. Adding new tables in a database
	3. Inserting foreign key and primary key to each table. 4. Creating relationship between tables. 5. Performing functions in a table

Course Objectives	
Title	
Course Code	
CO-1	Practical menus
CO-2	Practical menus

Course Outcome	
Title	***.ADVANCED FOOD PRODUCTION OPERATIONS LAB*** –I
Course Code	SH621
CO-1	• Students will gain knowledge on classic French cuisine which includes method of preparation, standard recipes and plating techniques.
CO-2	• Students will acquire knowledge on food safety and personal Hygiene during the course of practical.
CO-3	• Students will hone the skills and innovate and create new dishes and standard recipes.
CO-4	• Students gain knowledge in handling different large kitchen equipments.

SYLLABUS	
Title	*.ADVANCED FOOD PRODUCTION OPERATIONS LAB* –I
Course Code	SH621
Unit 1	**PART "A" – COOKERY** **MENU 01** Consommé Carmen • Poulet Sauté Chasseur • Pommes Loretta • Haricots Verts **MENU 02** • Bisque D'écrevisse • Escalope De Veauviennoise • Pommes Batailles • Epinards au Gratin **MENU 03** Crème Du Barry • Darne De Saumon Grille • Sauce paloise • Pommes Fondant • PetitsPois A La Flamande **MENU 04**

- Veloute Dame Blanche
- Cote De Porc Charcuterie
- Pommes De Terre A La Crème
- Carottes Glace Au Gingembre

MENU 05

- Cabbage Chowder
- Poulet A La Rex
- Pommes Marguises Ratatouille

MENU 06

- BarquettesAssortis
- Stroganoff De Boeuf
- Pommes Persilles
- Riz Pilaf

.MENU 07

- Duchesse Nantua
- Poulet Maryland
- Croquette Potatoes
- Banana fritters Corn gallets

MENU 08

- Vol-Au-Vent De Volaille Et Jambon
- Poulet a la kiev
- Creamy Mashed Potatoes
- Butter tossed green peas

MENU 09

- Quiche Lorraine
- Roast Lamb
- Mint sauce
- Pommes Parisienne

MENU – 10 (Demonstration)

- Cold Buffet
- Buffet Desserts
- Bread Displays

Unit 2 PART "B" – BAKERY & PATISSERIE

MENU – 01

- Brioche
- Baba au Rhum
- Doughnuts

MENU - 02

- Soft Rolls
- Chocolate Eclairs
- Chocolate Brownie

MENU - 03

- French Bread
- TarteTartin
- Muffins

MENU - 04

- Garlic Rolls
- Crêpe Suzette
- Charlotte Royal

MENU- 05

- Lavash
- Chocolate Cream Puffs
- Herb & Potato Loaf

MENU- 06

- Foccacia
- Crème Brûlée

MENU -07

- Vienna Rolls
- Mousse Au Chocolate

MENU – 08

- Hardrolls
- SouffleMilanaise

MENU – 09

- Brown Bread
- Apple Pie

MENU -10

- Milk Bread
- Ciabata
- Savarin des fruits

MENU -11

- Demonstration of Buffet desserts

Modern Plating Styles

SYLLABUS	
Title	*.ADVANCED FOOD PRODUCTION OPERATIONS LAB* –I
Course Code	SH621
Unit 1	**CHINESE** **MENU 01** • Sweet corn vegetable Soup • Spring roll • Chicken in Hot Garlic sauce • Hakka Noodles • Szechwan fried rice **ITALY** **MENU 02** • Minestrone soup • Ravioli Arrabbiata • Penne alfredofunghi • PolloAlla Cacciatore • MelanzaneParmigiane **ARABIC** **MENU 03** • Hummus • Fattush • Falafel • Kushari with dakoos • DejajMeshwi • Um ali **MEXICAN** **MENU 04** • Chicken Enchilada

- Vegetable Quesadillas
- Lamb Burritos
- Beef Tacos
- Chicken Fajitas
- Potato Na

KOREAN
MENU 05
- Spinach Pan cakes
- Kimchi Salad
- Chicken & Rice Poridge
- Bibimbab

THAI
MENU 06
- Chicken Satay with Peanut Sauce
- Tom Yum Soup
- Chicken Massaman curry with steamed rice
- Mussaman vegetable curry

SPAIN
MENU 07
- Gazpacho
- Paella
- PatatasBravas
- Empanadas
- Tortilla Española
- Albondigas

GREEK
MENU 08
Dolmadakia
Choriatiki
Moussaka A La Greque
Tzaziki

GREEK MEATBALL
MENU-09
DEMONSTRATION OF
Charcuterie Galantines
Pate
Terrines
Mousselines

	New Plating Techniques
Unit 2	**BAKERY PRACTICAL** **Menu – 1** Grissini Tiramisu **Menu – 2** Bread Sticks Apple Strudel **Menu – 3** Crossiants Black Forest Cake **Menu – 4** Pizza base Honey Praline Parfait **Menu – 5** Danish Pastry Cold Cheese Cake **Menu – 6** Soup Rolls Chocolate Truffle cake **Menu – 7** Ginger Bread Blancmange **Menu – 8** Cinnamon & Raisin Rolls SouffleChaudVanille **Menu – 9** Fruit Bread Plum Pudding **Menu – 10** Demonstration of Meringues Icings &Topings Demonstration of Wedding Cake - Ornamental cakes

Course Objectives	
Title	**ADVANCED FOOD & BEVERAGE OPERATIONS LAB – I**
Course Code	SH622
CO-1	Practical Sessions
CO-2	Practical Sessions

Course Outcome	
Title	**ADVANCED FOOD & BEVERAGE OPERATIONS LAB – I**
Course Code	SH622
CO-1	To introduce the students to the basic of Planning and Operating various F & B Outlet.
CO-2	To teach the students about Banquets, Banquets protocols.
CO-3	To make them aware of different types of Buffets.
CO-4	To teach the students about Gueridon Service.
CO-5	To equip the students about the basic knowledge about Kitchen Stewarding.

SYLLABUS	
Title	**ADVANCED FOOD & BEVERAGE OPERATIONS LAB – I**
Course Code	SH622
Unit 1	**Task** **Planning &Operating Food &Beverage Outlets** Classroom Exercise Developing Hypothetical Business Model of Food &Beverage Outlets
Unit 2	**Task** **Function Catering–Banquets** Planning &organizing Formal &Informal Banquets Planning & organizing outdoor caterings
Unit 3	**Task** **Function Catering–Buffets** Planning &organizing various types of Buffet
Unit 4	**Task** **Gueridon Service** Organizing Mise-en-place for Gueridon Service - Dishes involving work on the GueridonTask-01 Crepe suzette Task-02 Banana au Rhum Task-03 Peach Flambé Task- 04 Rum OmeletteTask-05 Steak Diane Task-06 Pepper Steak

Unit 5	**Task** **Kitchen Stewarding** Using &operating Machines-Exercise– physical inventory

Title	**FRONT OFFICE MANAGEMENT LAB**
Course Code	SH623
CO-1	components of yield management
CO-2	timeshare and vacation ownership concept

Course Outcome	
Title	**FRONT OFFICE MANAGEMENT LAB**
Course Code	SH623
CO-1	Identify the yield management concept
CO-2	Perceive the components of yield management
CO-3	Acknowledge the timeshare and vacation ownership concept
CO-4	Acquire knowledge in basic concepts of marketing
CO-5	Apprehend the fundamentals of HRM
CO-6	Develop new and upcoming techniques introduced in FO department

SYLLABUS	
Title	**FRONT OFFICE MANAGEMENT LAB**
Course Code	SH623
Unit 1	• Hands on practice of computer application (Hotel Management System) related to front office procedures such as • Night audit, • Income audit, • Accounts • Yield Management

	Situation handling – handling guests & internal situations requiring management tactics/strategies

Course Outcome	
Title	**PROJECT AND VIVA VORCE**
Course Code	SH6EQ
CO-1	**Students shall contact the respective Department for doing Project**

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 60204

DEPARTMENT OF COMMERCE(P.G.)

Program :Master of commerce

Program Outcomes	
	On Completion of Program the students will able to
PO-1	Enable preparation of books of accounts, cost sheets, and balance sheets via accounting application software
PO-2	Apply various Provisions of company and Business Laws and IRDA
PO-3	Fundamentals of Taxation, Auditing and Budgeting
PO-4	Application statistical tools for research
PO-5	Understand the various functions of business Management-Finance, HR, Marketing's & Systems
PO-6	Knowledge on prevailing issues in the financial markets and e-commerce
PO-7	Outline computation of national income and status of Indian economy
PO-8	Understanding the role of entrepreneurship and entrepreneurial agencies
PO-9	Awareness about business environment and ethics
PO-10	Comprehension of English, regional and foreign languages

Program Specific Outcomes	
	On Completion of Program the students will able to
PSO-1	Develop an ability to apply knowledge acquired in problem solving
PSO-2	Ability to work team with enlarged interpersonal skills and communications.
PSO-3	The students can work in different domines like Accounting, Taxation, HRM, Banking and Operations
PSO-4	To develop team work,leadership,Managerial& Administrative skills
PSO-5	To enable the students to understand the world of commerce.

Course Objectives	
Title	**Advanced Corporate Accounting and Accounting Standards**
Course Code	**KDA1E**
CO-1	To impart knowledge on corporate accounting methods and procedures
CO-2	To develop skills in the preparation of accounting statements and in their analysis.
CO-3	To families in the schedule number relating banking industries while preparing financial statement
CO-4	Calibrate the procedure involved in amalgamation and companies
CO-5	Explain the implications and unethical accounting practices on the society.

Course Outcome	
Title	**Advanced Corporate Accounting and Accounting Standards**
Course Code	**KDA1E**
CO-1	To provide the knowledge of issue of shares and along with regulations of companies.
CO-2	Construct the financial statement within the framework of AS.
CO-3	Construct the financial statement within the framework of AS.
CO-4	Reconstruct the capital structure as financial statement of joint stock company.
CO-5	Evaluate the reconstructing of capital structure of public company.
CO-6	Develop the procedure imposed in amalgamation of absorption.
CO-7	Illustrate the implications of unethical accounting practices on the study.

Syllabus	
Title	**Advanced Corporate Accounting and Accounting Standards**
Course Code	**KDA1E**
Unit 1	Advanced problems in share capital and debenture transactions including underwriting - Valuation of goodwill and shares
Unit 2	Acquisition, Amalgamation, absorption and reconstruction (internal and external) schemes - Statements for liquidation of companies
Unit 3	Consolidated final statement of Holding companies and subsidiary companies –inter- company holdings and owings -treatment of dividends
Unit 4	Final statements of banking companies and insurance companies Accounting for price level changes -Social responsibility accounting -Human resources Accounting.
Unit 5	Basic postulates of accounting theory and generally accepted accounting principles and practices recommended by the ICAI -Mandatory Accounting Standards (AS) issued by the ICAI

Course Objectives	
Title	**Financial Management**
Course Code	KDAIB
CO-1	To impart the basics of Financial Management for the benefit of Commerce students.
CO-2	To enable the students to know the concepts of the Investment, Financing and Working Capital.
CO-3	At the end of syllabus students will understand the basics of financial management, investing, financing and dividend decisions.
CO-4	To provide an overview of financial management in banking sector.
CO-5	To explain the basis of working capital financing.

Course Outcome	
Title	**Financial Management**
Course Code	KDAIB
CO-1	To learn theoretical foundation of financial management decisions.
CO-2	To families the theories of Capital structure and concept of cost of capital.
CO-3	To provide basic knowledge about working capital management.
CO-4	To evaluate feasibility of various investment options.
CO-5	Students would able to gain knowledge above how to handle finance.

Syllabus	
Title	**Financial Management**
Course Code	KDAIB
Unit 1	Functions of manager – methods and sources of raising finance – sources of short term and longterm finance – critical appraisal of different securities and bonds as source of finance – equity shares – convertible and non-convertible debentures – preferred stock - Objectives / goals of finance function - financing decisions -investment decision -importance of financial planning -problems in financial forecasting
Unit 2	Capital Structure decisions -Traditional and MM approaches -current views -determinants - capital structure- overtrading-over and under capitalization -leverage analysis EBIT -EPS analysis
Unit 3	Cost of capital measurement WACC-MCC and value of the firm - factors influencing dividend policy of firm -dividend relevancy - company law provisions on dividend payment.
Unit 4	Investment decisions -risk -required rate of return -estimating cash flows -present value of cash flows -evaluation of alternative investment proposals -sensitivity analysis -simulation -decision making under conditions of risk and uncertainty -inflation and investment decisions.
Unit 5	Working capital management -working capital cycle - forecasting of working capital requirement - factors influencing working capital- different components -inventory -cash - receivables -credit policies –collection policies

Course Objectives	
Title	**Organizational Behaviour**
Course Code	KDAIC
CO-1	To provide knowledge on employees' behaviour and their managerial implications
CO-2	To impart knowledge on organizational dynamics
CO-3	To enhance work result of the organisation in the present scenario
CO-4	To facilitate a critical evaluation of organisational practices.
CO-5	To help students understand their impact on work behaviour attitudes and performance.

Course Outcome	
Title	**Organizational Behaviour**
Course Code	KDAIC
CO-1	To familiarize the students about the concept of organisational behaviour and its application.
CO-2	To understand the concept of personality and perception.
CO-3	To study the various theories governing leadership and motivation.
CO-4	To gain knowledge in group behaviour.
CO-5	To know about the culture and management of stress.

Syllabus	
Title	**Organizational Behaviour**
Course Code	KDAIC
Unit 1	Introduction to Organizational Behaviour - Meaning - Elements - Need - Approaches - Models-Global Scenario.
Unit 2	Individual Behaviour - Personality - Learning - Attitudes - Perception - Motivation - Relevance to Organizational Behaviour - Group behaviour - Group Dynamics - Group Norms - Group Cohesiveness - Their relevance to Organizational Behaviour
Unit 3	Organizational communication - Meaning, Importance, Process, Barriers - Methods to reduce barriers - Principles of effective communication - Stress - Meaning - Types - Stress management
Unit 4	Organizational Dynamics - Organizational Effectiveness - Meaning, Approaches - Organizational Culture - Meaning, Significance - Organizational Climate - Implications on Organizational Behaviour
Unit 5	Organizational change - Meaning - Resistance to change - Management of change

Course Objectives	
Title	**Managerial Economics**
Course Code	KDAIG
CO-1	To offer expertise and knowledge on the application of economic theories and concepts to business decisions
CO-2	To gain knowledge on production demand and supply concepts
CO-3	To assess the relationship between short and long run production cost.
CO-4	To understand the choices made by a rational consumer.
CO-5	To explain the relationships between production and costs.

Course Outcome	
Title	**Managerial Economics**
Course Code	KDAIG
CO-1	Apply the concepts of managerial decision making to choose the product life cycle.
CO-2	Gain the knowledge of demand and supply chain in combination of products to be produce.
CO-3	Develop and forecast evaluation of cost of the product
CO-4	Gain knowledge on methods of pricing
CO-5	Discuss optimization and utility including consumer behaviour.

Syllabus	
Title	**Managerial Economics**
Course Code	KDAIG
Unit 1	The Scope and Methods of Managerial Economics -Risk - uncertainty and probability analysis - Approach to managerial decision making and the theory of firm.
Unit 2	Demand analysis, basic concepts and tools of analysis for demand forecasting, use of business indicators; demand forecasting for consumer goods, Consumer durable and capital goods
Unit 3	Concepts in resource allocation, cost analysis; breakeven analysis, short run and long run cost functions; production function: cost -price -output relations -Capital investment analysis - Economics of size and capacity utilization input -output -analysis
Unit 4	Market structure, Pricing and output; general equilibrium. Product policy,rates, promotion and market strategy -Advertising rates model- Advertisement budgeting
Unit 5	Pricing objectives -pricing methods and approaches - Product line pricing -Differential pricing - Monopoly policy restrictive agreements -Price discrimination - Measurement of economic concentration -Policy against monopoly and restrictive trade practices.

Course Objectives	
Title	**Advanced Cost and Management Accounting**
Course Code	**KDA2A**
CO-1	To impart knowledge on cost and management accounting techniques
CO-2	To develop the skills of students in the preparation of cost and management accounting statements
CO-3	To enable the students to get knowledge about the various techniques of Management Principles.
CO-4	To make the students to get practical skill in solving management problems.
CO-5	Understand the primary purpose of management accounting namely financial statement analysis and budgetary control
CO-6	Develop and apply budget for planning and controlling purpose.

Course Outcome	
Title	**Advanced Cost and Management Accounting**
Course Code	KDA2A
CO-1	Helps to understand the basic concept of managerial principle techniques.
CO-2	Help to analyse financial statement.
CO-3	To evaluate financial position of company by using ratio analysis.
CO-4	Fund flow statement helps to schedule working capital changes in business concern.
CO-5	Describe various budgets in several departments.

Syllabus	
Title	**Advanced Cost and Management Accounting**
Course Code	KDA2A
Unit 1	Installation of costing system -records required to be maintained under the Companies Act - management control and information system -cost reduction and cost control techniques -control over wastages, scrap, spoilage and defectives
Unit 2	Costing methods -product costing -process costing -treatment of equivalent units -inter - process profit- JIT costing -Activity based costing
Unit 3	Budgets and Budgeting control- Flexible Budgets, Zero Base Budgets
Unit 4	Cost Volume Profit Analysis -decision making -make or buy, own or lease, repair or renovate, changes V s. Status quo, sell or scrap, export V s. local sales, shut down or continue. Responsibility Accounting and Transfer Pricing -Measurement of Segment Performance
Unit 5	Financial Statement analysis -Ratio analysis -Funds / Cash flow statement

Course Objectives	
Title	**Quantitative Techniques for Business Decision**
CO-1	To provide knowledge in quantitative methods and applica-tions
CO-2	To offer expertise in quantitative analysis
CO-3	To be able to perform statistical Analysis on his own.
CO-4	To enable better reporting for decision making.
CO-5	To orient the students to various hypotheses testing methods as to how and where appropriately they can be applied

Course Outcome	
Title	**Quantitative Techniques for Business Decision**
Course Code	KDA2B
CO-1	To enable the students to know the scientific approach to decision making
CO-2	Determining the most profitable distribution pattern
CO-3	Helps to solve technical problems in business management.
CO-4	Helps to realise the importance of mathematical techniques in problem solving resources.
CO-5	Apply the concepts of probabilistic distributions in solving problems.

Syllabus	
Title	**Quantitative Techniques for Business Decision**
Course Code	KDA2B
Unit 1	Theory of probability -probability rules-Baye's theorem - Probability distribution -Binomial, Poisson and Normal. Statistical decision theory -Decision environment - decision making under certainty and uncertainty and risk conditions -EMV, EOL and marginal analysis -value of perfect information - decision tree analysis
Unit 2	Sampling-Meaning of random sample -sampling methods -sampling error and standard error relationship between sample size and standard error Sampling distribution - characteristics- central limit theorem -estimating population parameters - point and interval estimates - estimating proportion, percentage and mean of population from large sample and small sample.
Unit 3	Testing hypothesis -testing of proportions and means - large samples -small samples -one tailed and two tailed tests -testing differences between mean and proportions - errors in hypothesis testing -chi square distribution - characteristics -applications -test of independence and tests ofgoodness of fit - inferences -F distribution- testing of population variance- analysis of variance -one way and two way.

Unit 4	Correlation and regression -Simple, partial and multiple correlation -simple, partial and multiple regressions -estimation using regression line -standard error of estimate -testing significance of correlation and regression coefficients -interpreting correlation -explained variation and unexplained variation -coefficient of determination- multivariate analysis -factor, cluster and discriminant analysis
Unit 5	Linear programming graphic and simplex models -maximization and minimization - transportation -Assignment

Course Objectives	
Title	**Marketing of Services**
Course Code	KDA2C
CO-1	To provide specialized knowledge on marketing skills for service sector
CO-2	To expose students to marketing practices in service sector
CO-3	To facilitate the students to understand the importance and the relevance of marketing in to- day's Business world
CO-4	To enable the students to understand the features of the Indian Marketing.
CO-5	To understand the basic concepts of Marketing, Market Segmentation, Marketing Mix and Recent trends in Marketing.

Course Outcome	
Title	**Marketing of Services**
Course Code	KDA2C
CO-1	Understand the concept of services and intangible products and to expose marketing services.
CO-2	Discuss the relevance of the services industry and marketing strategies.
CO-3	Examine the pricing of services,problems in quality and innovations in services.
CO-4	Analyse the role and relevance of quality in services, marketing of insurance and mutual funds.
CO-5	Visualise future changes in the services industry relationship marketing and customer satisfaction.

Syllabus	
Title	**Marketing of Services**
Course Code	KDA2C
Unit 1	Nature and classification of services -Characteristics of services and their marketing implications
Unit 2	Marketing strategies for service firms -with special reference to information, communication, consultancy, advertising, professional services, after -sales service, recruitment, training and tourism
Unit 3	Product support services -pricing of services -problems of quality -innovations in services
Unit 4	Marketing of financial services -nature- types -marketing of insurance -mutual fund - marketing for non-profit firms.
Unit 5	CRM & Relationship Marketing -Customer Satisfaction

Course Objectives	
Title	**Total Quality Management**
Course Code	KDAXA
CO-1	To provide expert knowledge in the emerging Total Management techniques
CO-2	To build conceptual clarity and skill of concept applica-tions
CO-3	Gain knowledge on quality assessment.
CO-4	To understanding the process of managing quality and services.
CO-5	This course is designed to provide a valuable perspective for future business managers.

Course Outcome	
Title	**Total Quality Management**
Course Code	KDAXA
CO-1	To realized the importance of significance of quality of the management.
CO-2	Student would able to manage the quality improvement in different departments.
CO-3	To Identify the requirements of quality improvement programs among workers.
CO-4	To apply and gain the knowledge of sampling Techniques in assessment of manufacture sector.
CO-5	Students would able to understand the basic concept of ISO and its importance in Quality circle.

Syllabus	
Title	**Total Quality Management**
Course Code	KDAXA
Unit 1	Introduction to Quality Control - Quality and Cost Considerations - Statistics and its Applications in Quality Control.
Unit 2	Sampling Inspection in Engineering Manufacture- Statistical Quality Control by the Use of Control Charts- Methods of Inspection and Quality Appraisal - Reliability Engineering - Value Engineering and Value Analysis
Unit 3	Theory of Sampling Inspection - Standard Tolerancing - ABC Analysis - Defect Diagnosis and Prevention.
Unit 4	Recent Technique for Quality Improvement - Zero Defect - Quality Motivation Techniques - Quality Management System and Total Quality Control
Unit 5	Selection of ISO Model ad Implementation of ISO 9000 - Human Resource Development and Quality Circles - Environmental Management System and Total Quality Control.

Course Objectives	
Title	**Research Methodology**
Course Code	**KDA3A**
CO-1	To provide knowledge on research methods, techniques and the process.
CO-2	To develop skills in the application of research methods for business problem solving.
CO-3	Gain knowledge in preparation of thesis in future.
CO-4	To equip learners with basic tools and techniques of re-search.
CO-5	To introduce students to the challenges of research in the modern times.

Course Outcome	
Title	**Research Methodology**
Course Code	**KDA3A**
CO-1	To Understand meaning of research identification and formulation of research problem.
CO-2	To Create Hypothesis and Testing.
CO-3	To Understand the research design
CO-4	To Understand the different sampling and data collection
CO-5	To apply report writing and drafting of report.

Syllabus	
Title	**Research Methodology**
Course Code	**KDA3A**
Unit 1	Research -Meaning and purpose -types of research -Pure and applied, survey, case study experimental, exploratory -Research Design -Steps in selection and formulation of research problem-steps in research -review of literature
Unit 2	Formulation of Hypothesis- Types, sources -Testing -sampling techniques- sampling error and sample size
Unit 3	Methods of data collection -Primary and secondary data -observation -interview - questionnaire -construction of tools for data collection -testing validity and reliability -pilot study andpre-testing.
Unit 4	Processing and analysis of data -editing -coding -transcription- tabulation -outline of statistical analysis -descriptive statistics -elements of processing through computers -packages for analysis.
Unit 5	Report writing -target audience -types of reports -contents of reports - styles and conventions in reporting -steps in drafting a report.

Course Objectives	
Title	**Knowledge Management**
Course Code	KDA3A
CO-1	To provide knowledge on understanding managing human resources in organization
CO-2	To provide an exposure on the knowledge management tools
CO-3	To provide an overview of benefits,challenges and issue in management of knowledge in an organisation.
CO-4	To understand the future of knowledge management and industry perspective.
CO-5	To understand the bench marking and knowledge management.

Course Outcome	
Title	**Knowledge Management**
Course Code	KDA3A
CO-1	Use a Framework and a clear language for knowledge Management concept.
CO-2	Identify and evaluate Major KM issues such as Ethics and knowledge sharing incentives.
CO-3	Describe the Knowledge Management major roles and responsibilities & implementation.
CO-4	Identify Key tools and techniques used in knowledge Management Techniques and applications.
CO-5	Apply the concept of KM in Concern To sever in organisation.

Syllabus	
Title	**Knowledge Management**
Course Code	KDA3A
Unit 1	Knowledge Economy – Technology and Knowledge Management – Knowledge Management Matrix – Knowledge Management Strategy – Prioritizing knowledge strategies – knowledge as a strategic assets.
Unit 2	Knowledge Attributes – Fundamentals of knowledge formation – Tacit and Explicit knowledge– Knowledge sourcing, abstraction, conversion and diffusion.
Unit 3	Knowledge Management and organizational learning, architecture – important considerations – collection and codification of knowledge – Repositories, structure and life cycle – Knowledge Management infrastructure – Knowledge Management applications – Collaborative platforms.
Unit 4	Developing and sustaining knowledge culture – Knowledge culture enablers – implementing knowledge culture enhancement programs – Communities of practice – Developing organizational memory.
Unit 5	Knowledge Management tools, techniques – Knowledge Management and measurements – Knowledge audit – Knowledge careers – Practical implementation of Knowledge management systems – Case studies.

Course Objectives	
Title	**Fundamentals of Information Technology**
Course Code	KDA31
CO-1	To offer basic skills in computer applications and to develop working knowledge on business related software

Syllabus	
Title	**Fundamentals of Information Technology**
Course Code	KDA31
Unit 1	Introduction to Computer -Classification of Digital Computer System- Computer Architecture - Number - Compliments -Logic Gates -Truth Table -Boolean Algebra -Table Simplification of Boolean Function
Unit 2	Introduction to Computer Software -'C', DBMS, RDBMS - Implementing Number Sorting, Matrix Addition, Multiplication, Palindrome Checking, Searching an Element an Arrzay
Unit 3	MS- WORD -Creating Word Document -Editing Text -Adding and Formatting Numbers - Symbols -Getting into Print -MS-EXCEL -Creating Tables Using EXCEL -Using Tables and Creating Graphs -MS-ACCESS -Planning and Creating Tables - forms -Modifying Tables -Creating relational Database- Form Design- Reports -MS-POWERPOINT -Preparing Power Point Presentation for Marketing Products such as CREDIT CARD, Newly Introduced Cosmetic item etc.,
Unit 4	Introduction to Internet -Resources of Internet -Hardware and Software Requirement of Internet -Internet Service Providers - Creating an E-Mail Account-Sending and Receiving Messages with Attachments to our friends account -Multimedia and its Applications
Unit 5	Application software -Accounting packages- Statistical packages -Preparation of financial statements and statistical analysis

Course Objectives	
Title	**Business Ethics, Corporate Governance & Social Responsibility**
Course Code	KDAXB
CO-1	To develop an understanding among students on ethical issues in business and good governance practices
CO-2	To impart skills of analysis and capability of making business decisions.
CO-3	To recognize organizational challenges to ethical behaviour.
CO-4	To study corporate governance and corporate restructuring.
CO-5	To provide an overview of social responsibility.

Course Outcome	
Title	**Business Ethics, Corporate Governance & Social Responsibility**
Course Code	KDAXB
CO-1	The students will be familiarized with the concept of corporate governance and the role and importance of its stakeholders.
CO-2	The students will also be able to appreciate the principles, Theories and Models of corporate governance.
CO-3	Familiarized with the legislative framework of corporate governance in India.
CO-4	The students are familiarized with the concept of corporate social responsibility and issues relating to corruption, code of ethics and environment.
CO-5	Students will be able to understand the business ethics.

Syllabus	
Title	**Business Ethics, Corporate Governance & Social Responsibility**
Course Code	KDAXB
Unit 1	Concept of ethics - sources -- values - codes of conduct - what is an ethical issue? - Ethical theory and its applications to business/morality and ethical theory – Ethical management - love and reverence in work and life - strengthening personal and organizational integrity - the spiritual core of leadership.
Unit 2	Advertising and information disclosures - environmental responsibility - ethics and ecology - employee rights - conflict of interests - work ethics - professional ethics and responsibility.
Unit 3	Corporate Social Responsibility (CSR) - meaning - promoting corporate responsiveness - managing socially responsible business
Unit 4	Corporate Governance – Meaning and scope -– Origin- Practices – Shareholders Vs. Stakeholders approach –Board mechanism, Role and duties of the directors-Chairman-Governance committees
Unit 5	Codes of governance –Birla committee report

Course Objectives	
Title	**Management Information Systems**
Course Code	**KDA4A**
CO-1	To offer in depth knowledge on information systems in business and their management
CO-2	To assess the impact of internet and technology in E-Commerce.
CO-3	To describe the role of information technology and decision support system in business.
CO-4	To enable the students to use information to assess the impact of internet.
CO-5	To provide theoretical models used in database management system to answer business questions.

Course Outcome	
Title	**Management Information Systems**
Course Code	**KDA4A**
CO-1	To Understanding the MIS gathers data from multiple online systems, analysis the information, reports data.
CO-2	To analysis DBMS is system software for creating and managing database
CO-3	Student would able to system survey needs analysis, design. Implementation, testing, change and maintenance.
CO-4	To introduce OTPS, or online transaction processing system. Is an equivalent system that online merchant we of e- commerce.
CO-5	To give the various business functions such as production, marketing, finance and personal etc.,

Syllabus	
Title	**Management Information Systems**
Course Code	**KDA4A**
Unit 1	Management Information System – Concept, Need, Strategic role – Evolution of Management Information System – Components of Management Information System – Information flow
Unit 2	Data base management systems – Objectives and Components – Database design – Creation and control – Recent trends in database
Unit 3	Developing information system – Planning, Designing and redesigning – Approaches for system development – System analysis and Design – system Implementation and Maintenance
Unit 4	Transaction processing and Support system – Transaction processing system – Office automation systems – Decision support systems – Executive information systems – Artificial intelligence and Expert systems
Unit 5	Functional Information systems – Production, Finance, Human resource and Marketing – Managing information resources – Information Security – Control & Audit of Information Systems.

Course Objectives	
Title	**Investment Analysis and Portfolio (Theory)**
Course Code	KDA4G
CO-1	To acclimate the students on the concept of Portfolio Management.
CO-2	To facilitate the students to know the techniques of Portfolio Management.
CO-3	To Apply concept of Risk & Return in the markets
CO-4	To develop a strong foundation in portfolio management process and portfolio management theory.
CO-5	To explain the basics of fundamental analysis, technical analysis and portfolio performance measurement.

Course Outcome	
Title	**Investment Analysis and Portfolio (Theory)**
Course Code	KDA4G
CO-1	Students would enable to understand the concept of investment, different types of investments, views of investment and process of investment and apply the theoretical knowledge in investment for selecting the securities**.**
CO-2	Students would understand the types of risk in security market and applying various tools for the valuation of bonds as well as economic indicators to predict the market to some extent.
CO-3	Students would develop the knowledge about the provisions regarding and help in preparation of books of accounts and filing returns under the act.
CO-4	Students would understand about the powers of GST authorities regarding inspection search and seizure.
CO-5	Apply the basic understanding about the customs law in India.

Syllabus	
Title	**Investment Analysis and Portfolio (Theory)**
Course Code	KDA4G
Unit 1	Nature and scope of investment management -investment objectives, constraints -factors – investment process -investment management and portfolio management -factors for investment analysis -impact of economic analysis -impact of industrial analysis role of capital markets. Understanding the investment environment -sources of investment information
Unit 2	Approaches to security analysis- market indicators -security price movements -fundamental analysis -technical-analysis -Dow theory -Random walk theory -efficient market hypothesis -various forms of market efficiency and their implications to security analysis- technical analysis Vs. efficient markets hypothesis -common stock analysis -economic analysis -economic indicators -industry analysis
Unit 3	Company analysis components -non financial aspects -financial analysis -financial statement analysis of prospectus -ratio analysis -BPS, dividend yield -payout ratio -ROI, ROCI -Risk return -market risk -interest rat~ risk -purchasing power risk -business risk -financial risk -measurement of risk
Unit 4	Portfolio -portfolio management -portfolio theory -meaning and objectives, traditional and modem portfolio theory. Diversification- Markowitz's approach -portfolio management process- portfolio planning- portfolio analysis-portfolio selection -portfolio evaluation -portfolio revision- various steps involved in the development of portfolio
Unit 5	Capital market theory -assumptions -risk, investors preference -capital asset pricing model (CAPM) -estimating Betas -significance of betas in portfolio theory -securities market line arbitrage pricing theory- options pricing model-put and call-valuation of various options -futures trading - hedging and forward contracts -Indian stock market and the institutional investors.

Course Objectives	
Title	**Merchant Banking and Financial Services**
Course Code	KDA4C
CO-1	To provide conceptual understanding and in depth knowledge of merchant banking services concerning financial markets in India and to provide knowledge of financial services.
CO-2	To enable the students to understand the world of financial services.
CO-3	To facilitate the understanding of the various Financial Services.
CO-4	To facilitate the understanding of the various Financial Services.
CO-5	To understand the various financial services and their future.

Course Outcome	
Title	**Merchant Banking and Financial Services**
Course Code	KDA4C
CO-1	Have a broad understanding of indianfinancial system,merchant banking in India,recent developments on the completion of modules, the students will understand the various financial services.
CO-2	Understanding the role of merchant banker in designing prospectus method IPO method and credit syndication services.
CO-3	Analysing the types of prospectus and law relating to issue management.
CO-4	Discuss the types of understanding SEBI guidelines.
CO-5	Examining the mechanism of depository,credit rating and venture capital.

Syllabus	
Title	**Merchant Banking and Financial Services**
Course Code	KDA4C
Unit 1	Merchant Banking – merchant bankers – corporate counseling – project counseling – pre- investment studies – capital restructuring services – credit syndication – issue management – portfolio management – working capital finance – mergers and acquisition – foreign currency financing – brokering fixed deposits – project appraisal – merchant banking – regulatory framework– SEBI guidelines
Unit 2	**P**ublic issue management – functions – categories of securities issue – issue manager – role of issue manager – activities involved I issue management – marketing of new issue – pure prospectus method – offer for sale method – private placement method – IPO method – rights issue method – bonus issue method – book-building – ESOP – OTCEI – Credit SyndicationServices
Unit 3	Post-issue activities – major activities – steps – factors in public issue proposal – pricing of issues – law relating to issue management – SEBI regulations – Prospectus – information – abridged prospectus – misstatement in prospectus – golden rule – types of prospectus – red-herring prospectus – shelf prospectus – M & A services – Portfolio Management Services
Unit 4	Underwriting – meaning – types – mechanism – benefits and functions – Indian Scenario – underwriting agencies – underwriter – underwriting agreement – SEBI guidelines – Bought-out deals– grey market – capital market instruments – types – preference shares – equity shares – CCPS – company deposits – warrants – debentures and bonds – SEBI guidelines – global debt instruments – indexed bonds – floating rate Bonds – ECBs
Unit 5	Depository receipts – meaning and mechanism – benefits – steps in issue of GDR – IDR – Stock exchange – history – functions – Indian stock exchanges – SEBI regulations – mechanics of settlement – margin trading – stock trading system -0 dealer trading system – NSMS – ISE – INDONEXT – NSE – Financial Services – leasing – hire-purchase finance – bill financing – factoring – consumer finance – real estate financing – credit cards – credit rating venture capital

Course Objectives	
Title	**Indirect Taxes**
Course Code	KDAAE
CO-1	A tax is a compulsory change imposed by the government.
CO-2	Goods to service tax that are GST,SGST,IGST,UTGST.
CO-3	GST assessment proceedisselfassessment.
CO-4	GST Audit is enables its turnover based audit.
CO-5	Customs duty is a tax imposed on imports and exports of government.

Syllabus	
Title	**Indirect Taxes**
Course Code	KDAAE
Unit 1	Basics: Tax Vs Duty; Direct Tax Vs Indirect Tax – Powers of Union/States – Varieties of Indirect Taxes – Movement towards GST
Unit 2	Central Excise: Factors for Levy of Excise Duty – Goods, Excisable Goods, Manufacture, India– First principles of valuation of goods – Types of Excise Duty – Procedure for assessment and payment of Excise Duty – Philosophy of Cenvat –Registration.
Unit 3	Service Tax: Genesis – First Principles of Taxable Service, Negative list, Exemption list, Taxable area, non-taxable area, point of taxation and valuation - Procedure for assessment and payment of Service Tax – Philosophy of Cenvat –Registration
Unit 4	Factors for levy of Customs Duty – First principles of valuation – Procedure for assessment and payment of Customs Duty – Types of Customs Duty – Warehousing – Drawback
Unit 5	Value Added Tax: Salient features of VAT – Sales, Not Sales and Deemed Sales – Goods and Not Goods – Procedure for assessment and payment of VAT – Composition Scheme – Philosophy of Input Tax Credit – Registrations – Glimpses of CST.

Course Objectives	
Title	**Industrial Relations and Labour Welfare**
Course Code	KDABB
CO-1	To offer knowledge on managing industrial relations and the processes, regulations and the authorities regarding industrial relations
CO-2	To make the students aware on the recent amendments to companies Act.
CO-3	To enlighten the students on the provisions governing the company law.
CO-4	The students will gain knowledge on Company Law provisions and amendments.
CO-5	To study the law related to industrial relations and industrial disputes.

Course Outcome	
Title	**Industrial Relations and Labour Welfare**
Course Code	KDABB
CO-1	To understand the concept of ILR.
CO-2	To create awareness among students about the industrial peace and dispute and strikes.
CO-3	To give the students an understanding welfare measure and education and training schemes.
CO-4	To aware about the concept of industrial health, hygine and safety causes of accidents.
CO-5	To examine child labour and to help the students to understand the welfare knowledge.

Syllabus	
Title	**Industrial Relations and Labour Welfare**
Course Code	KDABB
Unit 1	Concepts – Importance - Industrial Relations Problems in the Public Sector- Growth of Trade Unions- Codes of conduct
Unit 2	Disputes – Impact – Causes – Strikes - Prevention – Industrial Peace –Government Machinery- Conciliation – Arbitration – Adjudication.
Unit 3	Concept –Objectives – Scope – Need- Voluntary Welfare Measures – Statutory Welfare Measures- Labour- Welfare Funds- Education and Training Schemes.
Unit 4	Causes of Accidents – Prevention –Safety – Provisions – Industrial Health and Hygiene- Importance – Problems-Occupational Hazards- Diseases – Psychological problems- counselling - statutory provisions
Unit 5	Child Labour – Female Labour- Contact Labour – Construction Labour –Agricultural labour – Disabled – Welfare of knowledge – Social Assistance – Social Security- Implications

Course Objectives	
Title	**Human Resources Accounting and Audit**
Course Code	KDABE
CO-1	To facilitate the students to know about the importance of Human Resources.
CO-2	To make the students to understand the various aspects of the Human Resources Management.
CO-3	Understanding of basic concepts, functions and functioning of Human resource department of theorganisation.
CO-4	To understand the values of human resources in organisations.
CO-5	To familiarises the process and approaches of human resource accounting.

Course Outcome	
Title	**Human Resources Accounting and Audit**
Course Code	KDABE
CO-1	Build an understanding, perspective and appreciation for HR as discipline, process and activity
CO-2	Students come to know after completing this about the various aspects
CO-3	Develop the decision making skills
CO-4	Develop the competency mapping skills,
CO-5	Develop the sense of belongings for the organisation and various HR issues.

Syllabus	
Title	**Human Resources Accounting and Audit**
Course Code	KDABE
Unit 1	HR as assets- Definition of Human Resource Accounting – Introduction to Human Resource Accounting – Human Resource accounting concepts, methods and applications – Human Resources accounting Vs otheraccounting.
Unit 2	Measuring human resource cost -investment in employees- Replacement costs – Determination of Human Resource value – Monetary and non-monetary measurement methods – Return on Investmentapproach
Unit 3	Developing Human Resource Accounting systems – Implementation of Human Resource accounting – Integrated of accounting with other accounting systems – Recent advancements and future directions in Human Resource Accounting
Unit 4	Role of Human Resource audit in business environment - HR Audit objectives – Concepts – Components –Need-benefits – Importance – Methodology- Instruments – HRD scorecard – Effectiveness of as an instrument – Issues in HR audit – Focus of HRD audit.
Unit 5	HRD audit report –Concept –Purpose –Role of HR managers and auditors – Report Design- Preparation of report – Use of Human Resource audit report for business improvement – Case studies.

Course Objectives	
Title	**Consumer Rights and Education**
Course Code	**KDACC**
CO-1	To facilitate the students to understand the importance and the relevance of marketing in to- day's Business world
CO-2	To enable the students to understand the features of the Indian Marketing.
CO-3	To understand the basic concepts of Marketing, Market Segmentation, Marketing Mix and Recent trends in Marketing.
CO-4	To demonstrate how taxes assessed and their purpose.
CO-5	Analyse the rights and responsibilities involved with consumer protection.

Course Outcome	
Title	**Consumer Rights and Education**
Course Code	**KDACC**
CO-1	Student would able to understand marketing concept and environment.
CO-2	Students acquire knowledge about products and channels of distribution.
CO-3	Learn knowledge about promotion.
CO-4	Learn how to fix the product pricing and product mix.
CO-5	Students would able to know CRM concept.

Syllabus	
Title	**Consumer Rights and Education**
Course Code	**KDACC**
Unit 1	Consumer Movement in India Profile of Indian Consumer –Problems of Indian Consumers – Consumerism-ill effects of consumerism/Limitation of 'Buyer Beware' concept
Unit 2	Right of Consumers- Responsibilities of Consumers –Consumer Education & awareness building –unfair trade practices –Caveat emptor
Unit 3	Consumer Protection Act- Main Provisions –Redressal forums – District Level –State Level and National Level –Powers & Functions –Filling of Complaints Procedure Regulatory Authorities & OMBUDSMAN
Unit 4	Consumer pressure groups-voluntary consumer organizations- Consumer Protection Councils- Remedy &Redressal of Grievances –Legal and non-legal
Unit 5	Consumer satisfaction and social Responsibility of Business – Consumer Communication – ethics in advertisement- Consumer care mechanism in Private and Public Sector.

Course Objectives	
Title	**Advertising and Salesmanship**
Course Code	**KDACD**
CO-1	To enable students to learn the nuances of target marketing and personal selling and public relations
CO-2	To Enable the students to learn basic needs of advertisement and salesmanship in present scenario
CO-3	To Integrated market strategy and communication in Advertise-ment strategy.
CO-4	To understand the role and issues of advertising in contemporary society.
CO-5	To explore the future of and careers in advertising.

Course Outcome	
Title	**Advertising and Salesmanship**
Course Code	**KDACD**
CO-1	Students will learn to resolve study and react to clients advertising and marketing
CO-2	Students will be able to develop an intergrated advertising and marketing communication plan
CO-3	Evaluate of the effectiveness of advertising
CO-4	Explain the steps involved in sales force management
CO-5	Students Would able to gain knowledge on importance of advertisement and role of salesmanship in E- Marketing.

Syllabus	
Title	**Advertising and Salesmanship**
Course Code	**KDACD**
Unit 1	Introduction to Integrated Marketing Communication – Components of Marketing communication – Advertising – Salesmanship and public relations – The role of Integrated Marketing communication in marketing process – Evaluation of marketing strategy and analysis. Evaluating Social, Ethical and Economical aspects of advertising
Unit 2	Identification of Target markets – Organization for Advertising and Salesmanship – The communication process – Sources – Message and channel factors –Advertising objectives and Budgeting – Determining the promotional objectives – DAGMAR approach – Media planning and strategy.
Unit 3	Determining different media strategy – Media mix – Evaluation of broadcast media – Evaluation of Print media and evaluation of other support media such as Home media and In-store media and Internet media.
Unit 4	Direct Selling – Role of Salesmanship in direct selling – Evaluating the role of salesmanship and his effectiveness – The Internet and interactive media – Measuring its effectiveness
Unit 5	Personal selling andPublicrelations – The role of personal selling and public relations in Integrated Marketing communication – Contribution of Personal selling with other media – Evaluating its effectiveness.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF PHYSICS(P.G.)

Program : M.SC. PHYSICS

Program Outcomes	
	On Completion of Program the students will able to
PO-1	Apply principles of basic scientific concepts in understanding, analysis& prediction of physical systems.
PO-2	Develop human resource with specialization in theoretical & experimental techniques required for career in academia, research & industry.
PO-3	Engage in lifelong learning & adapt to changing professional & societal needs.
PO-4	To impact high quality education in physical sciences.
PO-5	Become knowledgeable in the subject of Physics and apply the principles of the same to the needs of the Institution
PO-6	Gain Analytical skills in the fields of Physics
PO-7	Understand and appreciate professional ethics, community living and Nation Building initiatives
PO-8	Make the students to apply the knowledge and skills towards research areas in Physics
PO-9	Make them to compete with their counterparts in national and international levels
PO-10	Make feel comfortable in the ambit of fellow researcher/employee

Program Specific Outcomes	
	On Completion of Program the students will able to
PSO-1	The students will obtain good knowledge in physical sciences.
PSO-2	They will be prepared to take up challenges as globally competitive physicists/ researchers in diverse areas of theoretical and experimental physics.
PSO-3	They will be technically and analytically skilled enough to pursue their further studies.
PSO-4	They will have a sense of academia and social ethics.
PSO-5	They will be capable of taking up higher studies of interdisciplinary nature.

Course Objectives	
Title	**MATHEMATICAL PHYSICS**
Course Code	MCG1A
CO-1	To train the students to solve problems related to linear vector spaces.
CO-2	To teach the use of linear differential equations in solving physical problems.
CO-3	To provide and understanding of complex variables.
CO-4	To give the basic knowledge of laplace and fourier transforms.
CO-5	To teach about an understanding of loop theory.

Course Outcome	
Title	**MATHEMATICAL PHYSICS**
Course Code	MCG1A
CO-1	The students will be able to solve different physical problems which contains matrices and a tensors.
CO-2	They will be familiarized with the differential equations and finding the solutions of Legendre, Hermite equations.
CO-3	The students will obtain knowledge of complex variables and apply them solving the taylor and Laurent expansions.
CO-4	Students will be able to solve fourier integrals and fourier transforms.
CO-5	Useful to obtain the basic knowledge of loop theory and its applications.

Syllabus	
Title	**MATHEMATICAL PHYSICS**
Course Code	MCG1A
Unit 1	**Linear Vector Spaces and Tensors** Linear operators – Vectors in n-dimensions – Matrix representation of vectors and operators in a basis - Linear independence, dimension - Inner product - Schwarz inequality - Orthonormal basis - Gram-Schmidt Process – Eigen values and Eigen functions of operators/matrices – Hermitian and unitary operators/matrices – Cayley-Hamilton theorem - Diagonalizing matrix. Tensors : Coordinate transformations – Contravariant and Covariant Vectors – Tensors of higher rank – Einstein's summation convention – Kronecker delta – Product rule – Quotient rule- Levi-Civita tensor in three dimensions .
Unit 2	**LinearDifferential Equations and Green's Function** Second order linear differential equations – Wronskian - Sturm - Liouville theory - Orthogonality of eigenfunctions - Illustration with Legendre, Laguerre, and Hermite differential equations – Expansion of polynomials - Dirac delta function.One-dimensional Green's function - Eigenfunction expansion of the Green's function - Reciprocity theorem - Sturm - Liouville type equations in one dimension and their Green's functions
Unit 3	**Complex Variables** Functions of a complex variable - Single and multivalued functions - Analytic functions - Cauchy - Riemann conditions - Singular points - Cauchy's theorem and integral formulae - Taylor and Laurent expansions - Zeros and poles - Residue theorem and its applications
Unit 4	**Laplace and Fourier Transforms** Laplace transforms - Solution of linear differential equations with constant coefficients - Fourier integral - Fourier transforms (Infinite), Fourier sine and cosine transforms - Convolution theorems.
Unit 5	**Group Theory** Basic definitions - Lagrange's Theorem - Invariant subgroup - Homomorphism and Isomorphism between groups - Representation of a group - Unitary representations - Schur's lemmas - Orthogonality theorem - Character table - Simple applications to symmetry groups and molecular vibrations.

Course Objectives	
Title	**CLASSICAL MECHANICS AND RELATIVITY**
Course Code	MCG1B
CO-1	To define the concepts of Lagrangian and Hamiltonian formulations.
CO-2	To interpret the concepts of mechanics of rigid bodies.
CO-3	To explain canonical transformations and Poisson brackets.
CO-4	To illustrate the small oscillations.
CO-5	To formulate the concepts of relativity.

Course Outcome	
Title	**CLASSICAL MECHANICS AND RELATIVITY**
Course Code	MCG1B
CO-1	Formulate the Lgrangian mechanics concepts and solve the problems with the help of Lagrangian mechanics.
CO-2	Compare the formulations of Hamiltonian and Lagrangian mechanics and solve the problems of classical and relativistic mechanics.
CO-3	Solve the problems of canonical transformations and Poisson brackets.
CO-4	Formulate the equations of small oscillations and finding the frequency of normal modes.
CO-5	Solve the equations of Lorentz invariance of the four product.

Syllabus	
Title	**CLASSICAL MECHANICS AND RELATIVITY**
Course Code	MCG1B
Unit 1	**Lagrangian and Hamiltonian Formulations** Hamilton's variational principle - Lagrange's equations of motion – Canonical momenta – Cyclic coordinates and conservation of corresponding momenta – Legendre transformation and Hamiltonian - Hamilton's equations of motion - Two-body central force problem –Kepler Problem and Kepler's laws - Scattering by central potential - Two-particle scattering - Cross-section in lab. frame
Unit 2	**Mechanics of Rigid Bodies** Rigid body motion – Kinematics – Euler angles – Infinitesimal rotations – Rate of change of a vector – Coriolis force - Dynamics - Angular momentum and kinetic energy - Moment of inertia tensor - Euler's equations of motion - Torque-free motion - Symmetrical top.
Unit 3	**Canonical Transformation** Canonical transformations and their generators – Simple examples - Poisson brackets – Equations of motion in Poisson bracket formalism - Symmetries and conservation laws - Hamilton-Jacobi theory - Application to harmonic oscillator problem.
Unit 4	**Small Oscillations** Formulation of the problem - Transformation to normal coordinates - Frequencies of normal modes - Linear triatomic molecule.
Unit 5	**Relativity** Lorentz transforamtions - Four vectors - Lorentz invariance of the four product of two four vectors - Invariance of Maxwell's equations - Relativistic Lagrangian and Hamiltonian for a free particle.

Course Objectives	
Title	**QUANTUM MECHANICS - I**
Course Code	MCG1C
CO-1	To define the wave functions and derive the Schroedinger equation.
CO-2	To demonstrate particle in a box problem.
CO-3	To formulate the concepts of Hilbert space and explain the schroedinger and Heisenberg and interaction pictures.
CO-4	To formulate the approximation methods to solve real problems.
CO-5	To explain the angular momentum concepts and wave functions.

Course Outcome	
Title	**QUANTUM MECHANICS - I**
Course Code	MCG1C
CO-1	Derive Schroedinger equation and will be able to define eigen values and eigen functions.
CO-2	Solve square well potential and simple harmonic oscillator problems.
CO-3	Explain symmetry and conservation laws and also parity and time reversal.
CO-4	Apply the approximation methods to solve simple harmonic oscillator and hydrogen molecule problems.
CO-5	Derive Clebsch-Gordan coefficients.

Syllabus	
Title	**QUANTUM MECHANICS - I**
Course Code	MCG1C
Unit 1	**Basic formalism** Interpretation and conditions on the wave function - Postulates of quantum mechanics and the Schroedinger equation - Ehrenfest's theorem- Stationary states - Hermitian operators for dynamical variables - Eigenvalues and eigenfunctions - Uncertainty principle.
Unit 2	**One Dimensional Problems and Three Dimensional Problems** Particle in a box - Square-well potential - Barrier penetration - Simple harmonic oscillator - Ladder operators method. Orbital angular momentum and spherical harmonics - Central forces and reduction of two-body problem - Particle in a spherical well - Hydrogen atom.
Unit 3	**General Formalism** Hilbert space - Dirac notation - Representation theory - Co-ordinate and momentum representations - Time evolution - Schroedinger, Heisenberg and Interaction pictures- Symmetries and conservation laws - Unitary transformations associated with translations and rotations - Parity and time reversal.
Unit 4	**Approximation methods** Time-independent perturbation theory for non-degenerate and degenerate levels - Variation method, simple applications - WKB approximation - Connection formulae (no derivation) - WKB quantization rule - Application to simple harmonic oscillator - Hydrogen molecule, covalent bond and hybridization.
Unit 5	**Angular Momentum and Identical particles** Eigenvalue spectrum from angular momentum algebra - Matrix representation - Spin angular momentum - Non-relativistic Hamiltonian including spin - Addition of angular momenta - Clebsch - Gordan Coefficients.Symmetry and anti-symmetry of wave functions - Spin and Pauli matrices.

Course Objectives	
Title	**INTEGRATED CIRCUITS AND MICROPROCESSOR 8085 UNIT**
Course Code	MCG1E
CO-1	To impart the knowledge on operational amplifier and timer circuits.
CO-2	To have an idea of D/A and A/D coverters.
CO-3	To teach about the understanding of combinational and sequential logic circuits.
CO-4	To give the basic knowledge of programming of 8085 and interfacing of devices.
CO-5	To provide the understanding of 8085 interfacing applications.

Course Outcome	
Title	**INTEGRATED CIRCUITS AND MICROPROCESSOR 8085 UNIT**
Course Code	MCG1E
CO-1	Define an operational amplifier and a 555 timer circuit.
CO-2	Familiarize with the binary weighed, dual slope, ADC and successive approximation method.
CO-3	Gain knowledge of working of encoder, decoder, RS, D, JK, MS flip-flops and various counters.
CO-4	Learn about the memory interfacing EPROM, PPI and 8255.
CO-5	Design D/A converter and D/A converter.

Syllabus	
Title	**INTEGRATED CIRCUITS AND MICROPROCESSOR 8085 UNIT**
Course Code	MCG1E
Unit 1	**Linear ICs and Applications** Operational Amplifier : Solution of simultaneous equations and differential equations – Instrumentation amplifier – Log and Antilog amplifiers – Analog multiplication and division. Generation of square, triangular and sine waves – pulse generation – Schmitt trigger – Active filters (Second order Butterworth design). Timer 555 : Internal architecture and working – Schmitt trigger – Astable and monostablemultivibrators – Phase Locked Loop.
Unit 2	**Data Counters** Binary weighted and R/2R ladder DAC – Accuracy and resolution – Dual slope DAC- ADC – Simultaneous conversion – Counter method – Successive approximation.
Unit 3	**Combinational and Sequential Logic Circuits** 4-bit binary adder and subtracter- Encoder and Decoder – Multiplexer and Demultiplexer. Flip – Flops : RS, D-type, JK and M/S JK Flip-Flops, Counters – Asynchronous , Synchronous and Modulus counters – BCD counter – Shift registers – Ring counter – Johnson counter.
Unit 4	**8085 Programming, Peripheral Devices and their Interfacing** Instruction set -Addressing modes – Programming techniques – Memory mapped I/O scheme – I/O mapped I/O scheme – Memory and I/O interfacing – Data transfer schemes – Interrupts of 8085 – Programmable pheripheral interface (PPI) – Control group and control word – Programmable DMA controller – Programmable interrupt controller – Programmable communication interface – Programmable counter/interval timer.
Unit 5	**8085 Interfacing Applications** Seven segment display interface – Interfacing of Digital to Analog converter and Analog to Digital converter – Stepper motor interface – Measurement of electrical quantities (voltage and current) – Measurement of physical quantities (temperature and strain).

Course Objectives	
Title	**PRACTICAL – IPart – 1A : Electronics and Microprocessor 8085**
Course Code	MCG12
CO-1	To learn about microprocessor programs
CO-2	To understand arithmetic operations in microprocessor
CO-3	To gain overall knowledge abour electronics

Course Outcome	
Title	**PRACTICAL – IPart – 1A : Electronics and Microprocessor 8085**
Course Code	
CO-1	To study about microprocessor programs
CO-2	To understand arithmetic operations in microprocessor
CO-3	To acquire overall knowledge abour electronics
CO-4	Able to design Op-amplifiier operations
CO-5	To gain overall knowledge abour microprocessor.

Syllabus	
Title	**PRACTICAL – IPart – 1A : Electronics and Microprocessor 8085**
Course Code	
Unit 1	1. FET CS amplifier – Design, Frequency response, input impedance, output impedance
Unit 2	2. Study of attenuation characteristics of Wien's bridge network and design of Wien's bridge oscillator using Op-Amp.
Unit 3	3. Study of attenuation characteristics of Phase shift network and design of Phase shift oscillator using Op-Amp.
Unit 4	4. Design of a Schmitt trigger circuit using IC 741 f or a given hysteresis – application of squarer.

Unit 5	5. Design of a square wave oscillator using IC 741 – Triangular wave oscillator.
Unit 6	6. Construction of pulse generator using the IC 741 – application as frequency divider.
Unit 7	7. OP-Amp. – 4 bit Digital to Analog converter [R / 2R ladder network].
Unit 8	8. Study of R-S, clocked R-S and D-flip flops using NAND / NOR gates.
Unit 9	9. Study of J-K, D and T flip flops using IC 7476 / 7473.
Unit 10	10. Arithmatic operations using IC 7483 – 4 bit binary addition and subtraction.
Unit 11	12. 8 –bit addition and subtraction, multiplication and division.
Unit 12	13. Sum of a set of N data (8 – bit numbers), Picking up the smallest and largest number in an array. Sorting in ascending and descending order.
Unit 13	14. Code conversion (8 – bit numbers) : (a) Binary to BCD and (b) BCD to Binary.
Unit 14	15. Addition of multibyte numbers, Factorial.
Unit 15	16. 8 –bit addition and subtraction, multiplication and division.

Course Objectives	
Title	**PRACTICAL – IB GENERAL**
Course Code	MCG22
CO-1	To calculate physics constants
CO-2	To learn the physics concepts
CO-3	To gain overall knowledge about physics practicals

Course Outcome	
Title	**PRACTICAL – IB GENERAL**
Course Code	
CO-1	To calculate physics constants
CO-2	To learn the physics concepts
CO-3	To gain overall knowledge about physics practicals
CO-4	To study the working of practical experiments
CO-5	To learn bang gap energy

Syllabus	
Title	**PRACTICAL – IB GENERAL**
Course Code	
Unit 1	1. Cornu's Method – Young's modulus and Poisson's ratio by Elliptic fringes.
Unit 2	2. Stefan's constant.
Unit 3	3. Bang gap energy – Thermistor / Semiconductor.
Unit 4	4. Hydrogen spectrum – Rydberg's constant.
Unit 5	5. Thickness of the enamel coating on a wire – by diffraction.
Unit 1	6. Coefficient of linear expansion – Air wedge method.
Unit 2	7. Permittivity of a liquid using an RFO.
Unit 3	8. L-G plate.
Unit 4	9. Lasers : Study of laser beam parameters.
Unit 5	10. Arc spectrum : Copper.

Course Objectives	
Title	**: QUANTUM MECHANICS II**
Course Code	MCG2A
CO-1	To define scattering amplitude and explain their importance.
CO-2	To formulate time dependent perturbations theory and study approximation methods.
CO-3	Introducing Klein-Gorden equation Dirac equation to study relativistic quantum mechanics.
CO-4	Explain the derivation of Dirac equation and study Feynman's theory.
CO-5	Apply the ideas of second quantization and study commutation relations.

Course Outcome	
Title	**: QUANTUM MECHANICS II**
Course Code	MCG2A
CO-1	To explain scattering theory and S wave.
CO-2	To apply perturbation theory and deducing selection rules for dipole radiation.
CO-3	Interpret negative energy states.
CO-4	Explain four vector.
CO-5	Demonstrate commutation relations of operators.

Syllabus	
Title	**: QUANTUM MECHANICS II**
Course Code	MCG2A
Unit 1	**Scattering Theory** Scattering amplitude - Cross sections - Born approximation - Partial wave analysis -Effective range theory for S-wave - Transformation from centre of mass to laboratory frame.
Unit 2	**Perturbation Theory** Time dependent perturbation theory - Constant and harmonic perturbations - Transition probabilities - Adiabatic approximation - Sudden approximation - The density matrix - Spin density matrix and magnetic resonance - Semi-classical treatment of an atom with electromagnetic radiation - Selection rules for dipole radiation.
Unit 3	**Relativistic Quantum Mechanics** Klein-Gordon equation - Dirac equation - Plane-wave solutions - Interpretation of negative energy states - Antiparticles - Spin of electron - Magnetic moment of an electron due to spin - Energy values in a Coulomb potential.
Unit 4	**Dirac Equation** Covariant form of Dirac equation - Properties of the gammaMatrices - Traces -Relativistic invariance of Dirac equation – Probability density-current four vector – Bilinear covariants - Feynman's theory of positron (Elementary ideas only without propagation formalism).
Unit 5	**Dirac Equation** Covariant form of Dirac equation - Properties of the gammaMatrices - Traces -Relativistic invariance of Dirac equation – Probability density-current four vector – Bilinear covariants - Feynman's theory of positron (Elementary ideas only without propagation formalism)

Course Objectives	
Title	**ELECTROMAGNETIC THEORY AND PLASMA PHYSICS**
Course Code	MCG2B
CO-1	To understand the concepts of electrostatics and application of boundary condition.
CO-2	To learn the ideas of magneto statics and the energy.
CO-3	To grasp the concepts of Maxwell's equation.
CO-4	To study the wave propagation in conducting and non-conducting media.
CO-5	To acquire knowledge of electron plasma oscillations.

Course Outcome	
Title	**ELECTROMAGNETIC THEORY AND PLASMA PHYSICS**
Course Code	MCG2B
CO-1	To define boundary conditions.
CO-2	To explain magnetic moment, torque on a current element in external field.
CO-3	To derive wave equations.
CO-4	To discuss propagation of waves in a rectangular waves in a rectangular wave guide.
CO-5	To explain Debye's shelding problems.

Syllabus	
Title	**ELECTROMAGNETIC THEORY AND PLASMA PHYSICS**
Course Code	MCG2B
Unit 1	: **Electrostatics** Boundary value problems and Laplace equation – Boundary conditions and uniqueness theorem – Laplace equation in three dimension – Solution in Cartesian and spherical polar co ordinates – Examples of solutions for boundary value problems. Polarization and displacement vectors - Boundary conditions - Dielectric sphere in a uniform field – Molecular polarisability and electrical susceptibility – Electrostatic energy in the presence of dielectric – Multipole expansion.
Unit 2	: **Magnetostatics** Biot-Savart Law - Ampere's law - Magnetic vector potential and magnetic field of a localised current distribution - Magnetic moment, force and torque on a current distribution in an external field - Magnetostatic energy - Magnetic induction and magnetic field in macroscopic media - Boundary conditions - Uniformly magnetised sphere.
Unit 3	**Maxwell Equations** Faraday's laws of Induction - Maxwell's displacement current - Maxwell's equations - Vector and scalar potentials - Gauge invariance - Wave equation and plane wave solution- Coulomb and Lorentz gauges - Energy and momentum of the field - Poynting's theorem - Lorentz force - Conservation laws for a system of charges and electromagnetic fields.
Unit 4	**Wave Propagation** Plane waves in non-conducting media - Linear and circular polarization, reflection and refraction at a plane interface - Waves in a conducting medium - Propagation of waves in a rectangular wave guide. Inhomogeneous wave equation and retarded potentials - Radiation from a localized source - Oscillating electric dipole.
Unit 5	**Elementary Plasma Physics** The Boltzmann Equation - Simplified magneto-hydrodynamic equations - Electron plasma oscillations - The Debye shielding problem - Plasma confinement in a magnetic field - Magneto-hydrodynamic waves - Alfven waves and magnetosonic waves**.**

Course Objectives	
Title	**: SPECTROSCOPY**
Course Code	MCGAA
CO-1	To learn about the intricacies of microwave spectroscopy.
CO-2	To understand the details of Normal coordinates analysis.
CO-3	To know about the vibrations of diatomic, triatomic and polyatomic molecules.
CO-4	To learn about Raman scattering.
CO-5	To grasp complete knowledge of NMR & ESR spectroscopy.

Course Outcome	
Title	**: SPECTROSCOPY**
Course Code	MCGAA
CO-1	Able to deal with hyper fine structure and quadrupole moment.
CO-2	To differentiate between C2V and C3V point group.
CO-3	Learn to know how to operate a IR spectrometer.
CO-4	To explain phase transitions.
CO-5	Identifies the crystal defects.

Syllabus	
Title	**: SPECTROSCOPY**
Course Code	MCGAA
Unit 1	**Microwave Spectroscopy** Rotational spectra of diatomic molecules - Polyatomic molecules - Linear and symmetric top molecules - Hyperfine structure and quadrupole moment of linear molecules - Experimental techniques - Stark effect.
Unit 2	**Normal Coordinate Analysis** Selection rules for Raman and IR vibrational normal modes – Normal for Raman and IR activity C2V and C3V point groups – Representation of Molecular Vibrations in Symmetry co-ordinates – Normal coordinate analysis for H2O molecule
Unit 3	**Infrared Spectroscopy** Vibrations of diatomic and simple polyatomic molecules - Anharmonicity – Fermi Resonance – Hydrogen Bonding – Normal Modes of Vibration in a crystal – Solid State Effects – Interpretation of Vibrational Spectra – Instrumentation techniques – FTIR spectroscopy
Unit 4	**Raman Scattering** Vibrational and Rotational Raman spectra – Mutual Exclusion principle – Raman spectrometer – Polarization of Raman Scattering light. Structure Determination through IR and Raman spectroscopy – Phase transitions – Resonance Raman Scattering
Unit 5	**NMR and ESR Spectroscopy** Quantum theory of NMR – Bloch equations – Design of CW NMR Spectrometer – Principle and block diagram of PT NMR – Chemical Shift – Application to molecular structure. Quantum Theory of ESR – Design of ESR Spectrometer – Hyperfine Structure – Anisotropic systems – Triplet state study of ESR – Applications – Crystal defects -Biological studies

Course Objectives	
Title	**ENERGY PHYSICS**
Course Code	MCGAG
CO-1	To utilize judiciously the natural resources.
CO-2	To understand the ocean energy.
CO-3	To benefit from the wind energy.
CO-4	To learn hoe effectively we can generate Bio-mass energy.
CO-5	To understand designing of solar powers.

Course Outcome	
Title	**ENERGY PHYSICS**
Course Code	MCGAG
CO-1	Learn renewable energy sources.
CO-2	May design instruments to generate electricity from tidal waves.
CO-3	Learn the functionality of wind mills.
CO-4	May change over to Bio gas from LPG.
CO-5	Develop devices running on solar power.

Syllabus	
Title	**ENERGY PHYSICS**
Course Code	MCGAG
Unit 1	**INTRODUCTION TO ENERGY SOURCES -** Energy sources and their availability – prospects of renewable energy sources – Energy from other sources – chemical energy – Nuclear energy – Energy storage and distribution.
Unit 2	Energy from the oceans – Energy utilization – Energy from tides – Basic principle of tidal power – utilization of tidal energy.
Unit 3	Basic principles of wind energy conversion – power in the wind – forces in the Blades – Wind energy conversion – Advantages and disadvantages of wind energy conversion systems (WECS) Energy storage – Applications of wind energy.
Unit 4	**ENERGY FROM BIOMASS**: Biomass conversion Technologies – wet and dry process – Photosynthesis. Biogas Generation: Introduction – basic process and energetic – Advantages of anaerobic digestion – factors affecting bio digestion and generation of gas - biogas from waste fuel – properties of biogas- utilization of biogas.
Unit 5	Solar radiation and its measurements – solar, cells : Solar cells for direct conversion of solar energy to electric powers – solar cell parameter – solar cell electrical characteristics – Efficiency – solar water Heater – solar distillation – solar cooking – solar green house.

Course Objectives	
Title	**BASIC MATERIAL SCIENCE**
Course Code	MCGBC
CO-1	To provide the students with basic knowledge of material science.
CO-2	To understand variety of materials available.
CO-3	To distinguish between materials based on their structures and properties.
CO-4	To learn electron theory of metals.
CO-5	To understand electrical and magnetic properties of materials.

Course Outcome	
Title	**BASIC MATERIAL SCIENCE**
Course Code	MCGBC
CO-1	To provide the students with basic knowledge of material science.
CO-2	To understand variety of materials available.
CO-3	To distinguish between materials based on their structures and properties.
CO-4	To learn electron theory of metals.
CO-5	To understand electrical and magnetic properties of materials.

Syllabus	
Title	**BASIC MATERIAL SCIENCE**
Course Code	MCGBC
Unit 1	**Introduction:** Classification of materials – materials for engineering applications – different types of chemical bonds – crystal structure s of important engineering materials – crystal imperfection and types of imperfections
Unit 2	**Introduction:** Classification of materials – materials for engineering applications – different types of chemical bonds – crystal structure s of important engineering materials – crystal imperfection and types of imperfections
Unit 3	**Phase transformation:** Mechanism – nucleation and growth – applications of phase transformations – cooling, casting, solidification and heat treatment – TTT diagram – martensitic transformation
Unit 4	**Electron theory of metals:** Classical free electron theory – density of states – electron energies in a metal – energy band and Fermi energy in solids – distinction between metals, insulators and semiconductors on the basis of Fermi level – effect of temperature on Fermi level
Unit 5	**Electrical and magnetic properties of materials:** Electrical resistivity and conductivity of meterials – dielectric materials – electrical polarization – piezo, pyro and ferroelectric materials – electrostriction – classification of magnetic materials – domain structure – magnetostriction – soft and hard magnetic materials

Course Objectives	
Title	**STATISTICAL MECHANICS**
Course Code	MCG3A
CO-1	To understand thermodynamics potentials.
CO-2	To learn phase space, entropy and gibb's paradox.
CO-3	To grasp the concepts of ensembles.
CO-4	To understand classical and quantum statistics & Bose-Eienstein condensation.
CO-5	To learn I sing model & fluctuations students

Course Outcome	
Title	**STATISTICAL MECHANICS**
Course Code	MCG3A
CO-1	Use various ensembles theories to calculate thermodynamic properties of different systems.
CO-2	Compute properties of systems behaving as ideal Fermi gas or ideal Bose gas.
CO-3	Classify transitions as first order or second order.
CO-4	Reproduce the exact solution of Ising model-Dimension.
CO-5	Understand Liou-ville's theorem.

Syllabus	
Title	**STATISTICAL MECHANICS**
Course Code	MCG3A
Unit 1	**PHASE TRANSITIONS** Thermodynamic potentials - Phase Equilibrium - Gibb's phase rule - Phase transitions and Ehrenfest's classifications –Third law of Thermodynamics. Order parameters - Landau theory of phase transition - Critical indices - Scale transformations and dimensional analysis.
Unit 2	**Statistical Mechanics and Thermodynamics** Foundations of statistical mechanics - Specification of states of a system - Microcanonical ensemble - Phase space – Entropy - Connection between statistics and thermodynamics – Entropy of an ideal gas using the microcanonical ensemble - Entropy of mixing and Gibb's paradox.
Unit 3	**Canonical and Grand canonicalEnsembles** Trajectories and density of states - Liouville's theorem - Canonical and grand canonical ensembles - Partition function - Calculation of statistical quantities - Energy and density fluctuations.
Unit 4	**Classical and Quantum Statistics** Density matrix - Statistics of ensembles - Statistics of indistinguishable particles - Maxwell-Boltzman statistics - Fermi-Dirac statistics – Ideal Fermi gas – Degeneracy - Bose-Einstein statistics - Plank radiation formula - Ideal Bose gas - Bose-Einstein condensation.
Unit 5	**Real Gas, Ising Modeland Fluctuations** Cluster expansion for a classical gas - Virial equation of state – Calculation of the first virial coefficient in the cluster expansion - Ising model - Mean-field theories of the Ising model in three, two and one dimensions - Exact solutions in one-dimension. Correlation of space-time dependent fluctuations - Fluctuations and transport phenomena - Brownian motion - Langevin theory - Fluctuation-dissipation theorem - The Fokker-Planck equation.

Course Objectives	
Title	**NUCLEAR AND PARTICLE PHYSICS**
Course Code	MCG3B
CO-1	To impart the knowledge of nuclear interactions and nuclear scattering.
CO-2	To acquire knowledge about nuclear models and angular momentum.
CO-3	To provide the knowledge nuclear reactions and resonance scattering.
CO-4	To have a good understanding of Nuclear decay, γ- decay and selection rules.
CO-5	To have an elementary idea of particles and their classification.

Course Outcome	
Title	**NUCLEAR AND PARTICLE PHYSICS**
Course Code	MCG3B
CO-1	An idea developed about the nucleus.
CO-2	A concept &nature of nuclear force.
CO-3	Learn about the method and analyzing of scattering process.
CO-4	An idea about the interaction particles with matter.
CO-5	An understanding nature, interaction etc of the elementary particles.

Syllabus	
Title	**NUCLEAR AND PARTICLE PHYSICS**
Course Code	MCG3B
Unit 1	**Nuclear interactions** Nucleon-nucleon interaction – Tensor forces – Meson theory of nuclear forces – Yukawa potential – Nucleon-Nucleon scattering – Effective range theory – Spin dependence of nuclear forces – Charge independence and charge symmetry of nuclear forces – Isospin formalism
Unit 2	**Nuclear reactions** Types of reactions and conservation laws – Energetics of nuclear reactions –Dynamics of nuclear reactions – Q-value equation – Scattering and reaction cross sections – Compound nucleus reactions – Direct reactions – Resonance scattering – Breit-Wigner one level formula
Unit 3	**Nuclear Models** Liquid drop model – Bohr-Wheeler theory of fission – Experimental evidence for shell effects – Shell model – Spin-orbit coupling - Magic numbers – Angular momenta and parities of nuclear ground states – Qualitative discussion and estimate of transition rates – Magnetic moments and Schmidt lines – Collective model of Bohr and Mottelson
Unit 4	**Nuclear decay** Beta decay – Fermi theory of beta decay – Shape of the beta spectrum – Total decay rate - Mass of the neutrino – Angular momentum and parity selection rules – Allowed and forbidden decays – Comparative half-lives – Neutrino physics – Non-conservation of parity – Gamma decay – Multipole transitions in nuclei – Angular momentum and parity selection rules – Internal conversion – Nuclear isomerism
Unit 5	**Elementary particle physics** Types of interaction between elementary particles – Hadrons and leptons – Symmetries and conservation laws – Elementary ideas of CP and CPT invariance – Classification of hadrons – SU(2) and SU(3) multiplets – Quark model - Gell-Mann-Okubo mass formula for octet and decuplet hadrons – Charm, bottom and top quarks

Course Objectives	
Title	**NUMERICAL METHODS AND COMPUTER PROGRAMMING**
Course Code	MCG3C
CO-1	To teach the ways of solving equations.
CO-2	To train them to solve linear systems equations.
CO-3	To teach them the concepts of inter- polation and curve fitting.
CO-4	To instruct them to calculate integrals & differentials.
CO-5	To learn the programming with FORTRAN/C.

Course Outcome	
Title	**NUMERICAL METHODS AND COMPUTER PROGRAMMING**
Course Code	MCG3C
CO-1	Solve roots of non-linear algebraic equations.
CO-2	Effectively use eigen values & eigen vectors of materials.
CO-3	Enrich the given set of data points using inter-polation methods.
CO-4	Like Newton forward & backward inter polation.
CO-5	Numerically differentiate & integrate expressions.

Syllabus	
Title	**NUMERICAL METHODS AND COMPUTER PROGRAMMING**
Course Code	MCG3C
Unit 1	**SOLUTION OF NUMERICAL, ALGEBRAIC AND TRANSCENDENTAL EQUATIONS:** Bisection method – Repeated application of location theorem – Method ofinterpolation or of False position (Regula Falsi method) – Repeated plotting on a large scale –Newton Raphson method – Geometic significance of Newton Raphson method – Method ofsuccessive approximation or iteration
Unit 2	**INTERPOLATION:** Differences – Horizontal and Diagonal differences – Differences of apolynomial – Interpolation with equal intervals of arguments: Newton's formula for forward,backward interpolation. Interpolation with unequal intervals of arguments: Divideddifferences – Newton's central difference method
Unit 3	**NUMERICAL DIFFERENTIATION:** Stirlings formula & differentiation – with otherappropriate interpolation formulae. **NUMERICAL SOLUTION OF FIRST ORDER DIFFERENTIAL EQUATIONS:** Euler- Runge – Kutta methods. **SOLVING SIMULTANEOUS LINEAR EQUATIONS:** Gauss Elimination method –Jordan's modification. **NUMERICAL INTEGRATION:** Trapezoidal rule – Romberg's method (and Richardson'sdeferred approach) - Simpson's rule – extended Simpson's one third rule – Applications inPhysics
Unit 4	**COMPUTER PROGRAMMING IN FORTRAN 90:** Evolution of Fortran 90 - Logging into Linux terminals in LAN. Using text editor in Linux. Fortran 90 compiler in Linux:compilation, linking and running of programs. Writing simple Fortran 90 programs. Numericconstants and variables - Arithmetic expressions - Input and Output statements - Conditionalstatements - Loops in Fortran 90 - Logical expressions - Functions and subroutines - Arrays -Additional features in Fortran 90: Recursive functions. User defined operators.

Course Objectives	
Title	**CRYSTAL GROWTH**
Course Code	MCGAK
CO-1	Understand the fundamentals of crystal growth & nucleation.
CO-2	Analyze the low temperature method of crystal growth.
CO-3	Understand the melt growth technique of crystal growing.
CO-4	Be aware of thin films formation through vapour deposition.
CO-5	Introduce gel growth and flux growth.

Course Outcome	
Title	**CRYSTAL GROWTH**
Course Code	MCGAK
CO-1	Grow crystal using a simple technique.
CO-2	Understand laboratory technique of growing crystal.
CO-3	Understand thye High level technique of melt growth.
CO-4	Understand the formation of thin film mechanism.
CO-5	Analyze Gel growth and flux growth.

Syllabus	
Title	**CRYSTAL GROWTH**
Course Code	MCGAK
Unit 1	**NUCLEATION** Nucleation concept – Kinds of nucleation – Classical theory of nucleation - Spherical nucleus – Induction period – Measurement - Heterogeneous nucleation – Equilibrium concentration of embryos – Energy of formation of a critical nucleus - Free energy of formation of a critical heterogeneous cap shaped and disc shaped nuclei –Nucleation rate.
Unit 2	**CRYSTAL GROWTH THEORIES** Surface energy theory – Diffusion theory – Adsorption layer theory – Volmer theory – Bravais theory – Kossel theory – Two dimensional nucleation theory – Free energy of formation of a two dimensional nucleus – Possible shapes – Rate of nucleation
Unit 3	**CRYSTAL GROWTH FROM SOLUTION** Low temperature solution growth – Solution and Solubility – Preparation of solution - Principle of low temperature solution growth - Mier's solubility diagram – Measurement of solubity – Measurement of Ostwald-Mier's metastable zone width – Achievement of supersaturation. Crystal Growth methods – Slow cooling method – Holden's rotary crystallizer - Mason Jar method – Slow evaporation method – Johnson's rotating crystal method - Temperature gradient method – Kruger and Fink U tube method.
Unit 4	**MELT GROWTH AND VAPOUR GROWTH** Growth of crystal from melt – Bridgman method – Czochralski method – LEC growth of III – V materials – Verneuil method – Phase diagram principle of zone refining - Zone melting method. Physical vapour deposition – Chemical vapour deposition – Open and closed systems – Physical and thermo - chemical factors affecting growth process.
Unit 5	**GEL GROWTH AND FLUX GROWTH** Gel growth – Different gel medium – Specific gravity – Silica gel – Agar gel – Basic growth procedure – Single diffusion technique – Double diffusion technique – Reaction method – Chemical reduction method. High temperature solution growth (Flux growth) – Principle of flux growth – Slow cooling method – Slow evaporation method – Top seeded solution growth.

Course Objectives	
Title	**CLASSICAL DYNAMICS**
Course Code	MCGBE
CO-1	To distinguish between inertia frame of reference and non inertia frame of reference.
CO-2	To know how to impose constraints on a system in order to simplify the methods to be used in solving physics problems.
CO-3	To know the importance of concepts such as generalized co-ordinates and constrained motion.
CO-4	To find the linear approximation to any dynamical system near equilibrium and also know how to derive & solve the wave equation for small oscillations.
CO-5	To learn about cyclic coordinates & applications of Hamilton's canonical- equations of motion.

Course Outcome	
Title	**CLASSICAL DYNAMICS**
Course Code	MCGBE
CO-1	Learn about Lagrangian and Hamiltonian formulation of classical mechanics.
CO-2	Understand about motion of a particle under central force field.
CO-3	Have a deep understanding of transformation equation.
CO-4	Know about transformation to normal modes & linear triatomic molecule.
CO-5	Understand about four vectors, various physical quantities in for vector notation and their transformation.

Syllabus	
Title	**CLASSICAL DYNAMICS**
Course Code	MCGBE
Unit 1	**Principles of classical mechanics** Mechanics of a single particle – mechanics of a system of particles – conservation laws for system of particles – constraints – holonomic & non-holonomic constraints – generalized coordinates – configuration space – transformation equations – principle of virtual work
Unit 2	**Lagrangian formulation** D'Alembert's principle – Lagrangian equations of motion for conservative systems – applications: (i) simple pendulum (ii) Atwood's machine (iii) projectile motion
Unit 3	**Hamiltonian formulation** Phase space – cyclic coordinates – conjugate momentum – Hamiltonian function – Hamilton's canonical equations of motion – applications: (i) simple pendulum (ii) one dimensional simple harmonic oscillator (iii) motion of particle in a central force field
Unit 4	**Small oscillations** Formulation of the problem – transformation to normal coordinates – frequencies of normal modes – linear triatomic molecule
Unit 5	**Special theory of relativity** Inertial and non-inertial frames – Lorentz transformation equations – length contraction and time dilation – relativistic addition of velocities – Einstein's mass-energy relation – Minkowski's space – four vectors – position, velocity, momentum, acceleration and force in for vector notation and their transformations

Course Objectives	
Title	**CONDENSED MATTER PHYSICS**
Course Code	MCG4A
CO-1	To relate crystal structure to symmetry recognize the correspondence between real & reciprocal space.
CO-2	Acquire knowledge of the behavior of electronics in solid based on classical & quantum theories.
CO-3	To become familiar with the different types of magnetism & magnetism based phenomena.
CO-4	To develop an understanding of the dielectric properties & ordering of dipoles in ferroelectrics.
CO-5	To get familiarized with the different parameters associated with super conductivity & theory of superconductivity.

Course Outcome	
Title	**CONDENSED MATTER PHYSICS**
Course Code	MCG4A
CO-1	Able to correlate the x-ray diffraction pattern for a given crystal structure based on the corresponding reciprocal lattice.
CO-2	Able to explain how the predicted electronic properties of solids differ in the classical free electron theory, quantum free electron theory & nearly free electron model.
CO-3	Able to explain various magnetic phenomena on the exchange interactions.
CO-4	Able to differentiate between ferroelectric, anti-ferroelectric, piezoelectric and pyro electric materials.
CO-5	Able to differentiate between type-I and type-II superconductors & their theories.

Syllabus	
Title	**CONDENSED MATTER PHYSICS**
Course Code	MCG4A
Unit 1	**Crystal Physics** Types of lattices - Miller indices – Symmetry elements and allowed rotations - Simple crystal structures – Atomic Packing Factor- Crystal diffraction - Bragg's law – Scattered Wave Amplitude - Reciprocal Lattice (sc, bcc, fcc) – Diffraction Conditions - Laue equations - Brillouin zone - Structure factor - Atomic form factor - Inert gas crystals - Cohesive energy of ionic crystals - Madelung constant - Types of crystal binding (general ideas).
Unit 2	**Lattice Dynamics** Lattice with two atoms per primitive cell - First Brillouin zone - Group and phase velocities - Quantization of lattice vibrations - Phonon momentum - Inelastic scattering by phonons - Debye's theory of lattice heat capacity - Thermal Conductivity - Umkalapp processes.
Unit 3	**Theory of Metals and Semiconductors** Free electron gas in three dimensions - Electronic heat capacity - Wiedemann-Franz law - Band theory of metals and semiconductors - Bloch theorem - Kronig-Penney model - Semiconductors - Intrinsic carrier concentration – Temperature Dependence - Mobility - Impurity conductivity – Impurity states - Hall effect - Fermi surfaces and construction - Experimental methods in Fermi surface studies - de Hass-van Alphen effect .
Unit 4	**Theory of Metals and Semiconductors** Free electron gas in three dimensions - Electronic heat capacity - Wiedemann-Franz law - Band theory of metals and semiconductors - Bloch theorem - Kronig-Penney model - Semiconductors - Intrinsic carrier concentration – Temperature Dependence - Mobility - Impurity conductivity – Impurity states - Hall effect - Fermi surfaces and construction - Experimental methods in Fermi surface studies - de Hass-van Alphen effect .
Unit 5	**Superconductivity** **Experimental facts:** Occurrence - Effect of magnetic fields - Meissner effect – Critical field – Critical current - Entropy and heat capacity - Energy gap - Microwave and infrared properties - Type I and II Superconductors. **Theoretical Explanation:** Thermodynamics of super conducting transition - London equation - Coherence length – Isotope effect - Cooper pairs - BCS Theory - Single particle tunneling - Josephson tunneling - DC and AC Josephson effects - High temperature Superconductors - SQUIDS.

Course Objectives	
Title	**MICROPROCESSOR8086ANDMICROCONTROLLER8051**
Course Code	MCGAJ
CO-1	To study the architecture of 8086 microprocessor.
CO-2	To understand 8051 microcontroller concepts in hardware.
CO-3	To learn assembly language programming in 8051 microcontroller.
CO-4	To know different interrupt concepts in 8051 programming.
CO-5	To develop an in depth knowledge in interfacing techniques to implement in external world.

Course Outcome	
Title	**MICROPROCESSOR8086ANDMICROCONTROLLER8051**
Course Code	MCGAJ
CO-1	Describe the architecture of 8086 microprocessor.
CO-2	Implement the features of 8051 microcontroller and microcontroller hardware.
CO-3	Analyze assembly language programming.
CO-4	Implement interrupt program in various applications.
CO-5	Perform interfacing of I/O devices with 8051 microcontroller.

Syllabus	
Title	**MICROPROCESSOR8086ANDMICROCONTROLLER8051**
Course Code	MCGAJ
Unit 1	**8086ArchitectureandProgramming** 8086 Architecture–Min.Mode,Max.Mode–SoftwareModel–Segmentation- Segmentationofaddress–PipelineProcessing.AddressingModes–InstructionSet-ConstructingMachineCode–InstructionTemplates forMOVInstruction–DataTransferInstructions–Arithmetic,Logic,Shift,rotateinstructions- Flag Controlinstructions-Compare,JumpInstructions–LoopandString instructions-Assembly programs-Blockmove,Sorting,Averaging, Factorial–CodeConversion:BinarytoBCD, BCDtoBinary.
Unit 2	**8051MicrocontrollerHardware** Introduction–Featuresof 8051– 8051MicrocontrollerHardware:Pin-outof 8051,Central Processing Unit (CPU), Internal RAM, Internal ROM, Register set of 8051 – Memory organization of8051–Input/Outputpins,PortsandCircuits–Externaldatamemoryand Programmemory: Externalprogrammemory,Externaldatamemory.
Unit 3	**8051InstructionSetAndAssemblyLanguageProgramming** Addressingmodes–Datamoving(Datatransfer)instructions:InstructionstoAccessexternal datamemory,externalROM/programmemory,PUSHandPOP instructions,Dataexchange instructions–Logicalinstructions: byteandbitlevellogicaloperations,Rotateandswap operations – Arithmetic instructions : Flags, Incrementing and decrementing, Addition, Subtraction,Multiplicationanddivision,Decimalarithmetic–JumpandCALLinstructions: JumpandCallprogramrange,Jump,CALLandsubroutines–Programming.
Unit 4	**InterruptProgrammig** 8051Interrupts–Interruptvectortable–Enablinganddisablinganinterrupt–Timerinterrupts and programming – Programming external hardware interrupts – Serial communication interrupts and programming – Interrupt priority in the 8051 : Nested interrupts, Software triggeringofinterrupt.
Unit 5	**InterfacingToExternalWorld** Interfacing keyboard : Simple keyboard interface, Matrix keyboard interface – Interfacing displays:InterfacingsevensegmentLEDdisplays,InterfacingLCDdisplay–InterfacingDAC to8051–InterfacingADCto8051–Interfacingsensors–Interfacingsteppermotor.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF MICROBIOLOGY(P.G.)

Program : M.S.c., APPLIED MICROBIOLOGY

Program Outcomes	
	On Completion of Program the students will able to
PO-1	The objective of the Master's Program in Microbiology is to equip the students to apply knowledge of prokaryotic and eukaryotic cellular processes, classification, interaction of microorganisms among themselves, and chemical agents and higher order organisms
PO-2	Promote independent and collaborative work, while demonstrating the professional and ethical responsibilities of the profession
PO-3	Basics and current molecular updates in the areas of Industrial Microbiology, Fermentation Technology, Agriculture& Environmental Microbiology are included to train the students and also sensitize them to scope for research
PO-4	To provide basic understanding of the principles of modern applied microbiology. To provide teaching and research activities in applied microbiology.
PO-5	The Master's Program in Microbiology will address the increasing need for skilled scientific manpower with an understanding of research ethics involving microorganisms to contribute to application, advancement and impartment of knowledge in the field of microbiology.
PO-6	Understand and appreciate professional ethics, community living and Nation Building initiatives
PO-7	Become knowledgeable in the subject of Microbiology and apply the principles of the same to the needs of the Employer / Institution /own Business or Enterprise
PO-8	Practice Microbiology in support of the design of interdisciplinary Life science systems through the application of the acquired knowledge, skills, and tools pertinent to Microbiology
PO-9	Gain Analytical skills in the field/area of Microbiology

Program Specific Outcomes	
	On Completion of Program the students will able to
PSO-1	The two-year study of Master in Microbiology will impart in-depth understanding of basic aspects of microbiological science pertaining to industrial applications. The student will be able to assess treatment strategies including the appropriate use of antimicrobial agents and common mechanisms of antimicrobial action and resistance.
PSO-2	The courses of Industrial Microbiology & Fermentation Technology, Genetic Engineering, Microbial Genetics, Bio-analytical Techniques, Molecular Microbial Physiology, Agriculture & Environmental Microbiology, Animal Biotechnology, and Vaccinology will make the students ready to contribute to; Molecular, Biochemical, Industrial, medical and other basic and applied applications of better understanding of the key principles of microbial functioning at an advanced leave
PSO-3	Production of substantial original research of significance and quality sufficient for publication. Awareness of ethical issues in Microbiology research and careers options
PSO-4	To ability to design and Carry out research experiment and to intrept the data
PSO-5	To provide local exposure to various communities ,ecology ecological issue in the field of microbiology

Course Objectives	
Title	MICROBIALTAXONOMY
Course Code	MDT1A
CO-1	The purpose of studying the paper is to gain detailed taxonomic classification of microbes.
CO-2	Understand the concepts of binomial nomenclature of microorganisms
CO-3	To learn about the classification of bacteria based on bergegys Manual of bacteriology
CO-4	Learn about the classification of algae
CO-5	Learn about the phylogenetic analysis and tree construction

Course Outcome	
Title	MICROBIALTAXONOMY
Course Code	MDT1A
CO-1	Understanding and gaining knowledge in concepts and techniques for identification.
CO-2	Concepts related to extremophilic microbes and archea.
CO-3	. Significance and characteristics of algae and fungi.
CO-4	Characteristics of virus.
CO-5	Understanding the knowledge in concepts and techniques for algae

Syllabus	
Title	MICROBIALTAXONOMY
Course Code	MDT1A
Unit 1	Taxonomy, systematics, identification: Taxonomical hierarchyspecies- type strains: culture collections; binomial nomenclature; systems of classification- phenetic, numerical taxonomy- similarity matrix, dendrograms with examples; phylogenetic with examples; general characteristics used in classificationfive kingdom, six kingdom a006E
Unit 2	Classification of bacteria according to Bergey's Manual of systematic bacteriology 9th edition (up to level of section); characteristics of major sections; classification of archaea, photosynthetic bacteria, Entrobacteriaceae, Mollicutes.
Unit 3	Classification of Fungi - characteristics of zygomycetes, ascomycetes, basidiomycetes and dueteromycetes.
Unit 4	Classification of Protozoa - classical 1980; official system & 1993 Cavalier- Smith. Distinguishing characteristics of ciliates; flagellates; sporozoa; heliozoans; amoeba.
Unit 5	Classification of Algae - major characteristics of chlorophycophyta, crisophycophyta, cryptophycophyta, euglinophycophyta & rhodophycophyta. Classification of viruses - animal viruses, plant viruses and phages.

Course Objectives	
Title	General Microbiology & Laboratory Animal Science
Course Code	MDT1B
CO-1	Explain the theoretical basis of the tools technologies and methods common to general microbiology and immunology
CO-2	Demonstrate practical skills in the use of tools, technologies and methods common to Microbiology and immunology
CO-3	Describe methodological information.
CO-4	Apply concepts, basic research findings through description interpretation and analysis.
CO-5	To learn and understand about the laboratory animals

Course Outcome	
Title	General Microbiology & Laboratory Animal Science
Course Code	MDT1B
CO-1	Understand the structures and functions of biomolecule
CO-2	To know the functions of growth curve
CO-3	Gain the knowledge About the ethical issues of laboratory tests
CO-4	To Study the concepts of enumeration of bacteria
CO-5	To gain the knowledge about the enzymatic activity of microorganisms

Syllabus	
Title	General Microbiology & Laboratory Animal Science
Course Code	MDT1B
Unit 1	Microscopy – Its principles and application in the field of Microbiology including the following: Dark field, Phase contrast, Fluorescence microscopy. TEM and SEM. Principles, operation and maintenance of: refrigerated and ultracentrifuges, Spectrophotometer. Lyophilizers. Staining methods – Simple, differential and special methods. Sterilization and disinfection methods and their quality control.
Unit 2	Bacterial Anatomy, Structure, properties and biosynthesis cellular components of bacteria – Sporulation – Growth and nutrition – Nutritional requirements – Growth curve – Kinetics of growth – Batch culture – Synchronous growth – Measurement of growth and enumeration of cells – Pure culture techniques.
Unit 3	Distribution of Algae - Thallus structure in algae - Reproduction in alga - Life cycle patterns in algae - Chlamydomonas – Volvox (Green algae) - Nostoc – Spirogyra (BGA) - Ectocarpus – Sargassum (Brown algae) - Poly siphonia – Batrachospermum (Red algae)
Unit 4	Laboratory Animal Science. Modern methods of care, management, breeding and maintenance of laboratory animals. Detailed account of nutrition, handling, uses of different laboratory animals - rabbits, mice, rats, guinea pigs, monkeys, hamsters, fowl, sheep.
Unit 5	Breeding and handling of specific pathogen free Gnotobiotic animals and their maintenance and uses. Transgenic animal models – Methodology and uses. Disposal of animal house wastes and used animals. Laboratory uses of animals with special reference to microbiology, pathogenicity testing, antibody production, toxin/toxoid testing, hypersensitivity testing, maintenance of microbes in animals.

Course Objectives	
Title	Immunology
Course Code	MDT1C
CO-1	Knowledge the structure and function of organ systems.
CO-2	Study the pathogenesis of diseases, effective treatment and mechanisms of health maintenance to prevent diseases
CO-3	To provide knowledge on how the immune system works building on their previous knowledge from biochemistry, genetics, cell biology and microbiology
CO-4	Overview of the Immune system learning.
CO-5	To learn about the transplantation and know about the immune response

Course Outcome	
Title	Immunology
Course Code	MDT1C
CO-1	Gain knowledge about immune system
CO-2	Studied the structure and functions of Antibody and Antigen.
CO-3	Skills in immunological techniques.
CO-4	Provided knowledge in various mechanism of immune function
CO-5	Importance in public health and awareness about immunological diseases.

Syllabus	
Title	Immunology
Course Code	MDT1C
Unit 1	History and scope of immunology: types of immunity – Innate, acquired, passive and active, Physiology of immune response – Humoral immunity and cell mediated immunity – Lymphoid organs.
Unit 2	Antigen: Types – properties and functions: Immunoglobulin: structure, function and techniques of purification, - Antibody production – regulation and diversity – polyclonal and monoclonal antibodies.
Unit 3	Antigen – antibody reaction including agglutination and precipitation reactions – Enzyme immunoassays –Radio immune assays, Immunofluorescene, Immunoperoxidase. Immunohaematology of blood groups. ABO and RH incompatibility
Unit 4	Complement and its role in immune responses. Hypersensitivity – types and manifestations. Autoimmunity. Transplantation immunology and tumor immunology. HLA tissue typing – Major histocompatibility complex – structure and types
Unit 5	Vaccines: Principles and types. Immunization - its rationale, schedules and importance in public healt

Course Objectives	
Title	General Microbiology & Laboratory Animal Science
Course Code	MDT11
CO-1	To develop skills and competencies in standard microbiological laboratory techniques.
CO-2	Train students in the proper use and maintenance of the research grade laboratory microscope with emphasis on oil immersion methods.
CO-3	Train students in aseptic technique, prophylaxis, and the proper methods relating to the safe manipulation and maintenance of microorganism
CO-4	Train students in fundamental laboratory methodology to include the use of differential media, metabolic/enzymatic testing and associated reagents.
CO-5	Provide students with a hands-on familiarity with basic research procedure and associated critical and investigative thinking skills utilizing identification of unknown microorganism specimens & Provide students with an understanding of important facts, concepts, and the investigative procedures of a microbiology producing accurate, skilled clinical laboratory workers with strong ethical and professional values.

Course Outcome	
Title	General Microbiology & Laboratory Animal Science
Course Code	MDT11
CO-1	Properly prepare and view microbiological specimens for examination using bright field microscopy.
CO-2	Use pure culture and selective techniques to enrich for and isolate microorganisms, using proper aseptic technique.
CO-3	Estimate the number of microorganisms in a sample using viable plate counts CO-4. Evaluate a microbiological problem in the context of an unknown microorganism, using appropriate media-based methods for identification. Accurately document and report observations and interpretations made during laboratory exercises. CO-5. Use appropriate microbiological lab equipment and methods, in order to conduct and analyze experimental measurements relevant to microbiology. Practice safe microbiology, using appropriate protective and emergency procedures
CO-4	. Properly prepare and view microbiological specimens for examination using bright field microscopy. CO-2. Use pure culture and selective techniques to enrich for and isolate microorganisms, using proper aseptic technique. CO-3. Estimate the number of microorganisms in a sample using viable plate counts CO-4. Evaluate a microbiological problem in the context of an unknown microorganism, using appropriate media-based methods for identification. Accurately document and report observations and interpretations made during laboratory exercises. CO-5. Use appropriate microbiological lab equipment and methods, in order to conduct and analyze experimental measurements relevant to microbiology. Practice safe microbiology, using appropriate protective and emergency procedures
CO-5	. Properly prepare and view microbiological specimens for examination using bright field microscopy. CO-2. Use pure culture and selective techniques to enrich for and isolate microorganisms, using proper aseptic technique. CO-3. Estimate the number of microorganisms in a sample using viable plate counts CO-4. Evaluate a microbiological problem in the context of an unknown microorganism, using appropriate media-based methods for identification. Accurately document and report observations and interpretations made during laboratory exercises. CO-5. Use appropriate microbiological lab equipment and methods, in order to conduct and analyze experimental measurements relevant to microbiology. Practice safe microbiology, using appropriate protective and emergency procedures

Syllabus	
Title	General Microbiology & Laboratory Animal Science
Course Code	MDT11
Unit 1	Microscopic Techniques: Light microscopy: Hay infusion broth. Wet mount to show different types of microbes, hanging drop. Dark field microscopy: To show motility of spirochetes and others. Phase contrast microscopy: To show Eukaryotic Cell division, morphology etc. Fluorescence microscopy: Fluorescent staining for Mycobacteria, auromine, staining, Fluorescent antibody techniques
Unit 2	Washing and cleaning of glass wares: Sterilization principles methods: moist heat, dry heat, filtration. Quality control check for each method
Unit 3	Staining Techniques: Smear preparation, simple staining, Gram's staining, Acid fast staining, Metachromatic granule staining, Cell wall, spore, capsule, Flagella, Silver impregnation methods.
Unit 4	Media Preparation: Preparation of liquid, solid and semisolid media. Agar deeps, slants, plates. Preparation of basal, enriched, selective, enrichment media. Quality control and uses. Preparation of Biochemical test media, media to demonstrate enzymatic activities.
Unit 5	Microbial Physiology: Purification and maintenance of microbes. Streak plates, pour plate, and slide culture technique. Aseptic transfer, growth and growth requirements: Cell number, and cell proteins. Direct counts, viable counts, pour plate, streak plate. Bacterial growth curve – Turbidimetry, Anaerobic culture methods.

Course Objectives	
Title	Metabolic Pathway
Course Code	MDTAA
CO-1	Students will learn about the fundamental energetic of biochemical process biosynthesis of various amino acids, carbohydrate and lipid metabolism, understand about pathway regulation

Course Outcome	
Title	Metabolic Pathway
Course Code	MDTAA
CO-1	Students gain knowledge about enzymes, mechanism and regulation of enzyme
CO-2	Understand and learn about bioenergetics and phosphorylation,
CO-3	Students again knowledge about various biosynthesis process of biomolecules
CO-4	Students again knowledge about various biosynthesis process of biomolecules
CO-5	Students can describe amino acid structure, properties, inter conversion of an amino acid.

Syllabus	
Title	Metabolic Pathway
Course Code	MDTAA
Unit 1	Enzymes – nomenclature, components - Mechanism of enzyme reactions - Factors influencing enzymatic activity - Inhibition of enzyme action - Metabolic channeling – Control of enzyme activity – Regulation of enzyme synthesis.
Unit 2	Principles of Bio energetics - Oxidation –reduction reactions - Generation of energy –Substrate Level and oxidation phosphorylation - Electron transport chain
Unit 3	Carbohydrate catabolism – Glycolysis – Pentose phosphate pathway – ED pathway – The Kreb`s cycle – Energy yield in glucolysis and aerobic respiration – Anaerobic respiration – Lactic acid fermentation – Alcohol fermentation.
Unit 4	Lipid Metabolism – Oxidation of lipids; biosynthesis of fatty acids; triglycerides; phospholipids; sterols. Protein and amino acid catabolism – Oxidation of inorganic molecules – Photophosphorylation
Unit 5	Bio chemical pathways of energy use – Photosynthetic fixation of CO2 – Biosynthesis of peptidoglycan – Biosynthesis of lipids – Biosynthesis of amino acids -proline, arginine, aspartic acid, histidineInterconversions - therionine, isoleucine and methionine; isoleucine, valine and leucine; serine and lysine; Aspartate and pyruvate. Bio synthesis of purines and pyrimidines

Course Objectives	
Title	Microbial Diversity COURSE CODE: MDTAB
Course Code	MDTAB
CO-1	The course helps students to acquire knowledge on the classification, cell wall membranes, genetic functionality, characteristic feature and adaptation features of different extremophiles for their survivability in their different ecosystems.
CO-2	Learn about the characteristics features of different types of bacteria based on the ph
CO-3	Learn about the space microbiology
CO-4	To understand the concepts about astronaut of microbial flora
CO-5	To learn about the Martian environment of microorganisms

Course Outcome	
Title	Microbial Diversity COURSE CODE: MDTAB
Course Code	MDTAB
CO-1	Describes the common groups of bacteria and archeae and their distribution and ecological niche.
CO-2	Understand the classification, habitats, biogeochemical process and applications of thermophiles and methanogens
CO-3	. It provides knowledge on the classification, cell wall membrane, solutes and osmo adaptation of halophiles and barophiles
CO-4	Understand the objectives of space research, life detection methods for metabolism, photosynthesis, ATP production and Sulphur uptake
CO-5	Learn about Antarctica as a model for mars and to search for life on mars by sending various mission, landers and conducting biology box experiment. As well monitoring of microflora in Martian environment and within astronauts.

Syllabus	
Title	Microbial Diversity COURSE CODE: MDTAB
Course Code	MDTAB
Unit 1	Biodiversity: Introduction to microbial biodiversity- distribution, abundance, ecological niche. Types – Bacterial, Archael and Eucaryal
Unit 2	Thermophiles: classification, hyperthermophilic habitats and ecological aspects. Extremely Thermophilic Archaebacteria, Thermophily, commercial aspects of thermophilies, Applications of thermozymes. Methanogens: Classification, Habitats, applications.
Unit 3	Alkalophiles and Acidophiles - Classification, discovery basin, cell walls and membranes- purple membrane, compatible solutes. Osmoadaptation/ halotolerance. Applications of halophiles and their extremozymes. Barophiles: Classification, high pressure habitats, life under pressure, barophily, death under pressure. Halophiles - Classification, discovery basin, cell walls and membranes- purple membrane, compatible solutes.
Unit 4	Space Microbiology - Aim and objectives of space research. Life detection methods a) Evidence of metabolism (Gulliver) b) Evidence of photosynthesis (autotrophic and heterotrophic) c) ATP production d) phosphate uptake e) sulphur uptake.
Unit 5	Martian environment (atmosphere, climate and other details). Antartica as a model for Mars. Search for life on Mars, Viking mission, Viking landers, and Biology box experiment. Gas exchange, label release and pyrolytic release experiments. Monitoring of astronauts microbial flora: Alterations in the load of medically important microorganisms, changes in mycological and bacterial autoflora

Course Objectives	
Title	Virology
Course Code	MDT2A
CO-1	To understand the architecture of viruses.
CO-2	Understand the interactions between viruses and the host immune system.
CO-3	The terms Oncogenes and tumor suppressor genes, and how tumor viruses interact with these products and their intersecting pathways and cause oncogenesis.
CO-4	To know about the vaccine strategies and mechanisms of antiviral drugs and interferons.
CO-5	To know how viruses can be used as tools to study biological processes, as cloning vectors and for gene transfer.

Course Outcome	
Title	Virology
Course Code	MDT2A
CO-1	The process of entry into the cells, control of gene transcription and where relevant translation and gene product stability, control of and mechanism of genome replication, virion assembly and release from the cell.
CO-2	Define the growth behavior differences between normal cells and cells transformed by oncogenic DNA and RNA Viruses.
CO-3	Define the process of virus latency and describe in molecular terms control of the process and activation of viral genomes during reactivation
CO-4	Describe the processes involved in the anti-tumor effects of “anti-tumor” viruses.
CO-5	Describe about the vaccine production with help of cell culture technology

Syllabus	
Title	Virology
Course Code	MDT2A
Unit 1	Brief outline of virology- discovery of virus- general properties of viruses- general methods of diagnosis and serology- viriods, prions, satellite RNAs and virusoids.
Unit 2	Bacterial viruses - ΦX 174, M13, MU, T4, lambda, Pi; structural organization, lifecycle and phage production. Lysogenic cycle-typing and application in bacterial genetics.
Unit 3	Plant viruses-TMV- general characters- morphology-replication-RNA as its initiator of infection. Cauliflower mosaic virus; Transmission of plant viruses; common viral diseases of crop plants- paddy, cotton, tomato, and sugarcane. Viruses of cyanobacteria, algae, fungi and insects.
Unit 4	DNA Viruses- Pox viruses, Herpes viruses, Adeno viruses, Papova viruses and Hepadna viruses; RNA Viruses- Picorna, Orthomyxo, Paramyxo, Toga and other arthropod borne viruses, Rhabdo, Rota, HIV and other Hepatitis viruses.
Unit 5	Epidemiology, Diagnosis and Treatment of Viral Diseases; Viral Vaccines and Antiviral agents.

Course Objectives	
Title	Systematic Medical Bacteriology
Course Code	MDT2B
CO-1	Proforma development and direct examination of infectious human samples.
CO-2	Exposure of laboratory methods used in identifying infectious agents.
CO-3	Antibiotic sensitivity testing for pathogens.
CO-4	Epidemiology of infectious agents.
CO-5	Employing different staining methods for bacterial and fungal pathogens.

Course Outcome	
Title	Systematic Medical Bacteriology
Course Code	MDT2B
CO-1	Rationale and basis of classification of bacteria and to enumerate the order, family, genus and species.
CO-2	The morphology, cultural, biochemical and other biological properties and characteristics of medically important bacteria
CO-3	The mechanism and pathogenesis and pathology.
CO-4	The disease caused by them, epidemiology, treatment, prevention and control.
CO-5	Described about the virulence of various bacteria which leads to cause disease

Syllabus	
Title	Systematic Medical Bacteriology
Course Code	MDT2B
Unit 1	Philosophy and General approach to clinical conditions of various syndromes – general and specific syndromes. Indigenous normal microbial flora of human body. General attributes and virulence factors of bacteria causing infections.
Unit 2	Host Parasite relationships – Nonspecific host immune mechanisms. Ground rules for collection and dispatch of clinical specimens for microbiological diagnosis
Unit 3	Morphology, classification, cultural characteristics, Pathogenicity, pathology, Laboratory diagnosis and prevention – Control and treatment of diseases caused by the following organisms: Staphylococci, Streptococci, Pneumococci, Neisseriae (Gonococci & Meningococci), Corynebacterium, Mycobacterium, Clostridium, Bacillus
Unit 4	Studies on Salmonella, Shigella, Vibrios, Brucella, Gram negative anaerobes, Spirochetes, Rickettsiae, Chlamydiae, Mycoplasmas and ureoplasmas
Unit 5	Zoonotic diseases and their control – Hospital acquired infections – Hospital Infection control committee – functions – Hospital waste disposal – Ethical committee – functions.

Course Objectives	
Title	Mycology & Parasitology
Course Code	MDT2C
CO-1	Describe basic morphology, physiology of fungi and parasites.
CO-2	Classify parasites and fungi.
CO-3	Principles of safety, quality assurance and quality control.
CO-4	Learn about the pathogenic features of various parasites
CO-5	Learn about the pathogenic features of various fungi

Course Outcome	
Title	Mycology & Parasitology
Course Code	MDT2C
CO-1	To provide students both academic instruction and professional training in the field of laboratory medicine.
CO-2	To carry out the education of each student in a manner this encourages further education, participation in community service and maintenance of special interests in the field.
CO-3	Evaluate specimen acceptability.
CO-4	To understanding the prophylaxis and diagnosis of various pathogenic parasites
CO-5	To understanding the antifungal agents of Various fungi

Syllabus	
Title	Mycology & Parasitology
Course Code	MDT2C
Unit 1	Historical introduction to mycology - Structure and cell differentiation. Lichens – ascolichens, basidiolichens, deuterolichens. Fungi as insect symbiont. Morphology, Taxonomy, Classification of fungi.
Unit 2	Dermatophytes and agents of superficial mycoses. Yeasts of medical importance. Dimorphic fungi causing systematic mycoses. Dimatiaceous fungi, opportunistic hyaline hyphomycetes, agents of zygomycosis. Fungi causing Eumycotic mycetoma
Unit 3	Detection and recovery of fungi from clinical specimens. Newer methods in diagnostic mycology. Immunity to fungal infections. Mycotoxins. Antifungal agents - testing methods and quality control
Unit 4	Introduction to Medical parasitology – classification, host-parasite relationships. Epidemiology, life cycle, pathogenic mechanisms, lab diagnosis, treatment, etc. for the following: Protozoa causing human infections – Entamoeba, Aerobic and Anaerobic amoebae. Toxoplasma, Cryptosporidium, Leishmania, Trypanasoma, Giardia, Trichomonas, Balantidium
Unit 5	Classification, life cycle, lpathogenicity, laboratory diagnosis and treatment for the following parasites: Helminths: cestodes – Taenia solium, T.saginata, T. echinococcus. Trematodes – Fasciola hepatica, Fasciolopsis buski, Paragonimus, Schistosomes. Nematodes: Ascaris, Ankylostoma, Trichuris, Trichuris, Trichinella, Enterobius, Strongyloides, Wuchereria. Other parasites causing infections in immunocompromised hosts and AIDS

Course Objectives	
Title	Systematic Bacteriology Mycology, Virology & Parasitology
Course Code	MDT21
CO-1	Identify common infectious agents
CO-2	Evaluate methods used to identify infectious agents
CO-3	Specific mechanisms by which an infectious agent causes disease
CO-4	Epidemiology of infectious agents
CO-5	Appropriate use of antimicrobial agents and common mechanisms of antimicrobial action and resistance

Course Outcome	
Title	Systematic Bacteriology Mycology, Virology & Parasitology
Course Code	MDT21
CO-1	Rationale and basis of classification of bacteria and to enumerate the order, family, genus and species.
CO-2	The morphology, cultural, biochemical and other biological properties and characteristics of medically important bacteria.
CO-3	The mechanism of virulence and pathogenesis and pathology.
CO-4	The disease caused by them, epidemiology, treatment, prevention and control.
CO-5	From the concepts students gain the knowledge about the diagnosis procedures of various bacteria and fungi

Syllabus	
Title	Systematic Bacteriology Mycology, Virology & Parasitology
Course Code	MDT21
Unit 1	Collection and transport of clinical specimens -Prerequisites - Proforma -Methodologies. Direct examinations - wetfilms/stainings for Faeces (V.cholerae, Shigella, Salmonella) Pus, Sputum, throat/ear/nasal/wound swabs, CSF and other body fluids. Simple, differential and special staining methods.
Unit 2	Cultivation methods -Transport media - Isolation methods – Basal, differential enriched, selective media & special media for the pathogenic bacteria. Biochemical identification. Tests for the respective bacteria up to species level.
Unit 3	Antibiotic sensitivity tests -Stokes & Kirby Bauer methods - Disc diffusion -Dilution -Agar dilution & broth dilution -MBC/MIC -

	Quality Control for antibiotics and standard strains.
Unit 4	KOH preparation of skin / nail scrapings for fungi and scabies mites. Examination of hair infection under UV light. LPCB mount. Special stains for fungi -Gomori, PAS and Methanamine silver stain for sections. Cultivation of fungi and their identification -Mucor, Rhizopus, Aspergillus, Penicillium, Candida, Trichophyton, Microsporum, Epidermophtyon - Slide culture method - Germ tube method, Sugar assimilation / fermentation tests for yeast
Unit 5	Examination of parasites in clinical specimens - Ova/cysts in faeces -Direct and concentration: methods – Formal, Ether and Zinc sulphate methods - Saturated salt solution method. Blood smear examination for malarial parasites. Thin smear by Leishman's stain - Thick smear by J.B. stain. Wet film for Microfilariae. Identification of common arthropods of medical importance - spotters of Anopheles, Glossina, Phelbotomus, Aedes, etc. Ticks and mites.

Course Objectives	
Title	Industrial and pharmaceutical Microbiology
Course Code	MDTAC
CO-1	Enable Graduates to enter industry with an appropriate level of understanding of the need for both the science.
CO-2	Ability to apply the techniques used in industries.
CO-3	To produce new drug.
CO-4	To learn about the different types of media formulation and cultivation of microorganisms
CO-5	To learn about the pharmaceutical products and quality control of various products

Course Outcome	
Title	Industrial and pharmaceutical Microbiology
Course Code	MDTAC
CO-1	Get equipped with a theoretical and practical understanding of industrial microbiology.
CO-2	Know about design of bioreactor, factors affecting growth and production.
CO-3	Understand the rationale in medium formulation and design for microbial fermentation.
CO-4	Discuss microbial contamination, product spoilage and antimicrobial preservation of cosmetic products
CO-5	Know about the sterilization of media and air

Syllabus	
Title	Industrial and pharmaceutical Microbiology
Course Code	MDTAC
Unit 1	Isolation, preservation and improvement of industrially important micro organisms; Raw materials and media design for Fermentation processes; Sterilization; Development of inoculums for industrial fermentations; Types of fermentation: Batch, continuous, dual or multiple, surface, submerged, aerobic and anaerobic
Unit 2	Fermenter – Design and types. Instrumentation and control - aeration and agitation. Recovery and purification of fermentation products. Enzyme and cell immobilization, production of recombinant proteins having therapeutic and diagnostic applications: Vaccines, Insulin, Interferon, Somatotropin, Single cell protein.
Unit 3	Biology of industrial micro organisms. Streptomyces, Yeasts (Saccharomyes, Hansenela) Spirulina and Penicillium. Mushroom cultivation. Biosensors and Biochips. Biofuels from microbial sources.
Unit 4	Production of primary metabolites: Alcohols (Ethanol and Butanol); Beverages (Beer and Wine); Aminoacids (Glutamic acid and Lysine); Organic acids (Citric acid and acetic acid).
Unit 5	Production of secondary metabolites: Antibiotics (Penicillin and Streptomycin); Vitamins (Riboflavin and Cyanocobalamin); Steroids; Production of enzymes (Protease, amylase and lipase); Biopolymers (Xanthan gum and PHB); Biopreservatives (Nisin).

Course Objectives	
Title	BIOSTATISTICS & BIOINFORMATICS
Course Code	MDTBA
CO-1	This course helps student's emphasis on the application of bioinformatics and biological databases to problem solving in real research problems.
CO-2	This course helps students to learn computational tools to find sequences, analysis of protein and nucleic acid sequences by various software packages (BLAST, FASTA, Gen Bank etc.,)
CO-3	This course helps students gain knowledge on the different protein structure –MOTIFs, DNA Microarray
CO-4	To learn about the different types of DNA database
CO-5	Understand the concepts about the system medicine

Course Outcome	
Title	BIOSTATISTICS & BIOINFORMATICS
Course Code	MDTBA
CO-1	Describes the contents and properties of the most important bioinformatics databases, perform text- and sequence-based searches.
CO-2	Understand the major steps in pairwise and multiple sequence alignment by dynamic programming and predict the secondary and tertiary structures of protein and DNA sequences.
CO-3	Familiarized with various tools in identifying sequences for enhancing the advancements in system medicines.
CO-4	Described about the gene expression based on microarray
CO-5	Described about the statistical analysis,tabul tabulation in life sciences

Syllabus	
Title	BIOSTATISTICS & BIOINFORMATICS
Course Code	MDTBA
Unit 1	Nature and scope of statistical methods and their limitations compilation, classification, tabulation and applications in life sciences. Graphical representation – measure of average, dispersion - stem and leaf plots; box and whisker plots, coplots. Introduction to probability theory and distributions (concepts without derivation) binomial, poission and normal (only definition and problems).
Unit 2	Correlation and regression – concepts of sampling and sampling distribution – tests of significance based on t-test, chi-square and F-test for means, proportions, variations and correlation efficient, theory of attributes and tests of independence of contingency tables
Unit 3	Sampling methods- simple, random, stratified, systemic and cluster sampling procedures. Sampling and non-sampling errors. Principles of scientific experiments- analysis of variance- one way and two way classification.
Unit 4	Overview of bioinformatics- database types. Genomics and human genome project. Computational tools for sequence analysis and similarity searching.
Unit 5	Pair wise and multiple sequence alignment. Macromolecular structure function relationships. DNA micro array. Next generation sequencing. Systems medicine.

Course Objectives	
Title	Microbial Genetics
Course Code	MDT3A
CO-1	To understand the structure and function of Plasmids and Transposons.
CO-2	Understand the importance of mutations.
CO-3	Understand how gene expression is controlled.
CO-4	To understand the mechanism of transfer of genetic material from one species to another.
CO-5	To understand the organization of gene and chromosome.

Course Outcome	
Title	Microbial Genetics
Course Code	MDT3A
CO-1	To analyze processes involved in gene mutation and transfer in microorganisms.
CO-2	To apply valid microbial genetic knowledge to commercial applications.
CO-3	Students can able to identify and distinguish genetic regulatory mechanisms at different level
CO-4	To gain the knowledge of gene mapping and strain construction.
CO-5	Students can able to differentiate phenotypic and genotypic relationship.

Syllabus	
Title	Microbial Genetics
Course Code	MDT3A
Unit 1	Historical perspectives of microbial genetics. Nucleic acid as genetic information carriers: experimental evidence. DNA – types, structure and properties topology, super helicity, linking number.
Unit 2	Organization of genes and chromosomes: Definition of gene. Operon Positive regulation. Structure of chromatin and chromosomes -unique and repetitive DNA, heterochromatin, euchromatin, transposons
Unit 3	Plasmids as extrachromosomal genetic elements; types and properties. Structure and replication of different plasmids: Col E1, F1 and Ti plasmids. Plasmid amplification and curing; Gene transfer mechanisms: Transformation, conjugation and transduction.
Unit 4	Mutation and Mutagenesis – mechanisms, biochemical basis, mutagens. Molecular basis of spontaneous and induced mutations. Reversion and suppression. Environmental Mutagenesis and toxicity testing; Carcinogenecity - chemical carcinogenesis and their testing. Isolation of Mutants.
Unit 5	Molecular recombination - Mechanism, control and models. Transposition; regulatory sequences and transacting factors. Genetic mapping in E. coli and Yeast. Genetics of Lambda, M13, Mu, T4 and OX174Genetic systems of yeast and Neurospora

Course Objectives	
Title	Genetic Engineering
Course Code	MDT3B
CO-1	The purpose of this course is to introduce the basic molecular biological concepts and techniques used in the fields of genetic engineering.
CO-2	Learn about the various genetic markers
CO-3	Learn about the various enzymes involved in genetics engineering
CO-4	Learn about the various types of PCR
Co-5	Learn about the various types of blotting techniques

Course Outcome	
Title	Genetic Engineering
Course Code	MDT3B
CO-1	Gaining an appreciable knowledge of dealing with ethical issues relaying to science
CO-2	Gaining and understanding basic molecular and cellular biology concepts and techniques.
CO-3	Gaining the knowledge about current experimentation in genetic engineering.
CO-4	Gaining the various about the various types of vectors
CO-5	From the syllabus the students understand the gene expression

Syllabus	
Title	Genetic Engineering
Course Code	MDT3B
Unit 1	Principles and methods in genetic engineering: Host cell restriction -restriction modification. Restriction enzymes - types and applications, restriction mapping; Enzymes used in genetic engineering -Nucleases, Ribonucleases, DNA ligases, Tag DNA Polymerases, Methylases, Topoisomerases, Gyrases and Reverse Transcriptases.
Unit 2	Vectors - Plasmid vectors: pSC101, pBR322, pUC series and Ti plasmids based vectors - Bacteriophage vectors: Lambda phage based vectors, phagemids, cosmids, and M13 based vectors - Viral vectors: Vaccinia, Retroviral, SV40 and Baculoviral system; Bacterial and yeast artificial chromosomes. Expression vectors.
Unit 3	Cloning techniques - Genomic DNA and cDNA library Construction -Screening methods. Cloning in E. coli, Bacillus, Pseudomonas, Streptomyces and yeast. Expression systems. Gene fusion and Reporter genes. Gene targeting. Methods of gene transfer -transformation, transfection; electroporation, microinjection and biolistics
Unit 4	Analysis of Recombinant DNA. Polymerase chain reaction. Principles and techniques of nucleic acid hybridization and cot curves - Southern, Northern, Western and South-Western blotting techniques. Dot and Slot blotting
Unit 5	DNA and protein sequencing. Protein engineering. Protoplast fusion. Hybridoma Technology. DNA finger printing - RFLP, RPAD and AFLP techniques. Applications of genetic engineering in agriculture, health and industry including gene therapy

Course Objectives	
Title	Molecular Biology
Course Code	MDT3C
CO-1	Provide knowledge about molecular biology and inheritance at the molecular, cellular and phenotypic levels.
CO-2	Gain laboratory skills in molecular biology techniques such as micro pipetting, PCR and electrophoresis.
CO-3	Study about the terminology of cell and molecular biology.
CO-4	Learn about the Cellular concepts
CO-5	Learn about the DNA replication.trancription and translation

Course Outcome	
Title	Molecular Biology
Course Code	MDT3C
CO-1	Understand the structures and functions of biomolecules.
CO-2	To know the functions of DNA replication, recombination and their repair mechanism.
CO-3	Gain the knowledge about protein synthesis and protein regulations.
CO-4	To Study the concepts of Genetic code, Gene silencing and gene regulations.
CO-5	To gain the knowledge about the various structure of protein

Syllabus	
Title	Molecular Biology
Course Code	MDT3C
Unit 1	Composition, structure and function of biomolecules (carbonhydrates, lipids, proteins and nucleic acids). Conformation of proteins (Ramachandran plot, secondary, tertiary and quaternary structure; domains; motif and folds). Conformation of nucleic acids (A-, B-, Z-, DNA), t-RNA, micro-RNA. Stability of protein and nucleic acid structures. Molecular approaches to diagnosis and strain identification.
Unit 2	DNA replication, repair and recombination - unit of replication, enzymes involved, replication origin and replication fork, fidelity of replication, extra-chromosomal replications. DNA damage and repair mechanisms.
Unit 3	RNA synthesis and processing: Transcription factors and machinery -formation of initiation complex, transcription activators and repressors, RNA polymerases, capping, elongation and termination. RNA processing - RNA editing, splicing, polyadenylation, RNA transport.
Unit 4	Protein synthesis - formation of initiation complex, elongation and termination – machineries and their regulation. Genetic code. Aminoacylation of tRNA, tRNA-identity, aminoacyl tRNA synthetase, translational proof-reading, translation inhibitors. Post-translational modification of proteins
Unit 5	Control of gene expression at transcription and translation level -Regulation of phages, viruses, prokaryotic and eukaryotic gene expression - Role of chromatin in regulating gene expression and gene silencing

Course Objectives	
Title	Microbial Genetics, Molecular Biology and Genetic Engineering
Course Code	MDT31
CO-1	The purpose of this course is to provide knowledge about various separation, isolation techniques students will learn about electrophoresis and also advanced techniques.
CO-2	Learn about the various molecular techniques like isolation of DNA and RNA
CO-3	Learn about the mutation techniques
CO-4	Learn about the various types of PCR techniques
CO-5	Understand about the gene transfer and gene expression techniques

Course Outcome	
Title	Microbial Genetics, Molecular Biology and Genetic Engineering
Course Code	MDT31
CO-1	: Students can able to isolate DNA, RNA and perform electrophoresis.
CO-2	Students can isolate and estimate RNA.
CO-3	Students can perform SDS-PAGE, and also separate amino acids by thin layer chromatography and paper chromatography.
CO-4	They can able to separate proteins, immobilized enzyme, isolation of protoplast and spleroplast.
CO-5	Have clear idea about competent cells and also perform transformation

Syllabus	
Title	Microbial Genetics, Molecular Biology and Genetic Engineering
Course Code	MDT31
Unit 1	Isolation of genomic DNA from bacteria and demonstration in agarose gel electrophoresis. Isolation of plasmid DNA by alkali lysis method. Estimation of DNA by diphenyl amine method. Determination of Tm value of DNA. Quantitation of nucleic acids by UV Spectrophotometer
Unit 2	Isolation of RNA from yeast. Estimation of RNA by orcinol method. Induced mutagenesis - Isolation of antibiotic resistant auxotrophic mutants.
Unit 3	Estimation of proteins by Lowery et al method. SDS-PAGE. 2D-Gel electrophoresis. Isoelectric focussing. Separation of amino acids by TLC and paper chromatography
Unit 4	Separation of proteins using Gel filtration and Ion exchange chromatography. Immobilization of enzymes and whole cells. Western blotting. Protoplast and spheroplast isolation. Induction of betagalactosidase activity in E. c
Unit 5	Preparation of competent cells. Transformation and Blue-White selection for transformants. DNA amplification by PCR. Separation of PCR amplified product on PAGE and determination of product size. Restriction mapping / Restriction analysis

Course Objectives	
Title	Soil & Agricultural Microbiology
Course Code	MDTAD
CO-1	This course helps students to gain knowledge on the types of soil, microbial interactions in soil, nitrogen fixing organisms.
CO-2	Help to learn about the types of soil and fertility of soil
CO-3	Learn about the production of biofertilzers
CO-4	Learn about the various plant disease
CO-5	Learn about the bio pesticide production using microbes and plant disease management to promotes prevention and enhance the plants growth

Course Outcome	
Title	Soil & Agricultural Microbiology
Course Code	MDTAD
CO-1	Understand the properties of different types of soil and interaction of microbes with plants, insects and microbes itself.
CO-2	Insight knowledge on nitrogen fixing organisms, their cultivation on usage for bio fertilizer and bio pesticides
CO-3	Learn the types of pathogen causing plant disease and their defense mechanism by pathology, biochemical and molecular aspects.
CO-4	Efficient in understanding the different symptoms, epidemiology and management of various plant diseases like Tobacco Mosaic Diseases, Leaf spot of paddy etc.,
CO-5	Ability to use biotechnological methods to manage plant diseases, sanitation and plant disease forecasting.

Syllabus	
Title	Soil & Agricultural Microbiology
Course Code	MDTAD
Unit 1	Characteristics and classification of soils; Soil Microorganisms; Interactions between microorganisms - Mutalism, commensalism, ammensalism, synergism, parasitism, predation, competition. Interaction of microbes with plants - rhizosphere, phyllosphere and mycorrhizae
Unit 2	Symbiotic and Asymbiotic Nitrogen fixation – mechanism and genetics of Nitrogen Fixation. Biogeochemical cycles - carbon, nitrogen, phosphorus, sulfur. Biofertilizers - Rhizobium, Azotobacter, Azospirillum, VAM, Phosphobacteria, Azolla Cyanobacteria. Biopesticides. Interrelationships between microorganisms, plants and soil - Enzymes of microbial origin and their role in release of available plant nutrients.

Unit 3	Plant pathogens and classification of plant diseases. Host-pathogen recognition and specificity. Principles of plant infection and defense mechanisms - entry of pathogen in to host, colonization of host; role of enzymes, toxins and growth regulatory substances. Defense mechanisms in plants - Structural and biochemical - Molecular aspects of host defense reactions - Lipoxygenase and other enzymes in the expression of disease resistance.
Unit 4	Symptoms, Etiology, Epidemiology and management of the following plant diseases: Mosaic disease of tobacco; Bunchy top of banana; Leaf roll of potato; Bacterial blight of paddy; Angular leaf spot of cotton, Late blight of potato; Damping off of tobacco, Downy mildew of bajra; Powdery mildew of cucurbits; Head smut of sorghum; Leaf rust of coffee; Blight of maize/sorghum; Leaf spot of paddy, Grassy shoot of sugar cane; Root knot of mulberry.
Unit 5	Plant disease management – exclusion, evasion, eradication, crop rotation. Sanitation - physical, chemical and biological control. Plant disease forecasting. Biotechnological approaches to disease management.

Course Objectives	
Title	Environmental Biotechnology
Course Code	MDTBB
CO-1	To provide knowledge for environmental engineering, bioremediation control and monitoring, study on microbial growth kinetics.
CO-2	Learn about the bioflim and biomass production
CO-3	Learn about the detoxification of various chemical hazards
CO-4	Learn about the bioremediation and biodegradation of various products
Co5	Understand the concepts about the various types of bioreactors

Course Outcome	
Title	Environmental Biotechnology
Course Code	MDTBB
CO-1	Students gain knowledge on biofilm occurrence, effect and control measures.
CO-2	Understand and learn about various bioreactor and its usage, effluent recycle
CO-3	Able to learn about waste water treatment, drinking water treatment, denitrification process.
CO-4	Learn about various hazardous chemical and biodegradation process
CO-5	Gains knowledge about control and bioremediation of various industry

Syllabus	
Title	Environmental Biotechnology
Course Code	MDTBB
Unit 1	Biofilm – occurrence causes and effects - control measures. Biofilm reactor-soluble microbial products and inert biomass – principle and applications
Unit 2	Bioreactors - principles and designing. Reactor types – batch, continuous-flow, stirred-tank reactor, plug-flow reactors. Effluent recycle - reactors with recycle of settled cells - alternate rate models - Reactors in series
Unit 3	Denitrification – physiology, types and microbes involved - sludge denitrification. Waste water treatment systems - anaerobic and aerobic- Special factors for the design of anaerobic sludge digesters. Drinking-water treatment: principles - anaerobic treatment by methanogenesis
Unit 4	Detoxification of Hazardous chemicals - factors causing molecular recalcitrance. Synthetic organic chemicals - Energy metabolism versus co-metabolism - Electron donor versus electron acceptor - Biodegradation of environmental contaminants
Unit 5	Bioremediation: Strategies for bioremediation - Pollution monitoring, control and remediation (petroleum industry, paper industry, chemical industry etc.). Biomass from the wastes

Course Objectives	
Title	Food, Dairy & Environmental Microbiology
Course Code	MDT4A
CO-1	This course helps students to learn the microflora in different foods and their role in spoilage, contamination, preservation and disease causing nature
CO-2	This course concentrates on the preparation of different fermented products (cheese, yogurt etc.,) dairy microbiology, food sanitation process and different food control agencies and their regulations.
CO-3	The course provides knowledge on Micro flora in air – techniques to assess air quality, airsanitationandairbornedisease causing pathogen
CO-4	It helps students learn about water microbiology – fauna and flora in aquatic habitat and ecologyfactorson environment.
CO-5	As a part of serving nation this course provides knowledge on treatment of liquid and solidwastesby different method (composting,silage,saccharifiction etc.,)

Course Outcome	
Title	Food, Dairy & Environmental Microbiology
Course Code	MDT4A
CO-1	Understand the role of intrinsic and extrinsic factors on growth and survival ofmicroorganismsinfoods,theirspoilagemechanismandpreservationandpreventionmethods.
CO-2	Learn the basis of food safety regulations and the use of standard methods andproceduresfor themicrobiologicalanalysisoffood.
CO-3	Knowthebeneficialroleofmicroorganismsaswellasthemethodsofprocessingandpreparingdifferentfermentedfoodslikecheese,soysauceetc.,
CO-4	Understand the role of intrinsic and extrinsic factors on growth and survival ofmicroorganismsinfoods,theirspoilagemechanismandpreservationandpreventionmethods.
CO-5	Learn the basis of food safety regulations and the use of standard methods andproceduresfor themicrobiologicalanalysisoffood.

Syllabus	
Title	Food, Dairy & Environmental Microbiology
Course Code	MDT4A
Unit 1	Food Microbiology: Occurrence of microorganisms in food - Factors influencing microbial growth - extrinsicandintrinsic.Principlesandmethodsoffoodpreservation- highTemperature,lowTemperature, drying, irradiation and chemical preservatives. Food borne diseases -Bacteria, Fungi,Viruses,Algaeand Protozoa.Spoilageoffruits,vegetables, meat,poultry,fishandseafoods.
Unit 2	Dairy Microbiology: Microflora of milk - sources of contamination. Spoilage and preservation of milkand milk products. Fermented foods - Sauerkraut, Pickles, Buttermilk, Yogurt and Cheese. ProbioticsandPrebiotics.Milkbornediseases.Foodsanitation-food controlagenciesandtheirregulations.
Unit 3	Microbiology of air: Occurrence - number and kinds of microbes in air. Distribution and sources of airborne organisms - aerosol and droplet nuclei. Assessment of air quality -Air Sanitation - Airbornediseases. Microbiology of water: Aquatic habitats - their microflora and fauna - lake, ponds, river,estuaryandsea.Biologyandecologyofreservoirsandinfluenceofenvironmentalfactorsontheaquaticbiota.
Unit 4	EnvironmentalMicrobiology:Wastetreatment-Wastes-typesandcharacterization.Treatmentofsolidwastes - composting, vermiform composting, silage, pyrolysis and saccharifications. Treatment ofliquidwastes-primary,secondary(anaerobicandaerobic)-trickling,activatedsludge,oxidationpond,andoxidationditch-tertiary - disinfection.
Unit 5	DegradationofXenobioticcompounds:Simplearomatics,chlorinatedpolyaromaticpetroleumproducts, pesticides and surfactants. Biodeterioration of materials - paper, leather, wood, textiles andpaint.Metalcorrosion- Bioaccumulationof heavy metals.Biofoulingand Bioleaching.

Course Objectives	
Title	**Practical-IVSoil,Agricultural,Foodand EnvironmentalMicrobiology**
Course Code	**MDT41**
CO-1	Itwillprovideanintroductiontothemicrobialworldanditsimpacts,both positiveandnegativeon humans.
CO-2	Discussaboutsoilmicroorganisms
CO-3	DescribeFoodanddairymicroorganismsanditsimpacts.
CO-4	Discuss about the BOD and COD treatment to know about the microbial load
CO-5	Learn about the various microbial spoilage present in food.

Course Outcome	
Title	**Practical-IVSoil,Agricultural,Foodand EnvironmentalMicrobiology**
Course Code	**MDT41**
CO-1	Introduction to a wide range of microbial life, to the techniques used to studymicroorg anismsandtotheinteractions,bothbeneficialandadverse,between microbesandhumans.
CO-2	LearnhowtomanipulatedatefromMicrobiologicalexperimentsandhowthe resultsmay beused for thebenefitsofmankind.
CO-3	Evaluatespecimen acceptability
CO-4	From that curriculum students gain the knowledge about the milk quality
CO-5	Students gain the knowledge about the nitrogen fixation

Syllabus	
Title	**Practical-IVSoil,Agricultural,Foodand EnvironmentalMicrobiology**
Course Code	**MDT41**
Unit 1	Isolation and enumeration of soil microorganisms (fungi, bacteria and actinomycetes). Isolation ofphosphate solubilizer from soil. Isolation of Nitrogen fixers - *Rhizobium* from root nodule and - *Azotobacter* from rhizosphere. Screening of antagonistic bacteria in soil by agar overlay method.Isolationof Cyanobacteriaand Photosyntheticbacteriafromsoil/water.
Unit 2	Estimation of foliar infection by Stoyer's method. Cultivation of oyster mushroom. Study of thefollowing diseases: Tobacco mosaic; Bacterial blight of paddy; Downy mildew of bajra; Powderymildow of cucurbits; Head smut of sorghum, Leaf rust of coffee; Leaf spot of mulberry, Red rot ofsugarcane,Rootknotofmulberry.
Unit 3	Detection of number of bacteria in milk by breed count. Determination of quality of milk sample - methylenebluereductiontestandResorzurinmethod.Detectionofnumberofbacteriainmilk-standardplant count. Isolation of yeast and molds from spoiled nuts, fruits, and vegetables. Bacteriologicalexaminationofspecificfoods–curd,rawmeat,fish, Icecream.
Unit 4	Extracellular enzyme activities - phosphatase. Quantification of microorganisms in air-solid and liquidimpingementtechniques
Unit 5	Physical, chemical and microbial assessment of water and potability test for water. Physical andchemical-colour,pH,alkalinity,acidity,COD,BOD,anionsandcations.Microbiological-MPNindex -presumptive,completedandconfirmatorytests.

Course Objectives	
Title	**ResearchMethodology**
Course Code	**:MDTAE**
CO-1	Problemidentification
CO-2	Reviewinginformation
CO-3	Recenttechniquesinappliedbiology.
CO-4	Learn about the flowcytometery
CO-5	Students learn how to write the research thesis

Course Outcome	
Title	**ResearchMethodology**
Course Code	**:MDTAE**
CO-1	AnoverviewofEducationResearch.
CO-2	Knowledgeofthevariousresearchdesigns.
CO-3	Knowledge of how to do quality scholarly research including, identifying a researchproblem, review of literature, hypotheses, data collection, analysis the data, reportingandevaluatingresearch.
CO-4	Knowledge about the bioethics
CO-5	Knowledge about the radio labelling techniques

Syllabus	
Title	**ResearchMethodology**
Course Code	**:MDTAE**
Unit 1	Research Methodology - Meaning and objectives and types of research. Research approaches -research Process. Defining the research problem - research design. Sampling – types and design. Datacollection - methods - processing and analysis of data. Testing of Hypothesis. Fundamentals ofBioethics.
Unit 2	Writing the Research Report (Thesis and publications): Components of research report - Title,Authors, Addresses, Abstract, Keywords, Introduction, Materials and Methods, Results, Discussion,Summary,Acknowledgementsand Bibliography.
Unit 3	Molecular biology methods: In vitro mutagenesis and detection techniques. Gene knock out inbacterialandeukaryoticorganisms.Methodsforanalysisofgeneexpression-RNAandproteinlevel
Unit 4	Histochemical and immunotechniques: Flowcytometry and immunofluorescence microscopy.Detection of molecules in living cells - FISH and GISH. Biophysical methods: Analysis ofbiomolecules-UV/visible,fluorescence,circulardichroism,NMRandESRspectroscopy.Structuredetermination-X-ray diffraction,massspectrometry and surfaceplasmaresonancemethods.
Unit 5	Radiolabeling techniques: Radioisotopes used in biology – properties, detection and measurement.Molecular imaging of radioactive material and safety guidelines. Miscroscopic techniques:Microscopy of living cells, scanning and transmission microscopes, different fixation and stainingtechniques for EM, freeze-etch and freeze-fracture methods for EM - Image processing methods inmicroscopy.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF BIOTECHNOLOGY(P.G.)

Program : M.Sc. BIOTECHNOLOGY

Program Outcomes	
	On Completion of Program the student will able to
PO-1	Postgraduate students will be able to demonstrate and apply their knowledge of Cell biology, Biochemistry, Microbiology and Molecular Biology to solve the problem related to the field of biotechnology.
PO-2	Students will be able to demonstrate and apply the principles of bioprocess engineering in the design and analysis
PO-3	Gain fundamental knowledge in animal and Plant Biotechnology and their application.
PO-4	Students will be able to understand various facts of molecular procedures and basics of genomics, proteomics and metabolomics that could be employed in early diagnosis and prognosis of human diseases
PO-5	Students will be able to gain hands on training in Molecular Techniques. This experience could enable them to begin a carrier in industry that engages in genetic engineering as well as in research laboratories
PO-6	Become knowledgeable in the subject of Biotechnology and apply the principles of the same to the needs of the Employer / Institution /own Business or Enterprise
PO-7	Be competent to handle industrial scale process and product quality assessment
PO-8	Understand and appreciate professional ethics, community living and Nation Building initiatives
PO-9	Develop strategies to identify and alleviate societal health

Program Specific Outcomes	
	On Completion of Program the students will able to
PSO-1	Apply the knowledge of Biotechnology in the domain of Agriculture / Medicine /Environment / Pharma Biotech
PSO-2	The program provides intensive and in-depth knowledge of Biotechnology
PSO-3	This program makes the students to acquire knowledge on critical thinking skills and experience in projects
PSO-4	They are trained to handle equipments with understanding standard operating procedure and safety aspects.
PSO-5	The students are trained to take up wide variety of roles like Researchers and academicians

Course Objectives	
Title	**BIOCHEMISTRY**
Course Code	**MDK1A**
CO-1	Demonstrate knowledge and understanding of the molecular machinery of living cells
CO-2	Using basic laboratory skill and apparatus to obtained data
CO-3	Implement and experimental protocol and adapt them to plan and carry out simple investigation
CO-4	Build on their knowledge and understanding in tackling more advanced and specialized course
CO-5	More widely to pursue independent self direct and critical learning

Course Outcome	
Title	**BIOCHEMISTRY**
Course Code	**MDK1A**
CO-1	Students should be able to gain fundamental knowledge in biochemistry
CO-2	Knowledge of biochemical principles with specific emphasis on different metabolic pathways and regulations
CO-3	Identify and demonstrate Bioenergetics and biological oxidation
CO-4	Understand the molecular basics of aminoacids and protein
CO-5	To know about the nucleic acids like purine and pyrimidines and to know the pathways

Syllabus	
Title	**BIOCHEMISTRY**
Course Code	**MDK1A**
Unit 1	pH, pK – acid, base – biological buffer system – Water-Principles of thermodynamics. Carbohydrates: Nomenclature, classification, structure, chemical and physical properties of carbohydrates. Metabolisms: glycogenesis, glycogenolysis, gluconeogenesis, pentose phosphate pathway.
Unit 2	Lipids: Nomenclature, classification, structure, chemical and physical properties of fatty acids. Metabolisms: biosynthesis of fatty acids, triglycerols, phospholipids, glycol lipids. Cholesterol biosynthesis, bile acids and salt formation. Eicosanoids, sphingolipids and steroid hormones.
Unit 3	Bioenergetics and Biological oxidation: Electron transport chain, oxidative phosphorylation, glycolysis, citric acid cycle, cori's cycle, glyoxalate pathway. Oxidation of fatty acids-mitochondrial and peroxisomal ßoxidation, á and ù oxidation, oxidation of unsaturated and odd chain fatty acids, ketone bodies. Photosynthesis, urea cycle, hormonal regulation of fatty acids and carbohydrates metabolisms.
Unit 4	Amino acids and Protein: Nomenclature, Classification, structure, chemical and physical properties of amino acids and proteins. Metabolisms: Biosynthesis of amino acids. Degradation of proteins, nitrogen metabolisms and carbon skeleton of amino acids. Over all in born error metabolisms.
Unit 5	Nucleic acids: Nomenclature, Classification, structure, chemical and physical properties of purine and pyrimidines. In de novo and salvage synthesis of purines, pyrimidine bases, nucleosides and nucleotides. Catabolism of purine and pyrimidine bases. Synthetic analogues of nitrogenous bases.

Course Objectives	
Title	**MOLECULAR GENETICS**
Course Code	**: MDK1B**
CO-1	Basic principles of molecular genetics of prokaryotic and eukaryotic organisms
CO-2	Gain higher level thinking skills that is necessary for scientist
CO-3	This course suit exits about basic science and its application
CO-4	To identify important outstanding problems in molecular genetics
CO-5	To acquire a broad understanding of current molecular genetics and genomics

Course Outcome	
Title	**MOLECULAR GENETICS**
Course Code	**: MDK1B**
CO-1	Students can understand about the genes and chromosomes and complexity of eukaryotic genome
CO-2	Gain knowledge about replication of DNA, DNA regulation, Gene expression and regulation in prokaryotes and eukaryotes
CO-3	Helps to know about the DNA repair mechanisms and chromosomal abnormalities
CO-4	Enable the students to know about the discovery and early experiments of Mc Clintock in maize
CO-5	Can aquire knowledge in mutation, migration and random fenetic drift

Syllabus	
Title	**MOLECULAR GENETICS**
Course Code	**: MDK1B**
Unit 1	Genes and chromosomes, Colinearity of Genes and Proteins, Genetic code, Identification of DNA as the genetic material. The complexity of eukaryotic genome (introns, exons, repetitive DNA sequence, gene duplication and pseudogenes).
Unit 2	Replication of DNA, DNA repair, Gene expression and regulation in prokaryotes and eukaryotes. Mutation: Spontaneous and virus induced mutation, Radiation induced mutation – Ionizing radiation, UV radiation.
Unit 3	DNA repair mechanisms, (photoreactivation, excision, SOS, recombination and heat shock responses), xerodermapigmentosum, chemically induced mutation – Base analogs Nitrous acid, Acridines, Alkylating and hydroxylating agents. Chromosomal Abnormalities, Recombination - models.
Unit 4	Discovery – early experiments of McClintock in maize – Insertion sequences in prokaryotes – complex transposons (ex. Tn3, Tn5, Tn9 and Tn10) – Mechanisms, control consequences and application of transposition by simple and complex elements.
Unit 5	Allele frequencies and genotype frequencies, systems of mating, inbreeding, genetics and evolution – mutation and migration, random genetic drift.

Course Objectives	
Title	**MOLECULAR CELL BIOLOGY**
Course Code	**MDK1C**
CO-1	Students will understand the structure and purpose of basic components of prokaryotic and eukaryotic cell
CO-2	Students will understand the cellular components underlying mitotic division
CO-3	Students will apply their knowledge on cell biology
CO-4	Students will understand the relationship between cell level phenomena

Course Outcome	
Title	**MOLECULAR CELL BIOLOGY**
Course Code	**MDK1C**
CO-1	To learn about the structural organization of cell organelles
CO-2	Make the students to understand the principle, working mechanism of microscopy and microtome
CO-3	Gain fundamental knowledge on organization of eukaryotic DNA
CO-4	sensitize the students about molecular basis of eukaryotic cell cycle
CO-5	Students will be able to understand the structure and function of microtubules and microfilaments

Syllabus	
Title	**MOLECULAR CELL BIOLOGY**
Course Code	**MDK1C**
Unit 1	The molecules of a cell; Organelles of the eukaryotic cell and its functions; Biomembranes - structural organization, transport across membrane (Passive, Active and Bulk transport); Cell-Cell adhesion- Cell junctions (Tight junctions, gap junctions, desmosomes, adherens); Extra cellular matrix (ECM)- components and role of ECM in growth
Unit 2	Microscopy- Bright field, Phase contrast, fluorescence; Electron (TEM, SEM and Tunneling SEM), Histochemistry – Microtomy, Fixation, embedding, sectioning and staining of tissues. Hybridization-FISH; Flow cytometry; Cell fractionation.
Unit 3	Organization of Eukaryotic DNA in to chromosomes; DNA replication – mechanism; Transcription- basic mechanism in prokaryotes and eukaryotes; Post and co-transcriptional modifications; Translation in prokaryotes and eukaryotes; Post translational modifications; Protein sorting and secretion; Protein folding and degradation
Unit 4	Molecular basis of eukaryotic cell cycle, Regulation and cell cycle check points; Programmed cell death (Apoptosis); Cell-Cell signaling-signaling molecules, types of signaling, signal transduction pathways (GPCR-cAMP, IP_3, RTK, MAP Kinase, JAK-STAT, Wnt Pathway); Cancer-multistage cancer development, carcinogens, oncogenes and proto-oncogenes, tumor suppressor genes-Rb, p53
Unit 5	Microfilaments – Actin structure, Dynamics of actin assembly, Myosin and molecular motors. Intermediate filaments- types and functions. Microtubules- structure and dynamics, kinesin and dynein powered motors, focal adhesion points, microvilli and pseudopodial extensions.

Course Objectives	
Title	**BIOINSTRUMENTATION**
Course Code	**MDKAA**
CO-1	Students will be able to demonstrate an understanding of physics and engineering in biosensor electrodes
CO-2	Understanding of biomedical instruments, principles in aspects of device
CO-3	Science associated with a measurement of a biological variable such as pressure, temperature etc.
CO-4	Understanding of measuring of the biological parameters
CO-5	Students will get knowledge in instrument handling

Course Outcome	
Title	**BIOINSTRUMENTATION**
Course Code	**MDKAA**
CO-1	Students will have clear view on principle and application of light and electron microscopy
CO-2	To have elaborate knowledge on centrifugation and chromatography
CO-3	Gain knowledge on theory and application of electrophoresis and blotting techniques
CO-4	To have insight on various techniques of spectroscopy
CO-5	To apply the knowledge of Radioisotopic techniques, autoradiography and RIA

Syllabus	
Title	**BIOINSTRUMENTATION**
Course Code	**MDKAA**
Unit 1	Microscopic Techniques: Principles and Applications of Light, Phase Contrast, Fluorescence Microscopy, Scanning and Transmission Electron Microscopy, Scanning Tunneling Microscopy, Atomic Force Miscroscopy, Confocal Microscopy, Cytophotometry and Flow Cytometry, patch clamping
Unit 2	Centrifugation: Preparative and Analytical Centrifuges, Sedimentation analysis RCF, Density Gradient Centrifugation. Chromatography Techniques: Theory and Application of Paper Chromatography, TLC, Gel Filtration Chromatography, Ion Exchange Chromatography, Affinity Chromatography, GLC, HPLC, FPLC
Unit 3	Electrophoretic Techniques: Theory and Application of PAGE, Agarose Gel Electrophoresis – 2DE, Iso-electric Focusing, Immuno diffusion, Immuno Electrophoresis , ELISA , RIA , Southern , Northern and Western Blotting. PCR, Real time PCR, DNA/RNA Sequencing, Microarray (DNA, Proteins).
Unit 4	Spectroscopic Techniques: Theory and Application of UV and Visible Spectroscopy, Fluorescence Spectroscopy, MS, NMR, ESR, Atomic Absorption Spectroscopy, X- ray Spectroscopy, LASAR, Raman Spectroscopy, MALDI -MS
Unit 5	Radio-isotopic Techniques: Introduction to Radioisotopes and their Biological Applications, Radioactive Decay – Types and Measurement , Principles and Applications of GM Counter, Solid and Liquid Scintillation Counter, Autoradiography, RIA, Radiation Dosimetry .

Course Objectives	
Title	**ENZYMOLOGY**
Course Code	**MDKAC**
CO-1	Understanding the theory of enzyme kinetics
CO-2	Understanding the mechanism of enzyme catalysis
CO-3	Understanding the mechanism of enzyme regulation in the cell
CO-4	It provides information about the diverse range of reactions
CO-5	Understand the predict the metabolism of all living things

Course Outcome	
Title	**ENZYMOLOGY**
Course Code	**MDKAC**
CO-1	Enable students be aware of classification, nomenclature and properties of enzymes
CO-2	Understand the kinetics of catalyzed reaction and concept of Michaelis- Menten.
CO-3	Acquire knowledge on enzyme catalysis with its mechanism
CO-4	Students have knowledge on multi enzymes system
CO-5	To acquaint understanding on mechanism of enzyme regulation

Syllabus	
Title	**ENZYMOLOGY**
Course Code	**MDKAC**
Unit 1	Introduction to enzymes, Classification, nomenclature and general properties like effects of pH, substrate and temperature on enzyme catalysed reactions. Extraction Isolation and purification of enzymes by precipitation, centrifugation, chromatography and electrophoresis methods.
Unit 2	Kinetics of catalysed reaction : Single substrate reactions, bi-substrate reactions, concept of Michaelis - Menten, Briggs Haldane relationship, Determination and significance of kinetic constants, Limitations of Michaelis-Menten Kinetics, line weaver Burk plot, Hanes wolf equation , Eadie Hoofstee equation ,Inhibition of enzyme activity
Unit 3	Enzyme catalysis : enzyme specificity and the concept of active site, determination of active site. Stereo specificity of enzymes. Mechanism of catalysis: Proximity and orientation effects, general acid-base catalysis, concerted acid - base catalysis, nucleophilic and electrophilic attacks, catalysis by distortion, metal ion catalysis.
Unit 4	Theories on mechanism of catalysis -Mechanism of enzymes action: mechanism of action of lysozyme, chymotrypsin, carboxypeptidase and DNA polymerase. Multi enzymes system, Mechanism of action and regulation of pyruvate dehydrogenase and fatty acid synthetase complex.
Unit 5	Coenzyme action. Enzyme regulation: General mechanisms of enzyme regulation, Allosteric enzymes, sigmoidal kinetics and their physiological significance, Symmetric and sequential modes for action of allosteric enzymes. Reversible and irreversible covalent modification of enzymes, Immobilized enzymes and their industrial applications.Clinical and industrial applications of enzymes, Enzyme Engineering.

Course Objectives	
Title	**MICROBIOLOGY**
Course Code	**MDK2A**
CO-1	Students will be able to identify common infectious agents and the disease
CO-2	To evaluate methods used to identify infectious agents in the clinical microbiology lab
CO-3	Students will be able to recognize and diagnosis of microbial infections
CO-4	Students will be able to assess treatment strategies
CO-5	Students can perform antibacterial assays

Course Outcome	
Title	**MICROBIOLOGY**
Course Code	**MDK2A**
CO-1	Students gain knowledge on taxonomy and systematic identification of microorganisms
CO-2	Ability to perform gram, acid-fast, nuclear, capsule, flagella and other special staining method
CO-3	Perceive details about size, shape, composition and structure of eukaryotic cells
CO-4	Students learn about Host- parasite relationship ships, pathogenic mechanisms, lab- diagnosis and treatment
CO-5	Aware on microorganism role on production of food, pharmaceuticals, biofertilizers and biopesticide

Syllabus	
Title	**MICROBIOLOGY**
Course Code	**MDK2A**
Unit 1	Microbial Taxonomy, systematics, identification: Taxonomical hierarchyspecies- type strains: culture collections; binomial nomenclature; system of classification- phenetic, numerical taxonomy. General characteristics used in classification- five kingdom, six kingdom and eight kingdom systems. Classification of microbes using DNA analysis, proteins, rRNA analysis and phylogeny.
Unit 2	Staining methods – Gram, Acid fast, Metachromatic granules, nuclear staining, capsule, silver impregnation, Flagella and other special staining methods. Sterilization and disinfection methods and their quality control. Size, shape, composition and structure of prokaryotic (bacteria, actinomycetes, archaea and blue green algae).
Unit 3	Size, shape, composition and structure of eukaryotic cells (algae, fungi and protozoans). Nutritional requirements for growth. Growth media and pure culture techniques. Symbiosis, Mutualism, Parasitism, Commensalism and endophyte. Structure of virus and prions. Measurement of growth and enumeration of cells – Techniques of pure culture.
Unit 4	Introduction to Medical parasitology – classification, host-parasite relationships, pathogenic mechanisms, transmission life cycle, lab diagnosis, treatment etc. for the following: Protozoa – *Entamoeba*, Aerobic and Anaerobic amoebae causing human diseases. Toxoplasma, cryptosporidium and other protozoan parasites causing infections in man. *Leishmania, Trypanasoma, Giardia, Trichomonas, Balantidium.*
Unit 5	Role of microorganisms in food production (SCP) dairy and non-dairy products. Fuel (ethanol), pharmaceuticals (antibiotics), biofertilizers (BGA), biopesticides (*Bacillus thuringenesis*), biopolymers, biosurfactants, vitamin B12, protease, glutamic acid. Secondary metabolites. Biogas production, biocomposting and biotransformation.

Course Objectives	
Title	**PLANT AND ANIMAL BIOTECHNOLOGY**
Course Code	**MDK2B**
CO-1	Fundamental knowledge will be gained from plant and animal biotechnology
CO-2	Some of the basic techniques are micro propagation and plant molecular diagnostics
CO-3	Students will learn all the sterile techniques and media preparation
CO-4	Laboratory teaching will be provide to get hands on training
CO-5	To know about the animal health diagnosis and treatment

Course Outcome	
Title	**PLANT AND ANIMAL BIOTECHNOLOGY**
Course Code	**MDK2B**
CO-1	This course presents the application of plants in Biotechnology, to make the student to understand usage of plant products and exploitation of them in biotechnology
CO-2	To know about the plant transformation techniques for the development of new genetic traits
CO-3	To aware on the animal health, diseases and diagnosis using hybridoma techniques
CO-4	Gaining knowledge about the tissue culture, cryopreservation methods and micromanipulation techniques
CO-5	Students understand about the crop development, callus culture, animal tissue culture, animal products and production and improvement of them

Syllabus	
Title	**PLANT AND ANIMAL BIOTECHNOLOGY**
Course Code	**MDK2B**
Unit 1	Introduction of plant tissue culture, composition of media, Micropropagation, organogenesis, somatic embryogenesis, haploid and triploid production, protoplast isolation and fusion, hybrid and cybrid, synthetic seed production, secondary metabolic production
Unit 2	Plant Transformation — Direct transformation by electroporation and particle gun bombardment - Agrobacterium, Ti plasmid vector. Theory and techniques for the development of new genetic traits, conferring resistance to biotic and abiotic. Plant engineering towards development of enriched food products, plant growth regulators.
Unit 3	Animal health – disease diagnosis, hybridoma technique, monoclonal antibodies, application of probes for disease diagnosis of existing and emerging animal diseases. Prophylaxis - Vaccines, Oral vaccines – DNA Vaccines in animal disease. Cell culture: primary and established culture; organ culture; tissue culture;
Unit 4	Disaggregation of tissue and primary culture; cell separation, Slide and coverslip cultures, flask culture, test tube culture techniques, cell synchronization, cryopreservation. Scaling up of animal cell culture, cell line and cloning – micromanipulation and cloning, somatic cell cloning. Karyotyping; measuring parameters for growth, measurement of cell death, apoptosis and its determination, cytotoxicity assays
Unit 5	Nuclear magnetic resonance methods of monitoring cell metabolism culturing animal cells in fluidised bed reactors- GPI-Anchored fusion proteins- harvesting GPI- anchored proteins from CHO cells- Hematopoietic cells for cellular and gene therapy. Transgenic animals: Production and application; transgenic animals in livestock improvement, transgenic animals as model for human diseases

Course Objectives	
Title	**GENETIC ENGINEERING**
Course Code	**MDK2C**
CO-1	To illustrate creative use of modern tools
CO-2	To illustrate techniques for manipulation and analysis of genomic sequences
CO-3	To understand about the recombinant DNA techniques
CO-4	To know about the biological research
CO-5	To know about the new combination of heritable genetic material

Course Outcome	
Title	**GENETIC ENGINEERING**
Course Code	**MDK2C**
CO-1	Students have a detail understanding on gene cloning and recombinant DNA technology
CO-2	To describe different types of gene cloning vectors such as E.coli vectors, lamda bacteriophage vectors, phasemid and phagemid
CO-3	Students have insight on molecular genetics and expression of eukaryotic vectors
CO-4	Learning the process of nucleic acid hybridization techniques, types of probes and its construction
CO-5	Detailed note on technique like DNA microarray, chromosome walking and jumping

Syllabus	
Title	**GENETIC ENGINEERING**
Course Code	**MDK2C**
Unit 1	Gene cloning – Genetic engineering tools – Nucleic acid manipulating enzymes. Promoters, Selectable markers and reporters used in rDNA technology. Restriction digestion, Ligation, Transformation, Selection of Recombinants. Construction of gene libraries
Unit 2	*E.Coli* vectors - pBR322 and its derivatives; Cloning vectors for gram negative bacteria - ColE1, p15A, R1, IncPa, pSC101; Lambda bacteriophage vectors, filamentous phages, Cosmids, Phasmids, Phagemids. Cloning in gram-positive bacteria (*Bacillus subtilis*)
Unit 3	Cloning in yeast *Saccharomyces cerevisae* – Life cycle and types of vectors; Eukaryotic vectors – SV40 (molecular genetics and expression); Specialized cloning vector for cDNA; Synthesis of specific RNA in vitro; Vectors for cloning promoters and terminators; vectors with adjustable copy number
Unit 4	Nucleic acid hybridization techniques; Molecular probes (Types of probes and its construction); probe labeling – Nick translation, End labeling and Random primer labeling. Polymerase chain reaction and its variants; DNA fingerprinting; DNA sequencing first generation sequencing methods (Maxam and Gilbert sequencing, Sanger's Dideoxy sequencing, Pyrosequencing, PCR based sequencing and hybridization sequencing).Second generation sequencing methods.
Unit 5	Site directed mutagenesis; DNA microarray; chromosome walking and jumping. Molecular techniques in prenatal diagnosis gene therapy, Pharmaceutical products (Vaccine, Humulin, etc), Crop improvement – pesticide resistance, herbicide resistance, transgenic animals and GM foods.

Course Objectives	
Title	**TISSUE ENGINEERING**
Course Code	**MDKAD**
CO-1	To focus on strategies to repair, replace and regenerate various tissues and organs
CO-2	To solve major clinical problems
CO-3	To gain insight in to topical issues including stem cells
CO-4	To learn characterization of biomaterials and nonmaterial
CO-5	To focus and improve damage tissue or whole organs

Course Outcome	
Title	**TISSUE ENGINEERING**
Course Code	**MDKAD**
CO-1	Students will have a clear idea about the basic biology of tissue engineering
CO-2	Learning the process by invitro control of tissue development and organs
CO-3	To know about the organotypic and histotypic models of engineered tissues and biomaterials in tissue engineering
CO-4	Students have insight on bioartificial pancreas, red blood cell substitutes and renal replacement devices
CO-5	Understanding the role of tissue engineering and its application

Syllabus	
Title	**TISSUE ENGINEERING**
Course Code	**MDKAD**
Unit 1	Basic biology of tissue engineering: The basis of growth and differentiation morphogenesis and tissue engineering.
Unit 2	In vitro control of tissue development-Growth factors-Tissue engineering bioreactors-Tissue assembly in microgravity-In vitro synthesis of Tissue and organs
Unit 3	Organotypic and histotypic models of engineered tissues-Biomaterials in tissue engineering-Approaches to transplanting engineered cells and tissue engineering
Unit 4	Bioartificial pancreas- Hepatassist liver support system – Heamatopoietic system: Red blood cell substitutes - Renal replacement devices; Musculo-skeletal system.
Unit 5	Structural tissue engineering - Bone regeneration through cellular engineering-Brain implants - Neural stem cells - Periodontal applications- Artificial Womb

Course Objectives	
Title	**ENVIRONMENTAL BIOTECHNOLOGY**
Course Code	**MDKAG**
CO-1	To make known the great biodiversity existing in the microbial world
CO-2	To know the functions and types of bioreactors
CO-3	It makes student to understand about the aerobic and aneroboic treatment process
CO-4	Students can learn about sewage and waste water treatment process
CO-5	To know about the quality, evaluation and monitoring , remediation and contaminated environments

Course Outcome	
Title	**ENVIRONMENTAL BIOTECHNOLOGY**
Course Code	**MDKAG**
CO-1	Students understand the concept for deriving biofilm kinetics
CO-2	To describe the different types of reactors with effluent recycle
CO-3	To gain knowledge on denitrification, waste water and drinking water treatment systems
CO-4	Students learn detoxification of hazardous chemicals and biodegradation of contaminants
CO-5	Elaborate on strategies for evaluating bioremediation and sewage and waste treatment control and remediation

Syllabus	
Title	**ENVIRONMENTAL BIOTECHNOLOGY**
Course Code	**MDKAG**
Unit 1	Biofilm Kinetics: Completely mixed biofilm reactor-Soluble microbial products and inert biomass-Special-case biofilm solution. Reactor types - batch reactor - continuous-flow stirred-tank reactor with effluent recycle.
Unit 2	Plug-flow reactor - plug-flow reactor with effluent recycles-Reactors with recycle of settled cells - Using alternate rate models - Linking stoichiometric equations to mass balance equations - Engineering design of reactors - Reactors in series
Unit 3	Denitrification: Physiology of denitrifying bacteria-Tertiary denitrification-One-sludge denitrification - Waste water treatment systems - Anaerobic & Aerobic - Drinking-water treatment: Anaerobic treatment by methanogenesis - uses for methanogenic treatment-Reactor configurations - Special factors for the design of anaerobic sludge digesters
Unit 4	Detoxification of Hazardous chemicals: Factors causing molecular recalcitrance - Synthetic organic chemical classes - Energy metabolism versus co-metabolism - Electron donor versus electron acceptor Minimum substrate concentration (S_{min}) Biodegradation of problem environmental contaminants.
Unit 5	Bioremediation: Engineering strategies for bioremediation - Evaluation bioremediation - Sewage and waste treatment - Pollution monitoring, control and remediation (Petroleum Industry, Paper Industry, chemical industry etc.) Biomass from the wastes

Course Objectives	
Title	**BIOINFORMATICS**
Course Code	**MDK3A**
CO-1	Students studying bioinformatics shall be able to apply knowledge and principles and concepts of biology and computer science
CO-2	They can effectively use the existing software to extract information from large database
CO-3	Gain the ability to perform phylogenetic analysis
CO-4	They can have better understanding of the intersection of life and information sciences

Course Outcome	
Title	**BIOINFORMATICS**
Course Code	**MDK3A**
CO-1	Students could gain knowledge in Bioinformatics-an overview, definition and history information networks-internet in scope of bioinformation
CO-2	To gain knowledge on biological databases: NCBI, EMBL, PIR,SWISS-prot, Pubmed
CO-3	Helps to learn about analysis of three dimensional structures of proteins and primary and secondayu databases
CO-4	Elaborate on biomolecular sequences on genebank, fasta, msf, nbrf- pir etc
CO-5	Understanding the basic concepts of scoring matrix PAM and BLOOSUM series and also usage of different software for analysing biological data

Syllabus	
Title	**BIOINFORMATICS**
Course Code	**MDK3A**
Unit 1	Bioinformatics data – nucleic acid sequence, protein sequence, protein structure, genomic, proteomic and metabolomic information, Bioinformatics databases – types, design, file formats, access tools with examples, Bioinformatics tools and Resources – free online tools, downloadable free tools, software packages, internet, Bioinformatics books and Journals, Bioinformatics web-portals.
Unit 2	Sequence alignment basics, match, mismatch, similarity, scoring an alignment, gap penalty, protein vs DNA alignments, Dot-matrix alignment, Pairwise alignment – global and local alignment algorithms, Multiple sequence alignment-progressive alignment and Iterative alignment algorithms, consensus sequence, patterns and profiles, Database searching: Pairwise alignment based rigorous algorithm (Smith and Waterman) and Heuristic algorithms (FASTA and Blast). Multiple sequence alignment based database searching – PSI- Blast, PAM and Blosum matrices.
Unit 3	Bioinformatics for genome sequencing, EST Clustering and analyses, Finding genes in prokaryotic and eukaryotic genomes, Regulatory sequence analysis, Bioinformatics for Genome maps and markers, Bioinformatics for understanding Genome variation, Protein structure prediction and classification, Bioinformatics in support of Proteomic research
Unit 4	Molecular visualization tools – Rasmol, Chime and Spdb viewer – Structure analysis tools – VAST and DALI, Structural biology - Homology modeling, Bioinformatics for micro array designing and transcriptional profiling, Bioinformatics for metabolic reconstruction, Bioinformatics for phylogenetic analysis.
Unit 5	Medical application of Bioinformatics – disease genes, Drug Discovery –History – Steps in drug discovery – Target Identification – Target Validation – QSAR – Lead Identification – Preclinical pharmacology and toxicology – ADME – Drug designing – Rational drug design – Computer aided drug design – Ligand based approach – Target based approach.

Course Objectives	
Title	**IMMUNOLOGY**
Course Code	**MDK3B**
CO-1	The course aims to provide an adequate knowledge about the functioning of the immune system
CO-2	To analyze the mechanism of immune response against infectious agent
CO-3	To describe the reactions between antigen and antibody with the production of monoclonal antibody
CO-4	To provide an adequate knowledge on various effects, mechanisms in immunity
CO-5	To provide an overall knowledge on various immune techniques for detection of antigen

Course Outcome	
Title	**IMMUNOLOGY**
Course Code	**MDK3B**
CO-1	Helps to get an adequate knowledge about the functioning of immune system
CO-2	Students can analyze the mechanism at the base of the immune response against different infectious agents and against tumors
CO-3	To provide an overall comprehension about the causes and the pathogenesis of the main alterations of the immune response and knowledge about vaccines and immunotherapy
CO-4	Acquire knowledge on the immune response to explain the alterations and functions
CO-5	To acquire a correct terminology and applications of immunotechniques

Syllabus	
Title	**IMMUNOLOGY**
Course Code	**MDK3B**
Unit 1	Histroy and overview of the immune system. Types of immunity - innate, acquired, passive and active, self *vs* nonself discrimination. Physiology of immune response: HI and CMI specificity and memory. Cells and organs of the immune system – Lymphoid tissue, origin and development. Hematopoiesis, differentiation of lymphocytes
Unit 2	Lymphocyte-sub-populations of mouse and man. T and B cells, APC cells, lymphokines, Phagocytic cells, macrophage, dendritic cells, K and NK Cells. Nature and biology of antigens, epitopes, haptens, adjuvents. Immunoglobulins- structure, distribution and function, Isotypic, Allotypic and Idiotypic variants, generation of antibody diversity
Unit 3	Antigen antibody reactions. Monoclonal antibody production and its applications. Types of vaccine and vaccination schedule. Role of MHC antigens in immune responses, Structure and function of class I and class II MHC molecules. MHC antigens in transplantation and HLA tissue typing.
Unit 4	Effector mechanisms in immunity - macrophage activation, cell mediated cytotoxicity, cytotoxicity assay. Hypersensitivity reactions and types. The complement system, mode of activation, classical and alternate pathway, biological functions of C proteins
Unit 5	Immunotechniques- precipitation, Single and double immuno diffusion, Immuno fluorescence, RIA and ELISA, FACS, Western blot, Agglutination tests – Direct and Indirect, Widal's test, VDRL test. Purification of antibodies, Quantitation of immunoglobulin by RID, EID and nephelometry.

Course Objectives	
Title	**BIOPROCESS TECHNOLOGY**
Course Code	**MDK3C**
CO-1	This course introduces the knowledge of fermentation process and their applications
CO-2	Exemplify different types of bioreactors and production of bioproducts
CO-3	Introduce the knowledge on cell disruption and flocculation method
CO-4	Generate conditional knowledge on sedimentation and extraction
CO-5	Describe the principles and operation of various dryer formulation method

Course Outcome	
Title	**BIOPROCESS TECHNOLOGY**
Course Code	**MDK3C**
CO-1	This course contains the development of bioprocess in an interdisciplinary perspective and basic engineering calculations applied in biological processes
CO-2	Able to understand and explain the definition of bioprocess techniques and fermentation process
CO-3	To gain knowledge about the term byproducts and bioseparation by different methods
CO-4	Able to analyse the filtration ,principle, conventional, sedimentation and liquid-liquid extraction
CO-5	Makes the students to understand the development of bioprocess engineering in educational world and industry to support a biobased economy

Syllabus	
Title	**BIOPROCESS TECHNOLOGY**
Course Code	**MDK3C**
Unit 1	Aerobic and anaerobic fermentation processes and their application in the field of biotechnology industry. Solid substrate, slurry fermentation and its application. Microbial cell culture. Whole cell immobilization.
Unit 2	Types of bioreactors: Submerged reactors, surface reactors, mechanically agitated reactors, non-mechanically agitated reactors. Design of fermentors – body construction. Production of citric acid, penicillin and insulin.
Unit 3	Introduction to bioproducts and bioseparation. Primary recovery process: Cell disruption methods. Cell lysis and Flocculation: Osmotic and mechanical methods of lysis. Flocculation by electrolysis; polymorphic flocculation.
Unit 4	Filtration: Principles, Conventional, Crossflow filtration. Sedimentation: Principles, Sedimentation coefficients. Extraction Principles, Liquid – liquid extraction, aqueous two phase extraction, supercritical fluid extraction.
Unit 5	Membrane separation – ultrafiltration, precipitation methods: liquid-liquid extraction, aqueous two phase extraction. Drying – Principles and operation of vacuum dryer, shelf dryer, rotary dryer, freezer and spray dryer. Formulation methods.

Course Objectives	
Title	**MOLECULAR DEVELOPMENTAL BIOLOGY**
Course Code	**MDKAJ**
CO-1	To develop the skill of observing developing organisms
CO-2	TO know about the developmental stages of all the organs
CO-3	To learn about the Different pathways
CO-4	To analyze about the different phases of cell cycle
CO-5	To know clearly about the cellular mechanisms that regulate cell death and apoptosis

Course Outcome	
Title	**MOLECULAR DEVELOPMENTAL BIOLOGY**
Course Code	**MDKAJ**
CO-1	Helps to understand about different developmental stages and the mechanism like instructive and permissive interactions and the signaling pathway
CO-2	To gain knowledge about the fertilization process, types, mechanism and molecular recognition of egg and sperm
CO-3	To acquire knowledge about the cleavage and gastrulation in gastrulation in xenopus, click and mammals
CO-4	To gain comprehensive knowledge about the vertebrate development like formation of neural tube and eye development
CO-5	Students can gain knowledge about the development disorders and drosophila maternal effect genes

Syllabus	
Title	**MOLECULAR DEVELOPMENTAL BIOLOGY**
Course Code	**MDKAJ**
Unit 1	Gamete cells: Dynamics of the Sperm and Egg, Spermatogenesis, Oogenesis, Sperm and oocyte maturation, Instructive and permissive interactions, competence, epithelial- mesenchymal interactions. Important signaling pathways in vertebrate development.
Unit 2	Fertilization: Fate Maps, Nieuwkoop center, molecular role of organizer, Types of fertilization, Molecular recognition of egg and sperm, fusion and prevention of polyspermy, rearrangement of egg cytoplasm and activation of egg.
Unit 3	Cleavage and gastrulation: Cleavage in Xenopus, Chick and mammals, Regulation of cleavage cycle. Morphogenetic movements, Gastrulation in Xenopus, chick and mammals.
Unit 4	Vertebrate Development: Formation of the neural tube, mechanism of vertebrate eye development, myogenesis, and hematopoiesis.
Unit 5	Drosophila Maternal effect genes, induction at single cell level differentiation of photoreceptors in ommatidia. Developmental disorders – Spina bifida, Anenecephaly, and craniorachischis, Cyclopia, Thanotrophic dysplasia.

Course Objectives	
Title	**LIFE STYLE-DISEASE AND PREVENTION**
Course Code	**MENBB**
CO-1	This course aims to implement the importance of individual general healthcare system
CO-2	To provide depth knowledge on the dietary management of hypertension
CO-3	Enhance their knowledge on different types of cancer with treatment
CO-4	Inculcate the depth understanding on age related diseases
CO-5	Describe on causes, symptoms, preventive aspects on treatment of gall stone

Course Outcome	
Title	**LIFE STYLE-DISEASE AND PREVENTION**
Course Code	**MENBB**
CO-1	Students can understand the causes on consequence of obesity
CO-2	They can have a depth knowledge on hypertension and its dietary management
CO-3	Students can know about diagnosis and treatment of different types of cancer
CO-4	Awareness on several age related diseases such as dementia osteoporosis and osteoarthritis
CO-5	They gain knowledge on causes and prevention of gall stone and ulcer

Syllabus	
Title	**LIFE STYLE-DISEASE AND PREVENTION**
Course Code	**MENBB**
Unit 1	Obesity – Prevalence- causes, Consequences (Symptoms-coronary heart disease and type2 diabetes mellitus-lifestyle and dietary management of obesity
Unit 2	Hypertension-blood pressure-normal level of blood pressure, dietary management of hypertension, stroke and chronic renal failure due to hypertension-kidney stone-causes, types, symptoms and treatment(only lethotrophy), dietary management for prevention of kidney stone
Unit 3	Cancer-types of cancer, aetiology of breast cancer, diagnosis (self examination, Mammography) and treatment (radiation, chemotherapy, surgery). Cervical cancer-causes types of cervical cancer, symptoms, diagnosis and treatment (radiation, chemotherapy, surgery) Cigarette smoking and symptoms, diagnosis and treatment (chemotherapy
Unit 4	Aging factors influencing aging. Age related diseases – dementia, osteoporosis. Osteoarthritis- causes, sign and symptoms, preventive measures of aging with special reference to antioxidants
Unit 5	Gallstone- causes, factor, aetiology of gall stone, type of gall stone, symptoms, preventive aspects of gall stone. Drug therapy- ursodeoxy cholic acid, surgical treatment and dietary management. Ulcer-Causes and prevention

Course Objectives	
Title	**RESEARCH METHODOLOGY**
Course Code	**MDK4A**
CO-1	Understands some basic concepts of research and its methodology
CO-2	Identify appropriate research topics
CO-3	Preparation of project proposal
CO-4	Organize and conduct research in more appropriate manner
CO-5	Write a research report, thesis and proposal

Course Outcome	
Title	**RESEARCH METHODOLOGY**
Course Code	**MDK4A**
CO-1	Students can acquire knowledge about the research methodology like objective, types, research approaches and importance
CO-2	Students can able to write the research report (thesis and publications)
CO-3	Students have depth knowledge about analysis of variance components (ANOVA) for fixed effect model and factorial design
CO-4	Students will gain knowledge in spread sheet tool, applications, features and functions
CO-5	Students acquire knowledge on creating presentation, customizing presentation and showing presentation

Syllabus	
Title	**RESEARCH METHODOLOGY**
Course Code	**MDK4A**
Unit 1	Research Methodology - An Introduction: Meaning of Research, Objectives of Research, Types of Research, Research Approaches, Importance of knowing how research is done, Research Process, Criteria of good research. Defining the Research Problem; Research Design; Sampling Design; Methods of Data Collection; Processing and Analysis of Data; Sampling Fundamentals; Testing of Hypothesis.
Unit 2	Writing the Research Report (Thesis and publications): Components of research report - Title, Authors, Addresses, Abstract, Keywords, Introduction, Materials and Methods, Results, Discussion, Summary, Acknowledgements and Bibliography
Unit 3	Analysis of Variance components (ANOVA) for fixed effect model; Total, treatment and error of squares, Degrees of freedom, Confidence interval; ANOVA for random effects model, Estimation of variance components, Model adequacy checking. Two factor Factorial Design, Basic definitions and principles, main effect and interaction, response surface and contour plots, General arrangement for a two factor factorial design;
Unit 4	Spreadsheet Tool: Introduction to spreadsheet application, features and functions, Using formulas and functions, Data storing, Features for Statistical data analysis, Generating charts/

	graph and other features.
Unit 5	Tools used may be Microsoft Excel, Open office or similar tool. Presentation Tool: Introduction to presentation tool, features and functions, Creating presentation, Customizing presentation, Showing presentation. Tools used may be Microsoft Power Point, Open Office or similar tool. Web Search: Introduction to Internet, Use of Internet and WWW, Using search engine like Google, Yahoo etc, and Using advanced search techniques.

Course Objectives	
Title	**STEM CELL BIOLOGY**
Course Code	**MDKAK**
CO-1	This course aims to learn fundamental process of human embryology
CO-2	To know about human embryology and developmental biology
CO-3	To learn about the progression of pluripotent stem cells through different phases of development
CO-4	To know about molecular mechanisms and cell biology
CO-5	To learn about the research and application of stem cells science and human health

Course Outcome	
Title	**STEM CELL BIOLOGY**
Course Code	**MDKAK**
CO-1	To get clear idea about the stem cell niche, specification and drosophila germ line stem cells
CO-2	To know about the stem cell niche, specification and drosophila germ line stem cell.
CO-3	To acquire knowledge about characteristics of stem cell, cell cycle, Ras/Rat pathway, P13k cell signaling , P53 check points in cell cycle control
CO-4	To gain knowledge about chromatin modification and transcriptional regulation
CO-5	Students acquire knowledge in therapeutic applications of embryonic stem cells and ethics in human stem cell research

Syllabus	
Title	**STEM CELL BIOLOGY**
Course Code	**MDKAK**
Unit 1	Stem cells - Definition, Characterization, Pluripotency, Self renewal and differentiation.
Unit 2	Stem cell niche, Niche specification - Drosophila germ line stem cells. Adult stem cell from amniotic fluid, cord blood and tooth primordial.
Unit 3	Characteristics of stem cell- cell cycle, Ras/Raf pathway, pI3K cell signaling, p53 check points, Role of LIF pathway in cell cycle control.
Unit 4	Chromatin modification and transcriptional regulation, chromatin modifying factors, Chromosomal inactivation.
Unit 5	Therapeutic applications of Embryonic stem cells, Bone marrow stem cells, Adipose derived stem cells and Hematopoietic stem cells in Heart regeneration and neural defects. Ethics in human stem cell research.

Course Objectives	
Title	**BIOETHICS, HUMAN RIGHTS AND SOCIAL ISSUES**
Course Code	**MDKAL**
CO-1	This course aims to study about ethics, human rights and social issues
CO-2	Evaluate multiple perspective concerning bioethical issues and recognize different value system may lead to different ethical decision
CO-3	To asses complex bioethical issues and the processes used to build resolution
CO-4	To identify the reason advancement in this areas have influenced current bioethical issues
CO-5	This course aims to study about ethics, human rights and social issues

Course Outcome	
Title	**BIOETHICS, HUMAN RIGHTS AND SOCIAL ISSUES**
Course Code	**MDKAL**
CO-1	Students acquire knowledge about historical development of human rights relation- international and national instruments
CO-2	To gain knowledge about European convention for human right, UDHR, civil, political rights and article of Indian constitution
CO-3	To know about human relations, political relations, ethnic, human rights and communal relations
CO-4	To have insights on assignment, case study, Term paper etc
CO-5	To gain knowledge on the impact of gene cloning and bioethics and about genetically modified organisms

Syllabus	
Title	**BIOETHICS, HUMAN RIGHTS AND SOCIAL ISSUES**
Course Code	**MDKAL**
Unit 1	Introduction: Historical development of Human Rights and Human Relations – International and National. International Instruments: United Nation Commission for Human Rights
Unit 2	European Convention for Human Rights, UDHR, Civil and Political Rights National Instruments: National and State Instruments: Development of Human Rights – Article 21 of Indian Constitution.
Unit 3	Human Relations: Political relations, Ethnic and Communal relations, Socio-cultural relations, Organization relation etc., and related Human Rights. Economics of Human Rights and Relations – Adam Smith's thoughts on moral sentiments.
Unit 4	Student's Activity: Assignment/Case study/Term paper etc.,
Unit 5	Impact of gene cloning and Bioethics. Intellectual Property Rights (IPR) and patents, biosafety, containment facilities for Genetic Engineering experiments, Regulations on field experiments and release of GMO's (Genetically Modified Organisms), labeling of GM (Genetically Modified) Foods.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF MATHEMATICS(P.G.)

Program : M.Sc MATHEMATICS

Program Outcomes	
	On Completion of Program
PO-1	To provide student with a knowledge, abilities, and insight in mathematics and computational techniques so that they are able to work as mathematical professionals.
PO-2	To increase students self-confident in conducting research independently or within a team.
PO-3	To provide students with knowledge and capability in formulating and analysis of mathematical models of real life applications.
PO-4	To train the students who can work on real life challenging problems.
PO-5	Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges
PO-6	Analytical Reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesise data from a variety of sources
PO-7	Research Skills: Capability to use appropriate software to solve various problems and to apply programming concepts of C++ and Mathematica/ Matlab to various scientific investigations , problem solving and interpretation .
PO-8	Imbibe effective scientific and / or technical communication in both oral and writing.
PO-9	Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge
PO-10	Development of a set of competencies in order to enhance and promote the growth of multicultural sensitivity within universities.

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Demonstrate the ability to conduct research independently and pursue higher studies towards the Ph.D degree in Mathematics.
PSO-2	Carry out development work as well as take up challenges in the emerging area of industry.
PSO-3	Use Mathematical and computational skill a to Model, formulate and solve real life applications.
PSO-4	Acquire deep knowledge of different mathematical and computational disciplines so that they can qualify SLET, NET or GATE Examinations.
PSO-5	Strong Foundation in Knowledge: Have strong foundation in core areas of Mathematics, and able to communicate Mathematics effectively.

Course Objectives	
Title	Algebra-I
Course Code	MFF1A
CO-1	The core of algebra comprises the theory equations in many variables the theory on group sets and linear maps.
CO-2	The objectives of this course is to introduce some advance material in linear .
CO-3	The addition, subtraction, multiplication and division of polynomials
CO-4	Solving quadratic equations
CO-5	Solving of linear equations and inequalities

Course Outcome	
Title	Algebra-I
Course Code	MFF1A
CO-1	Recognise technical terms and appreciate some of the uses of algebra.
CO-2	Collect like terms and simplify expressions term by term
CO-3	Simplify some formulas using group and linear transformation problems.
CO-4	Solve simple linear equations using linear transformations.
CO-5	To Solve Hermitian, unitary, normal transformations, real quadratic form

Syllabus	
Title	Algebra-I
Course Code	**MFF1A**
Unit 1	Group actions on a set, Sylow theorems - Applications of Sylow theorems. Chapter 3: Section 3.6 Chapter 4 – Sections 4.2 and 4.3 from J.B. Fraleigh (18 hrs)
Unit 2	Direct products - Finite abelian groups- Modules Chapter 2: Sections 2.13 and 2.14 Chapter 4: Section 4.5 from I.N.Herstein(18 hrs)
Unit 3	Linear Transformations - Canonical forms -Triangular form – Nilpotent transformations. Chapter 6: Sections 6.4 ,6.5 from I.N. Herstein (18 hrs)
Unit 4	Jordan form - rational canonical form. Chapter 6 : Sections 6.6 and 6.7 from I.N. Herstein (18 hrs)
Unit 5	Trace and transpose - Hermitian, unitary, normal transformations, real quadratic form. Chapter 6 : Sections 6.8, 6.10 and 6.11 (Omit 6.9) from I.N. Herstein (18 hrs)

Course Objectives	
Title	Real Analysis-I
Course Code	MFF1B
CO-1	The course will develop a deep and rigorous understanding of real line and defining terms to prove the results about convergence and divergence of sequences and series of real numbers.
CO-2	These concepts has wide range of applications in real life scenario.
CO-3	Have the knowledge of basic properties of the field of real numbers.
CO-4	Studying the notion of continuous functions and their properties.
CO-5	Studying the basic topological properties of the real numbers

Course Outcome	
Title	Real Analysis-I
Course Code	MFF1B
CO-1	Describe the fundamental properties of the real numbers that underpin the formal development of real analysis.
CO-2	Demonstrate an understanding of the theory of sequences and series, continuity, differentiation and integration.
CO-3	Demonstrate an understanding of the theory of Riemann Stieltjes integral.
CO-4	Apply the theory in the course to solve a variety of problems at an appropriate level of difficulty.
CO-5	Mean value theorems for Riemann - Stieltjes integrals - The integrals as a function of the interval

Syllabus	
Title	Real Analysis-I
Course Code	**MFF1B**
Unit 1	Functions of bounded variation - Introduction - Properties of monotonic functions - Functions of bounded variation - Total variation - Additive property of total variation - Total variation on [a, x] as a function of x - Functions of bounded variation expressed as the difference of two increasing functions - Continuous functions of bounded variation. Sections 6.1 to 6.8 Infinite Series : Absolute and conditional convergence - Dirichlet's test and Abel's test - Rearrangement of series - Riemann's theorem on conditionally convergent series. Chapter 8 : Sections 8.8, 8.15, 8.17, 8.1 (18 hrs)
Unit 2	The Riemann - Stieltjes Integral - Introduction - Notation - The definition of the Riemann - Stieltjes integral - Linear Properties - Integration by parts- Change of variable in a Riemann - Stieltjes integral - Reduction to a Riemann Integral – Euler's summation formula - Monotonically increasing integrators, Upper and lower integrals - Additive and linearity properties of upper and lower integrals - Riemann's condition - Comparison theorems. Chapter - 7 : Sections 7.1 to 7.14 (18 hrs)
Unit 3	The Riemann-Stieltjes Integral - Integrators of bounded variation-Sufficient conditions for the existence of Riemann-Stieltjes integrals-Necessary conditions for the existence of RiemannStieltjes integrals- Mean value theorems for Riemann - Stieltjes integrals - The integrals as a function of the interval - Second fundamental theorem of integral calculus-Change of variable in a Riemann integral-Second Mean Value Theorem for Riemann integral-Riemann-Stieltjes integrals depending on a parameter-Differentiation under the integral sign-Lebesguecriteriaon for the existence of Riemann integrals. Chapter - 7 : 7.15 to 7.26 (18 hrs)
Unit 4	Infinite Series and infinite Products - Double sequences - Double series - Rearrangement theorem for double series - A sufficient condition for equality of iterated series - Multiplication of series - Cesarosummability - Infinite products. Chapter - 8 Sec, 8.20,

	8.21 to 8.26 Power series - Multiplication of power series - The Taylor's series generated by a function - Bernstein's theorem - Abel's limit theorem - Tauber's theorem. Chapter 9 : Sections 9.14 9.15, 9.19, 9.20, 9.22, 9.23 (18 hrs)
Unit 5	Sequences of Functions - Pointwise convergence of sequences of functions - Examples of sequences of real - valued functions - Definition of uniform convergence - Uniform convergence and continuity - The Cauchy condition for uniform convergence - Uniform convergence of infinite series of functions - Uniform convergence and Riemann - Stieltjes integration – Non-uniform Convergence and Term-by-term Integration - Uniform convergence and differentiation - Sufficient condition for uniform convergence of a series - Mean convergence. Chapter -9 Sec 9.1 to 9.6, 9.8,9.9, 9.10,9.11, 9.13 (18 hrs)

Course Objectives	
Title	Ordinary Differential Equations
Course Code	MFF1C
CO-1	The aim of course is to cover the basic of first and higher order differential equations.
CO-2	The objective of the course is to develop in student, an intuitive understanding of differential equation emphasizing on its application science and engineering fields.
CO-3	To learn existence theory of scalar differential equations along with system of linear differential equations, quantitative information and qualitative methods which provide a good geometric understanding of ODE
CO-4	Solution of boundary value problems: Sturm Liouville Problem and Green’s function.
CO-5	The learner learns basics of stability of autonomous systems.

Course Outcome	
Title	Ordinary Differential Equations
Course Code	MFF1C
CO-1	Understand the genesis of ordinary differential equations.
CO-2	Learn various techniques of getting exact solution of solvable first order differential equations and linear differential equation of higher order.
CO-3	Grasp the concept of a general solution of a linear equation of an arbitrary order and also learn a few methods to obtain the general solution of such equations.
CO-4	To understand the concept of linear equation with regular singular point.
CO-5	To understand the equation with variable separated method, Lipschitz condition – Convergence of the successive approximations and the existence theorem.

Syllabus	
Title	Ordinary Differential Equations
Course Code	**MFF1C**
Unit 1	Linear equations with constant coefficients Second order homogeneous equations-Initial value problems-Linear dependence and independence-Wronskian and a formula for Wronskian-Non-homogeneous equation of order two. Chapter 2: Sections 1 to 6 (18 hrs)
Unit 2	Linear equations with constant coefficients Homogeneous and non-homogeneous equation of order n –Initial value problemsAnnihilator method to solve non-homogeneous equation. Chapter 2 : Sections 7 to 11. (18 hrs)
Unit 3	Linear equation with variable coefficients Initial value problems

	-Existence and uniqueness theorems – Solutions to solve a non-homogeneous equation – Wronskian and linear dependence – Reduction of the order of a homogeneous equation – Homogeneous equation with analytic coefficients-The Legendre equation. Chapter : 3 Sections 1 to 8 (omit section 9) (18 hrs)
Unit 4	:Linear equation with regular singular points Second order equations with regular singular points –Exceptional cases – Bessel equation . Chapter 4 : Sections 3, 4 and 6 to 8 (omit sections 5 and 9) (18 hrs)
Unit 5	Existence and uniqueness of solutions to first order equations: Equation with variable separated – Exact equation – Method of successive approximations – the Lipschitz condition – Convergence of the successive approximations and the existence theorem. Chapter 5 : Sections 1 to 6 (omit Sections 7 to 9) (18 hrs)

Course Objectives	
Title	Graph Theory
Course Code	MFF1D
CO-1	To understand how graph theory have been.
CO-2	To understand the concept of vertex connectivity and edge connectivity in graphs.
CO-3	To develop the understand of connectivity and euler tour.
CO-4	To have an idea of matching in graphs and study some applications of matching in day to day life problems.
CO-5	To introduce the idea of coloring in graphs.

Course Outcome	
Title	Graph Theory
Course Code	MFF1D
CO-1	Able to define the basic concept of graphs, subgraph and tree.
CO-2	To understand the concept of connectivity, block, euler tour and Hamilton cycle.
CO-3	To understand the concept of matching, covering in bipartile graph and vizing's theorem.
CO-4	To have an ideal of plane graph, planar graph, Euler graph and five color theorem.
CO-5	Able to define the properties of bipartite graphs, particularly in trees.

Syllabus	
Title	Graph Theory
Course Code	**MFF1D**
Unit 1	Graphs, subgraphs and Trees : Graphs and simple graphs – Graph Isomorphism – The Incidence and Adjacency Matrices – Subgraphs – Vertex Degrees – Paths and Connection – Cycles – Trees – Cut Edges ana Bonds – Cut Vertices. Chapter 1 (Section 1.1 – 1.7) Chapter 2 (Section 2.1 – 2.3) (18 hrs)
Unit 2	Connectivity, Euler tours and Hamilton Cycles : Connectivity – Blocks – Euler tours – Hamilton Cycles. Chapter 3 (Section 3.1 – 3.2) Chapter 4 (Section 4.1 – 4.2) (18 hrs)
Unit 3	Matchings, Edge Colourings : Matchings – Matchings and Coverings in Bipartite Graphs – Edge Chromatic Number – Vizing's Theorem. Chapter 5 (Section 5.1 – 5.2) Chapter 6 (Section 6.1 – 6.2) (18 hrs)
Unit 4	Independent sets and Cliques, Vertex Colourings : Independent sets – Ramsey's Theorem – Chromatic Number – Brooks' Theorem – Chromatic Polynomials. Chapter 7 (Section 7.1 – 7.2) Chapter 8 (Section 8.1 – 8.2, 8.4) (18 hrs)
Unit 5	Planar graphs : Plane and planar Graphs – Dual graphs – Euler's Formula – The Five- Colour Theorem and the Four-Colour Conjecture. Chapter 9 (Section 9.1 – 9.3, 9.6) (18 hrs)

Course Objectives	
Title	Fuzzy Sets and their Applications
Course Code	MFFAC
CO-1	Fuzzy set theory has been shown to be a useful tool to describe situations in which the data are imprecise or vague.
CO-2	Fuzzy sets handle such situation by attributing a degree to which a certain object belongs to a set.
CO-3	In other words, there may be a hesitation or uncertainty about the membership degree of x in A.
CO-4	Fuzzy sets handle such situation by attributing a degree to which a certain object belongs to a set.
CO-5	There may be a hesitation or uncertainty about the membership degree of y in B.

Course Outcome	
Title	Fuzzy Sets and their Applications
Course Code	MFFAC
CO-1	Learn crips and fuzzy set theory .make calculation on fuzzy set theory.
CO-2	Recognize fuzzy logic membership function.
CO-3	Make applications on fuzzy logic membership function and fuzzy inference systems.
CO-4	Analysis statistical data by using fuzzy logic methods.
CO-5	Analysis of Fundamental Notions

Syllabus	
Title	Fuzzy Sets and their Applications
Course Code	**MFFAC**
Unit 1	Fundamental Notions: Chapter I: Sec. 1 to 8 (18 hrs)
Unit 2	Fuzzy Graphs: Chapter II: Sec. 10 to 18 (18 hrs)
Unit 3	Fuzzy Relations: Chapter II: Sec. 19 to 29 (18 hrs)
Unit 4	Fuzzy Logic: Chapter III: Sec.31 to 40 (omit Sec. 37, 38, 41) (18 hrs)
Unit 5	The Laws of Fuzzy Composition: Chapter IV: Sec.4```3 to 49 (18 hrs)

Course Objectives	
Title	Algebra-II
Course Code	MFF2A
CO-1	This course aims to provide a first approach to the subjects of algebra, which is one of the basic pillars of modern mathematics.
CO-2	In particular to study in details the sylow theorems and polynomials.
CO-3	This course helps to gain skill in problem solving and critical thinking.
CO-4	Abstract algebra is a classical field that is associated with the study of polynomials in several variables.
CO-5	Use numeric or variable substitution while working with expressions

Course Outcome	
Title	Algebra-II
Course Code	MFF2A
CO-1	Classify a extension fields and transcendence.
CO-2	Evaluate and simply problems based on the theory on galois and roots of polynomial.
CO-3	Perform calculations using order of operations based on roots of polynomials.
CO-4	Evaluate and simply algebraic problem on radical-Galois groups over the rationals.
CO-5	Perform calculation using Wedderburn's theorem on finite division rings

Syllabus	
Title	Algebra-II
Course Code	**MFF2A**
Unit 1	Extension fields - Transcendence of e. Chapter 5: Section 5.1 and 5.2 (18 hrs)
Unit 2	Roots or Polynomials.- More about roots Chapter 5: Sections 5.3 and 5.5 (18 hrs)
Unit 3	Elements of Galois theory. Chapter 5 : Section 5.6 (18 hrs)
Unit 4	Finite fields - Wedderburn's theorem on finite division rings Chapter 7: Sections 7.1 and 7.2 (Theorem 7.2.1 only) (18 hrs)
Unit 5	Solvability by radicals–Galois groups over the rationals -–A theorem of Frobenius. Chapter 5: Sections 5.7 and 5.8 Chapter 7: Sections 7.3 (18 hrs)

Course Objectives	
Title	Real Analysis-II
Course Code	MFF2B
CO-1	The develop the concept of measure on the real line in lebesgue measurability, integration of functions of a real variable, fourier series and fourier integrals.
CO-2	Solve the problem based on the theory multivariable differential calculus, implicit functions and extremum problems.
CO-3	Intellectual Skills: Develop a reasoned argument in handling problems about functions, especially those that are of bounded variation.
CO-4	General and Transferable Skills: Develop the ability to reflect on problems that are quite significant in the field of real analysis.
CO-5	Knowledge and Understanding: Learn the theory of Riemann-Stieltjes integrals, to be aquainted with the ideas of the total variation and to be able to deal with functions of bounded variation.

Course Outcome	
Title	Real Analysis-II
Course Code	MFF2B
CO-1	Understand the theory and applications of the measure on the real line.
CO-2	Have a good knowledge of the theory and practice of integratin of functions of real variable.
CO-3	Understand the role of fourier series and fourier integrals.
CO-4	Solve the problem based on multivariable and differential calculus.
CO-5	An integral representation for the partial sums of Fourier series

Syllabus	
Title	Real Analysis-II
Course Code	**MFF2B**
Unit 1	Measure on the Real line - Lebesgue Outer Measure - Measurable sets - Regularity - Measurable Functions - Borel and Lebesgue Measurability Chapter - 2 Sec 2.1 to 2.5 of de Barra (18 hrs)
Unit 2	Integration of Functions of a Real variable - Integration of Non-negative functions - The General Integral - Riemann and Lebesgue Integrals Chapter - 3 Sec 3.1,3.2 and 3.4 of de Barra (18 hrs)
Unit 3	Fourier Series and Fourier Integrals - Introduction - Orthogonal system of functions - The theorem on best approximation - The Fourier series of a function relative to an orthonormal system - Properties of Fourier Coefficients - The Riesz-Fischer Thorem - The convergence and representation problems in for trigonometric series - The Riemann - Lebesgue Lemma - The Dirichlet Integrals - An integral representation for the partial sums of Fourier series - Riemann's localization theorem - Sufficient conditions for convergence of a Fourier series at a particular point - Cesarosummability of Fourier series- Consequences of Fejes'stheorem - The Weierstrass approximation theorem Chapter 11 : Sections 11.1 to 11.15 of Apostol (18 hrs)
Unit 4	Multivariable Differential Calculus - Introduction - The Directional derivative - Directional derivative and continuity - The total derivative - The total derivative expressed in terms of partial derivatives - The matrix of linear function - The Jacobian matrix - The chain rule - Matrix form of chain rule - The mean - value theorem for differentiable functions - A sufficient condition for differentiability - A sufficient condition for equality of mixed partial derivatives - Taylor's theorem for functions of Rn to R1 Chapter 12 : Section 12.1 to 12.14 of Apostol (18 hrs)
Unit 5	Implicit Functions and Extremum Problems : Functions with non-zero Jacobian determinants – The inverse function theorem-The Implicit function theorem-Extrema of real valued functions of severable variables-Extremum problems with side conditions. Chapter 13 : Sections 13.1 to 13.7 of Apostol (18 hrs)

Course Objectives	
Title	Partial Differential Equations
Course Code	MFF2C
CO-1	In this course we have studied the Partial Differential techniques which consist of applying your mathematical skills to obtain useful answer to real problem.
CO-2	Equations are used in a very wide range of applications, some of which do not appear initially to be mathematical in nature.
CO-3	Learning to apply mathematical skills is very different from learning mathematics itself.
CO-4	Learn to find and use eigenvalues and eigenvectors of a matrix.
CO-5	Learn about and work with vector spaces and subspaces.

Course Outcome	
Title	Partial Differential Equations
Course Code	MFF2C
CO-1	Introduce and derive of partial differential equation, linear partial differential equation of second order.
CO-2	Discuss Canonical form for hyperbolic equation, canonical form for parabolic equation and elliptic equation.
CO-3	Understand the laplace and poisson equation, Dirichlet problem and solution of laplace equation in cylindrical coordinates.Solve using separation of variable method.
CO-4	Apply in finding the solution for Derivation of One-dimensional Wave Equation , Solution of One-dimensional Wave Equation by Canonical Reduction ,The Initial Value Problem,and D'Alembert's Solution.
CO-5	Solve the concept of Green's function for Laplace equation,Green's function for the wave equation,Helmholtz theorem and Green's function for the Diffusion equation.

Syllabus	
Title	Partial Differential Equations
Course Code	**MFF2C**
Unit 1	Fundamental Concepts : Introduction – Classification of Second Order PDE – Canonical Forms : Canonical Form for Hyperbolic Equation , Canonical Form for Parabolic Equation , Canonical Form for Elliptic Equation. Section 1.1 to 1.3 (18 hrs)
Unit 2	Elliptic Differential Equations : Occurrence of the Laplace and Poisson Equations: Derivation of Laplace Equation, Derivation of Poisson Equation. Boundary Value Problem (BVPs) – Some important Mathematical tools - Separation of Variables – Dirichlet Problem for a Rectangle - The Neumann Problem for a rectangle - Interior Dirichlet Problem for a Circle – Exterior Dirichlet Problem for a Circle – Interior Neumann Problem for a Circle- Solution of Laplace equation in cylindrical coordinates. Section 2.1 to 2.3, 2.5 to 2.11 (18 hrs)
Unit 3	Parabolic Differential Equations: Occurrence of The Diffusion Equation –Boundary Conditions – Elementary Solutions of the Diffusion Equation – Dirac Delta Function – Separation of Variables Method – Solution of diffusion equation in cylindrical coordinates. Section 3.1 to 3.6 (18 hrs)
Unit 4	Hyperbolic Differential Equations : Occurrence of the Wave Equation – Derivation of One-dimensional Wave Equation – Solution of Onedimensional Wave Equation by Canonical Reduction – The Initial Value Problem ; D'Alembert's Solution – Vibrating String : Variables Separable Solution - Forced Vibrations: Solution of Nonhomogeneous Equation – Boundary and Initial Value Problem for Two-dimensional Wave Equations: Method of Eigenfunction. Section 4.1 to 4.7 (18 hrs)
Unit 5	Green's Function: Introduction – Green's function for Laplace equation – the methods of Images – the eigenfunction method – Green's function for the wave equation: Helmholtz theorem – Green's function for the Diffusion equation. Section 5.1.to 5.6. (18 hrs)

Course Objectives	
Title	Probability Theory
Course Code	MFF2D
CO-1	Objective probability refers to the chances or the odds that an event will occur based o the analysis of concrete measures rather than hunches or guesswork.
CO-2	Each measure is a recorded observation, a hard fact or part of a long history of collected data.
CO-3	Providing students with a formal treatment of probability theory
CO-4	Equipping students with essential tools for statistical analyses at the graduate level.
CO-5	Fostering understanding through real-world statistical applications.

Course Outcome	
Title	Probability Theory
Course Code	MFF2D
CO-1	Calculate probabilities by applying probability laws and theoretical results.
CO-2	Identify an appropriate probability distribution for a given continuous random variable.
CO-3	Understanding the concept of parameters of the distribution and probability characteristic functions.
CO-4	Solve the problems about Bayes theorem and cauchy and laplace distributions.
CO-5	Use its properties to calculate probabilities.

Syllabus	
Title	Probability Theory
Course Code	**MFF2D**
Unit 1	Random Events and Random Variables: Random events – Probability axioms – Combinatorial formulae – conditional probability – Bayes Theorem – Independent events – Random Variables – Distribution Function – Joint Distribution – Marginal Distribution – Conditional Distribution – Independent random variables – Functions of random variables. Chapter 1: Sections 1.1 to 1.7 Chapter 2 : Sections 2.1 to 2.9 (18 hrs)
Unit 2	Parameters of the Distribution : Expectation- Moments – The Chebyshev Inequality – Absolute moments – Order parameters – Moments of random vectors – Regression of the first and second types. Chapter 3 : Sections 3.1 to 3.8 (18 hrs)
Unit 3	:Characteristic functions : Properties of characteristic functions – Characteristic functions and moments – semi0invariants – characteristic function of the sum of the independent random variables – Determination of distribution function by the Characteristic function – Characteristic function of multidimensional random vectors – Probability generating functions. Chapter 4 : Sections 4.1 to 4.7 (18 hrs)
Unit 4	:Some Probability distributions: One point , two point , Binomial – Polya – Hypergeometric – Poisson (discrete) distributions – Uniform – normal gamma – Beta – Cauchy and Laplace (continuous) distributions. Chapter 5 : Section 5.1 to 5.10 (Omit Section 5.11) (18 hrs)
Unit 5	:Limit Theorems : Stochastic convergence – Bernaulli law of large numbers – Convergence of sequence of distribution functions – Levy-Cramer Theorems – de Moivre-Laplace Theorem – Poisson, Chebyshev, Khintchine Weak law of large numbers – Lindberg Theorem – LapunovTheroem – BorelCantelli Lemma - Kolmogorov Inequality and Kolmogorov Strong Law of large numbers. Chapter 6 : Sections 6.1 to 6.4, 6.6 to 6.9 , 6.11 and 6.12. (Omit Sections 6.5, 6.10,6.13 to 6.15)

Course Objectives	
Title	Mathematical programming
Course Code	MFFAD
CO-1	Mathematical programming methods are based on the solution of a CAMD problem as an optimization problem.
CO-2	The objective function is defined in terms of the performance criteria.
CO-3	Target properties that must be satisfied are introduced as constraints.
CO-4	Improve their ability to rigorously prove mathematical statements.
CO-5	Develop knowledge of the mathematical structure of the most commonly used deterministic linear optimization models.

Course Outcome	
Title	Mathematical programming
Course Code	MFFAD
CO-1	Formulate a given simplified description of a suitable real-world problem as a linear programming model in general, standard and canonical forms.
CO-2	Classify a two-dimensional linear programming model by the type of its solution.
CO-3	Solve a two-dimensional linear programming problem graphically.
CO-4	Use the simples method to solve small linear programming models by hand, given a basic feasible point.
CO-5	Cultivate an ability to analyze the structure of and mathematically model various complex system occurring in industrial applications.

Syllabus	
Title	Mathematical programming
Course Code	**MFFAD**
Unit 1	Integer Linear Programming: Types of integer linear programming problems- Concept of cutting plane- Gomory's all integer cutting plane method –Branch and Bound method. Chapter 7
Unit 2	Dynamic Programming: Characteristic of Dynamic Programming Problem- Developing optimal Decision policy – Dynamic Programming under Certainty – DP approach to solve LPP. Chapter22
Unit 3	Classical optimization Method: Unconstrained Optimization- Constrained Multi-variable Optimization with Equality Constraints – Constrained Multi-variable Optimization with inequality constraints Non-Linear Programming Methods: Examples of NLPP – General NLPP- Graphical solution – Quadratic programming – Wolfe's modified simplex method. Chapter 23 and chapter 24: Section 24.1 to 24.
Unit 4	Linear programming problem- Simple problems. Parametric Linear Programming: Variation in the coefficients cj, variation in the Right hand side bj Chapter 4: Section 4.1 to 4.3 and Chapter 29
Unit 5	Goal Programming: Difference between LP and GP approach- Concept of Goal Programming – Goal programming model formulation – Graphical solution method of Goal Programming. Chapter8: section 8.1 to 8.5

Course Objectives	
Title	Complex Analysis-I
Course Code	MFF3A
CO-1	This course is aimed to provide an introduction to the theories for functions of a complex variable.
CO-2	Students will be equipped with the understanding of the fundamental concepts of complex variable of first level.
CO-3	To understand the principal of Analytic Continuation and the concerned results
CO-4	To Understand certain theorems like Inverse Function theorem, Hardmards three circle theorem.
CO-5	To understand the principal of Analytic Continuation and the concerned results.

Course Outcome	
Title	Complex Analysis-I
Course Code	MFF3A
CO-1	Students will be equipped with the understanding of the fundamental concept of complex variable theory.
CO-2	Apply problem-solving using cauchy integral formula and analytic function.
CO-3	To understanding the concepts of Schwarz theorem, weierstraws theorem and series.
CO-4	Apply problem-solving using harmonic, partial and entire function.
CO-5	Skill using of contour integration to evaluate complicated real integral via residue calculus.

Syllabus	
Title	Complex Analysis-I
Course Code	**MFF3A**
Unit 1	Cauchy's Integral Formula: The Index of a point with respectto a closed curve - The Integral formula - Higher derivatives. Local Properties of Analytical Functions :Removable Singularities-Taylors's Theorem-Zeros and poles-The local Mapping - The Maximum Principle . Chapter 4 : Section 2 : 2.1 to 2.3, Section 3 : 3.1 to 3.4 (18 hrs)
Unit 2	The general form of Cauchy's Theorem : Chains and cycles-SimpleConnnectivity Homology - The General statement of Cauchy's Theorem - Proof of Cauchy's theorem – Locally exact differentials-Multilply connected regions – Residue theorem - The argument principle. Chapter 4 : Section 4 : 4.1 to 4.7, Section 5: 5.1 and 5.2 (18 hrs)
Unit 3	Evaluation of Definite Integrals and Harmonic Functions: Evaluation of definite integrals - Definition of Harmonic functions and basic properties - Mean value property - Poisson formula. Chapter 4 : Section 5 : 5.3, Section 6 : 6.1 to 6.3 (18 hrs)
Unit 4	Harmonic Functions and Power Series Expansions: Schwarz theorem - The reflection principle - Weierstrass theorem - Taylor Series - Laurent series . Chapter 4 : Sections 6.4 and 6.5 Chapter 5 : Sections 1.1 to 1.3 (18 hrs)
Unit 5	Partial Fractions and Entire Functions: Partial fractions– Infinite products - Canonical products - Gamma Function - Jensen's formula Chapter 5 : Sections 2.1 to 2.4, Section 3.1 (18 hrs)

Course Objectives	
Title	Topology
Course Code	MFF3B
CO-1	The objective of the course on Topology is to provide the knowledge of topological spaces and their importance.
CO-2	To acquaint students with the concept of homeomorphism and the topological properties.
CO-3	Important mathematical concepts which can generalized in topological spaces, so that students may learn and appreciate the nature of abstract mathematics.
CO-4	Understand terms, definitions and theorems related to topology.
CO-5	Use continuous functions and homeomorphisms to understand structure of topological spaces.

Course Outcome	
Title	Topology
Course Code	MFF3B
CO-1	Understand the concept of topological spaces and the basic definitions of open sets, neighbourhood, interior, exterior, closure and their axiom for defining topological spaces.
CO-2	Understanding the concept of Bases and subspaces, create new topological spaces by using subspaces.
CO-3	Understand continuity, compactness, connectedness, local connectedness and compact subspaces of the real life.
CO-4	Understand normal spaces , urysohn lemma and extension theorem.
CO-5	Understand the concept od product topology, Homotopy of paths and fundamental group.

Syllabus	
Title	Topology
Course Code	**MFF3B**
Unit 1	Topological spaces, Basis for a topology, Product topology on X xY,Subspace topology, Closed sets and Limit points, Continuous functions. Chapter 2 - Sections 12, 13, 15, 16, 17, 18. (18 hrs)
Unit 2	Connected spaces, Connected subspaces of the real line, Components and Local connectedness, Compact spaces, Compact subspaces of the real line. Chapter 3 - Sections 23, 24, 25, 26, 27. (18 hrs)
Unit 3	Countability axioms, Separation axioms, Normal spaces, Urysohn Lemma, Urysohnmetrization theorem, Tietze extension theorem. Chapter 4 - Sections 30, 31, 32, 33, 34, 35. (18 hrs)
Unit 4	Product topology, Tychonoff theorem. Chapter 2 - Sections 19. Chapter 5 - Section 37. (18 hrs)
Unit 5	Homotopy of paths, Fundamental group. Chapter 9 - Sections 51, 52. (18 hrs)

Course Objectives	
Title	Operation Research
Course Code	MFF3C
CO-1	The objective of this course is to understand the theory of operation research.
CO-2	It is developed for solving various types of optimization problem.
CO-3	Understand the mathematical tools that are needed to solve optimisation problems.
CO-4	Identify and develop operational research models from the verbal description of the real system.
CO-5	Use mathematical software to solve the proposed models.

Course Outcome	
Title	Operation Research
Course Code	MFF3C
CO-1	To understand the concept of decision theory.
CO-2	Understand network application, shortest route problem.
CO-3	Solve the problems Inventory Control Models and Probabilistic Inventory Control Models.
CO-4	Learn about the application of Queueing Theory and Characteristic.
CO-5	To Acquire Knowledge linear programming formulation and network simplex algorithm.

Syllabus	
Title	Operation Research
Course Code	**MFF3C**
Unit 1	Decision Theory : Steps in Decision theory Approach – Types of Decision-Making Environments – Decision Making Under Uncertainty – Decision Making under Risk – Posterior Probabilities and Bayesian Analysis – Decision Tree Analysis – Decision Making with Utilities. Chapter 10 : Sec. 10.1 to 10.8 (18 hrs)
Unit 2	Network Models : Scope of Network Applications – Network Definition – Minimal spanning true Algorithm – Shortest Route problem – Maximum flow model – Minimum cost capacitated flow problem - Network representation – Linear Programming formulation – Capacitated Network simplex Algorithm. Chapter 6 : Sections 6.1 to 6.6 H.A.Taha : Operations Research (18 hrs)
Unit 3	Deterministic Inventory Control Models: Meaning of Inventory Control – Functional Classification – Advantage of Carrying Inventory – Features of Inventory System – Inventory Model building - Deterministic Inventory Models with no shortage – Deterministic Inventory with Shortages

	Probabilistic Inventory Control Models: Single Period Probabilistic Models without Setup cost – Single Period Probabilities Model with Setup cost. Chapter 13: Sec. 13.1 to 13.8 Chapter 14: Sec. 14.1 to 14.3 (18 hrs)
Unit 4	Queueing Theory : Essential Features of Queueing System – Operating Characteristic of Queueing System – Probabilistic Distribution in Queueing Systems – Classification of Queueing Models – Solution of Queueing Models – Probability Distribution of Arrivals and Departures – Erlangian Service times Distribution with k-Phases. Chapter 15 : Sec. 15.1 to 15.8 (18 hrs)
Unit 5	Replacement and Maintenance Models: Failure Mechanism of items – Replacement of Items that deteriorate with Time – Replacement of items that fail completely – other Replacement Problems. Chapter 16: Sec. 16.1 to 16.5 (18 hrs)

Course Objectives	
Title	Mechanics
Course Code	MFF3D
CO-1	The course aims at understanding the various concepts of physical quantities.
CO-2	It emphasizes knowledge building for applying mathematics in physical world.
CO-3	To understand the effect on different bodies using mathematical techniques.
CO-4	Study the concept the legrange equation and integrals of motion.
CO-5	To understand the uses of transformation, lagrange and poisson brackets.

Course Outcome	
Title	Mechanics
Course Code	MFF3D
CO-1	Know the significance of mathematics involved in physical quantities and their uses.
CO-2	Understand the concept of generalized coordinates, constraints , virtual work , energy and momentum.
CO-3	Learn the concept the legrange equation and integrals of motion.
CO-4	Study about the Hamilton's principle function, Hamilton Jacobi equation and separability.
CO-5	To understand the uses of transformation, lagrange and poisson brackets.

Syllabus	
Title	Mechanics
Course Code	**MFF3D**
Unit 1	Mechanical Systems : The Mechanical system- Generalised coordinates – Constraints - Virtual work - Energy and Momentum Chapter 1 : Sections 1.1 to 1.5 (18 hrs)
Unit 2	Lagrange's Equations: Derivation of Lagrange's equations- Examples- Integrals of motion. Chapter 2 : Sections 2.1 to 2.3 (Omit Section 2.4) (18 hrs)
Unit 3	Hamilton's Equations : Hamilton's Principle - Hamilton's Equation - Other variational principles. Chapter 4 : Sections 4.1 to 4.3 (Omit section 4.4) (18 hrs)
Unit 4	Hamilton-Jacobi Theory : Hamilton Principle function – Hamilton-Jacobi Equation - Separability Chapter 5 : Sections 5.1 to 5.3 (18 hrs)
Unit 5	Canonical Transformation : Differential forms and generating functions – Special Transformations– Lagrange and Poisson brackets. Chapter 6 : Sections 6.1, 6.2 and 6.3 (omit sections 6.4, 6.5 and 6.6) (18 hrs)

Course Objectives	
Title	Number Theory and Cryptography
Course Code	MFFAH
CO-1	Covers fundamental algorithms for integer arithmetic, greatest coomon divisor calculation, modular arithmetic, and other number-theoretic computations. To be able to use a system like Maple to explore concepts and theorems from numbertheory.
CO-2	Algorithms are derived, implemented and analyzed for primality testing and integer factorization.
CO-3	Application to cryptography are explored including symmetric and public-key cryptosystem.
CO-4	A cryptosystem will be implemented and methods of attack investigated. To be able to implement and analyze algorithms for integer factorization and Primality testing.
CO-5	To understand fundamental algorithms from symmetric-key and public-key cryptography

Course Outcome	
Title	Number Theory and Cryptography
Course Code	MFFAH
CO-1	To understand fundamental number-theoretic algorithms such as the Euclidean algorithms.
CO-2	To understand fundamental algorithms for crypto system and Enciphering matrices DES.
CO-3	To understand the concept of finite fields , quadratic and Reciprocity.
CO-4	To understand fundamental algorithms for symmetric key and public-key cryptography.
CO-5	Understand fundamental algorithms for crypto system and Enciphering matrices DES

Syllabus	
Title	Number Theory and Cryptography
Course Code	**MFFAH**
Unit 1	Elementary Number Theory: Time Estimates for doing arithmetic – divisibility and Euclidean algorithm – Congruences – Application to factoring. (Chapter 1)(18 hrs)
Unit 2	Introduction to Classical Crypto systems – Some simple crypto systems – Enciphering matrices DES (Chapter 3)(18 hrs)
Unit 3	Finite Fields, Quadratic Residues and Reciprocity (Chapter 2) (18 hrs)
Unit 4	Public Key Cryptography (Chapter 4) (18 hrs)
Unit 5	Primality , Factoring, Elliptic curves and Elliptic curve crypto systems (Chapter 5, sections 1,2,3 &5 (omit section 4), Chapter 6, sections 1& 2 only) (18 hrs)

Course Objectives	
Title	Complex Analysis-I I
Course Code	MFF4A
CO-1	The course presents an introduction to some topics of contemporary complexanalysis.
CO-2	The purpose is to prepare the student to independent work in these topics and especially to use the methods of complex of complex analysis in other areas of mathematics.
CO-3	The zeros of zeta function – Equicontinuity – Normality and compactness – Arzela's theorem
CO-4	Conformal mappings of polygons : Behaviour at an angle Schwarz-Christoffel formula
CO-5	Analytic continuation along Arcs – Homotopic curves – The Monodromy Theorem

Course Outcome	
Title	Complex Analysis-I I
Course Code	MFF4A
CO-1	Represent complex numbers algebraically and geometrically.
CO-2	Apply the concepts and consequences of Riemann zeta functions, Riemann mapping theorem, doubly periodic functions.
CO-3	Apply the weierstrass theorem and functions, modular equation and conformal mapping.
CO-4	Analysis solving problem based on elliptic functions simply periodic functions.
CO-5	Conformal mappings of polygons : Behaviour at an angle Schwarz-Christoffel formula

Syllabus	
Title	Complex Analysis-I I
Course Code	**MFF4A**
Unit 1	Riemann Zeta Function and Normal Famalies : Product development – Extension of (s) to the whole plane – The zeros of zeta function – Equicontinuity – Normality and compactness – Arzela's theorem – Families of analytic functions – The Classcial Definition Chapter 5 : Sections 4.1 to 4.4, Sections 5.1 to 5.5 (18 hrs)
Unit 2	Riemann mapping Theorem : Statement and Proof – Boundary Behaviour – Use of the Reflection Principle. Conformal mappings of polygons : Behaviour at an angle Schwarz-Christoffel formula – Mapping of a rectangle.Harmonic Functions : Functions with mean value property – Harnack's principle. Chapter 6 : Sections 1.1 to 1.3 (Omit Section 1.4) Sections 2.1 to 2.3 (Omit section 2.4), Section 3.1 and 3.2 (18 hrs)

Unit 3	Elliptic functions : Simply periodic functions – Doubly periodic functions Chapter 7 : Sections 1.1 to 1.3, Sections 2.1 to 2.4 (18 hrs)
Unit 4	Weierstrass Theory : The Weierstrass -function – The functions (s) and (s) – The differential equation – The modular equation ( ) – The Conformal mapping by ( ). Chapter 7 : Sections 3.1 to 3.5 (18 hrs
Unit 5	Analytic Continuation :The Weiesrtrass Theory – Germs and Sheaves – Sections and Riemann surfaces – Analytic continuation along Arcs – Homotopic curves – The Monodromy Theorem – Branch points. Chapter 8 : Sections 1.1 to 1.7 (18 hrs)

Course Objectives	
Title	Differential Geometry
Course Code	MFF4B
CO-1	The aim of the course is to provide knowledge of the geometry of curves and surfaces.
CO-2	The course integrates concept from different parts of mathematics, such as linear algebra, calculus and differential equations.
CO-3	It also provides intuitive examples for many conceptsin linear algebra, calculus and differential equations.
CO-4	Apply major foundational results in TheoremaEgregium of Gauss.
CO-5	Study Curvature of curves on a surface, normal, principal, Gaussian and mean curvatures

Course Outcome	
Title	Differential Geometry
Course Code	MFF4B
CO-1	Functionally use connections, curvature and geodesics.
CO-2	Perform geometric calculations in local coordinates.
CO-3	Demonstrate knowledge of important examples of gaussian and mean curavature.
CO-4	Explain and apply major foundational results in TheoremaEgregium of Gauss.
CO-5	The second fundamental form, Curvature of curves on a surface, normal, principal, Gaussian and mean curvatures

Syllabus	
Title	Differential Geometry
Course Code	**MFF4B**
Unit 1	Curves in the plane and in space : Curves, parametrisation, arc length, level curves, curvature, plane and space curves. Chapters 1 and 2. (18 hrs)
Unit 2	Surfaces in space : Surface patches, smooth surfaces, tangents, normals, orientability, examples of surfaces, lengths of curves on surfaces, the first fundamental form, isometries, surface area. Chapter 4 - 4.1, 4.2, 4.3, 4.4, 4.7 and Chapter 5 - 5.1, 5.2, 5.4 (18 hrs)
Unit 3	Curvature of surfaces: The second fundamental form, Curvature of curves on a surface, normal, principal, Gaussian and mean curvatures, Gauss map. Chapter 6 - 6.1, 6.2, 6.3 and Chapter 7 - 7.1, 7.5,7.6 (18 hrs)
Unit 4	Geodesics : Geodesics, geodesic equations, geodesics as shortest paths, geodesic coordinates. (18 hrs) Chapter 8 - 8.1, 8.2, 8.4, 8.5
Unit 5	TheoremaEgregium of Gauss : TheoremaEgregium, isometries of surfaces, Codazzi-Mainardi equations, compact surfaces of constant Gaussian curvature. Chapter 10 (18 hrs)

Course Objectives	
Title	Functional Analysis
Course Code	MFF4C
CO-1	This course will develop a deeper and rigorous understanding of fundamental concepts of functional analysis, their properties and related theorems.
CO-2	Apply fundamental theorem from the theory of normed and Banach spaces including the open mapping theorem
CO-3	To study the behavior of different mathematical expressions arising in science and engineering.
CO-4	Uniform boundedness principle, Closed Graph and Open Mapping theorems
CO-5	To study concepts of functional analysis and their role in modern mathematics

Course Outcome	
Title	Functional Analysis
Course Code	MFF4C
CO-1	Explain the fundamental concepts of functional analysis and their role in modern mathematics.
CO-2	Explain the concept of Hahn-banach theorems and Banach spaces.
CO-3	Utilize the concepts of functional analysis, for example continuous and bounded ,normed spaces and to study the behavior of different mathematical expressions arising in

	science and engineering.
CO-4	Understand and apply fundamental theorem from the theory of normed and Banach spaces including the open mapping theorem, closed graph theorem and uniform boundness theorem.
CO-5	Explain the concept of dual spaces , inner product space and operators.

Syllabus	
Title	Functional Analysis
Course Code	**MFF4C**
Unit 1	Normed spaces, Continuity of linear maps, Hahn-Banach Theorems, Banach Spaces. Chapters II (omit sections 6.8, 7.11, 7.12, 8.4) (18 hrs)
Unit 2	Uniform boundedness principle, Closed Graph and Open Mapping theorems, Bounded Inverse Theorem, Spectrum of a bounded operator. Chapter III (omit sections 9.4 to 9.7, 11.2, 11.4, 11.5, 12.6, 12.7)(18 hrs)
Unit 3	Duals and Transposes, Weak and weak *convergence, Reflexivity Chapter IV (omit sections 13.7, 13.8, 14, 15.5 to 15.7, 16.5 to 16.9)(18 hrs)
Unit 4	Inner Product Spaces, Orthonormal sets, Best approximation,Projection and RieszRepresentaion theorems. . Chapter VI (omit sections 23.2, 23.4, 23.6, 24.7, 24.8) (18 hrs)
Unit 5	Bounded operators and adjoints, Normal, unitary and self adjoint Operators, Spectrum and Numerical range, Compact selfadjoint operators Chapter VII (omit sections 26.4, 26.5 26.6, 27.4 to 27.7, 28.7, 28.8)(18 hrs)

Course Objectives	
Title	Fluid Dynamics
Course Code	MFFAJ
CO-1	To introduce and explain fundamentals of fluid mechanics, which used in the applications of aerodynamics,gas dynamics etc.
CO-2	To develop understand about three dimensional and two dimensional problems in fluid flow.
CO-3	To determine the viscous of flows on a system and relation between stress and rate of strain
CO-4	To inculcate the importance of fluid flow measurement and its applications of in industries.
CO-5	Apply the problem on solving some three dimensional flows,stokes stream function and axix symmetric flows.

Course Outcome	
Title	Fluid Dynamics
Course Code	MFFAJ
CO-1	Determine the fluid pressure and use if kinematics of fluid in motion and its problems.
CO-2	Calculate equation of motion of a fluid on eulers equation of motion.
CO-3	Apply the problem on solving some three dimensional flows,stokes stream function and axix symmetric flows.
CO-4	Use of different fluid viscous flows on the problems.
CO-5	To Study velocity of a fluid at a point ,stream lines, path lines, steady and unsteady flows

Syllabus	
Title	Fluid Dynamics
Course Code	**MFFAJ**
Unit 1	Kinematics of Fluids in motion:Real fluids and ideals fluids- velocity of a fluid at a point ,stream lines, path lines, steady and unsteady flows- velocity potential- The voracity vector- Local and particle rates of changes-Equation of continuity- Worked examples-Acceleration of a fluid-Conditions at a rigid boundary. Chapter2. Sec 2.1 to 2.10
Unit 2	Equation of motion of a fluid: Pressure at a point in a fluid at rest-Pressure at a point in a moving fluid- Conditions at a boundary of two inviseid immiscible fluids- Euler's equation of motion – Disscussion of the case of steady motion under conservative body forces. Chapter3. Sec3.1 to 3.7
Unit 3	Some three dimensional flows. Introduction- Sources, sinks and doublets- images in a rigid infinite plane- Axis symmetric flows – Stokes stream function. Chapter 4. Sec4.1, 4.2, 4.3, 4.5.
Unit 4	Some two dimensional flows: Meaning of two dimensional flow – Use of Cylindrical polar coordinates- The stream function- The complex potential for two dimensional, irrotational incompressible flow- Complex velocity potentials for standard two dimensional flows- Some worked examples- Two dimensional image system- The Milne Thompson circle Theorem. Chapter5. Sec 5.1 to 5.8
Unit 5	Viscous flows: Stress components in a real fluid- Relation between Cartesian components of stress- Translational motion of fluid elements –The rate of strain quadric and principle stresses- Some further properties of the rate of strain quadric- Stress analysis in fluid motion – Relation between stress and rate of strain – The coefficients of viscosity and Laminar flow – The Navier- Stokes equations of motion of a Viscous fluid. Chapter8. Sec 8.1 to 8.9

Course Objectives	
Title	Tensor Analysis and Relativity
Course Code	MFFAM
CO-1	The aim of the course is to introduce and develop the methods of Tensor analysis and relativity.
CO-2	These methods provide a natural aid to the understanding of geometry and some physical concepts.
CO-3	They are also fundamental tool in many theories of Applied Mathematics.
CO-4	Understand the fundamental concept in special theory of relativity and principle of relativity.
CO-5	Study Algebra of Tensors – Equality of Tensors – Symmetric and Skew-symmetric tensors - Outer multiplication

Course Outcome	
Title	Tensor Analysis and Relativity
Course Code	MFFAM
CO-1	Understand the basic concept of tensor variable and different form of tensor methods.
CO-2	Realize importance of Riemannian space and christoffel symbol and their properities.
CO-3	Evaluate the concept of curvature tensor and intrinsic differentiation.
CO-4	Know the fundamental concept in special theory of relativity and principle of relativity.
CO-5	To understand the concept of Accelerated Systems, Relativistic Dynamics and Relativistic Kinematics .

Syllabus	
Title	Tensor Analysis and Relativity
Course Code	**MFFAM**
Unit 1	Tensor Algebra : Systems of Different orders – Summation Convention – Kronecker Symbols - Transformation of coordinates in Sn - Invariants – Covariant and Contravariant vectors - Tensors of Second Order – Mixed Tensors – ZeroTensor – Tensor Field – Algebra of Tensors – Equality of Tensors – Symmetric and Skew-symmetric tensors - Outer multiplication, Contraction and Inner Multiplication – Quotient Law of Tensors – Reciprocal Tensor – Relative Tensor – Cross Product of Vectors. Chapter I : I.1 – I.3,I.7 and I.8 and Chapter II : II.1 – II.19 (18 hrs)
Unit 2	Tensor Calculus : Riemannian Space – Christoffel Symbols and their properties. Chapter III: III.1 and III.2
Unit 3	Tensor Calculus(contd) : Covariant Differentiation of Tensors – Riemann–Christoffel Curvature Tensor – Intrinsic Differentiation Chapter III: III.3 – III.5 (18 hrs)
Unit 4	Special Theory of Relativity : Galilean Transformations – Maxwell's equations – The ether Theory – The Principle of Relativity. Relativistic Kinematics : Lorentz Transformation equations – Events and simultaneity – Example – Einstein Train – Time dilation – Longitudinal Contraction - Invariant Interval - Proper time and Proper distance - World line - Example – twin paradox – addition of velocities – Relativistic Doppler effect. Chapter 7 : Sections 7.1 and 7.2 (18 hrs)
Unit 5	Relativistic Dynamics : Momentum – Energy – Momentum – energy four vector – Force - Conservation of Energy – Mass and energy – Example – inelastic collision – Principle of equivalence – Lagrangian and Hamiltonian formulations. Accelerated Systems : Rocket with constant acceleration – example – Rocket with constant thrust. Chapter 7 : Sections 7.3 and 7.4 (18 hrs)

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF BUSINESS ADMINISTRATION(P.G.)

Program : M B A

Program Outcomes	
	On Completion of Program the students will able to
PO-1	To equip the students with requisite knowledge, skill and right attitude necessary to provide effective leadership in global environment.
PO-2	To develop leadership capabilities to act as change agents and be source of motivation in the organization they work in.
PO-3	To develop competent management professional with strongvalues, capable of assuming a pivotal role in the various sectors of Indian economy ands aligned with the national priorities.
PO-4	To develop proactive thinking so as to perform effectively in the dynamic socio-economic and business ecosystem.
PO-5	To demonstrate effective written forms of communication and oral business presentation.
PO-6	Identify, formulate and analyze business management problems, reaching substantiated conclusions using principles of business management and social sciences
PO-7	Create, select and apply appropriate methods, techniques and resources for successful business operations
PO-8	Understand the need for rational decision making
PO-9	Develop desire for professional development and life-long learning

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	An ability to communicate effectively in a variety of formats.
PSO-2	An ability to evaluate and integrate ethical considerations when making business decisions.
PSO-3	An ability to utilize qualitative and quantitative methods to investigate and solve critical business problem.
PSO-4	An ability to identify the key issues facing a business or business subdivision.
PSO-5	An ability to manage Time

Course Objectives	
Title	**Management principle and business ethics**
Course Code	**PMF1A**
CO-1	To understand the global management practices in emerging business management
CO-2	To apply suitable global management practices in domestic and MNCs operations
CO-3	To give comprehensive view on management process in the corporate world
CO-4	To understand the process of Decision making
CO-5	To improve co-ordination

Course Outcome	
Title	**Management principle and business ethics**
Course Code	**PMF1A**
CO-1	Explain the basis of management concept
CO-2	Application of Planning and decision making in business
CO-3	Development of organizational skills among people in business
CO-4	An ability to identify the key issues facing a business or business subdivision.
CO-5	An ability to incorporate diversity and multicultural perspectives when making business decisions.

Syllabus	
Title	**Management principle and business ethics**
Course Code	**PMF1A**
Unit 1	Introduction: Nature of Management – The Evolution of Management Thought – Tasks of a Professional Manager – Manager and Environment – Systems Approach to Management – Levels in Management
Unit 2	Planning & Decision Making: Steps in Planning Process – Scope and Limitations – Short Term and Long-Term Planning – Flexibility in Planning – Characteristics of a Sound Plan – Management by Objectives (MBO). Decision Making Process and Techniques.
Unit 3	Nature of Organizing: Organisation Structure and Design - Authority Relationships – Delegation of Authority and Decentralisation – Interdepartmental Coordinator – emerging Trends in corporate Structure, Strategy and Culture – Impact of Technology on Organisational design – Mechanistic vs. Adoptive Structures – Formal and Informal Organisation. Span of control – Pros and Cons of Narrow and Wide Spans of Control – Optimum Span.
Unit 4	Co-ordination: Need for Co-ordination – Techniques of Securing Co-ordination. Control: Concept of Control – Application of the Process of Control at Different Levels of Management (top, middle and first line). Performance Standards – Measurements of Performance – Remedial Action - An Integrated Control system in an Organisation – Management by Exception (MBE)
Unit 5	Business Ethics: Importance of Business Ethics – Corporate Social Responsibility - Ethical Issues and Dilemmas in Business - Ethical Decision Making and Ethical Leadership – Ethics Audit – Environmental Ethics –Sustainable Business Practices.

Course Objectives	
Title	**QUANTITATIVE AND RESEARCH METHODS IN BUSINESS**
Course Code	PMF1B
CO-1	To expose the students to various Statistical and Operations research tools for dataanalysis.
CO-2	To enable the students to interpretation the results.
CO-3	To facilitate them to take objective decisions based on the models.
CO-4	To make decision under Risk and Uncertainty
CO-5	To make Academic and Business research reports

Course Outcome	
Title	**QUANTITATIVE AND RESEARCH METHODS IN BUSINESS**
Course Code	PMF1B
CO-1	Understand the concept of probability distribution applicability of Business.
CO-2	Calculation of differentiation &integration
CO-3	Determine the research design and survey.
CO-4	Evaluation of data analysis.
CO-5	Variance analysis of business understanding.

Syllabus	
Title	**QUANTITATIVE AND RESEARCH METHODS IN BUSINESS**
Course Code	PMF1B
Unit 1	Probability: Rules of Probability, Binomial, Poisson and Normal Distribution – their Applications in Business and Industrial Problems – Baye's theorem and its applications Decision Making under Risk and Uncertainty: Minimax, Maximin and Regret criteria – Hurwitz and Laplace criteria in Business Decision Making – Decision tree
Unit 2	Calculus: Application of Differentiation and Integration, Maxima, Minima, Average Cost, Total Cost, Marginal Revenue, Average Revenue, Total Revenue – Consumer Surplus and Producer Surplus
Unit 3	Research Methods: Research Meaning, Scope and Objectives – Types of Research and Research Design – Methods of Data Collection - Questionnaire Design, Interview, Scheduling – Scaling Techniques – Nominal, Ordinal, Ratio, Interval -Sampling Techniques and Sample Size Determination for Survey Research Formulation of hypothesis – Hypothesis Testing
Unit 4	Data analysis - Editing and Coding of Data- Central Tendencies: Mean, Median Mode, Dispersion – Standard Deviation, Mean Deviation, Range, Coefficient of Range, Coefficient of Variation – Application in Business Situations. Univariate and Bivariate Analysis- Chi-Square test – Correlation and Regression analysis – Single and Two Factor Analysis of Variance- Application of Statistical Tests – Parametric and non-parametric and interpretation of test results.
Unit 5	Multivariate analysis: Elementary Concepts of factor analysis, Multiple regression analysis, Discriminant analysis, Cluster analysis and Conjoint analysis in marketing problems – Statistical packages. Research in business: Conducting investigation – Report writing – Academic and Business research reports – research format.

Course Objectives	
Title	**Organizational behaviour**
Course Code	**PMF1C**
CO-1	To learn some of the elements that enhance work results
CO-2	Understand the overview of attitudes and satisfaction
CO-3	To understand counterproductive work behaviour.
CO-4	To know about organizational commitment and job performance
CO-5	To study the theories of OB

Course Outcome	
Title	**Organizationalbehaviour**
Course Code	**PMF1C**
CO-1	Understand the basis of OB with reference to personality and perception concept.
CO-2	Evaluate the concepts of learning with the support of EI, attitude and value and motivation.
CO-3	Discuss about the group behaviour in the organization and communication knowledge
CO-4	Application of leadership skill, power a politics involved in business with respect to conflict and negotiation
CO-5	Develop the skill of controlling work stress

Syllabus	
Title	**ORGANISATIONAL BEHAVIOUR**
Course Code	**PMF1C**
Unit 1	Introduction to Organisational Behaviour: Historical background of OB - Relevance of OB to management functions – Contributing disciplines - Challenges Personality: Determinants – Assessment – Trait Theories – Psychoanalytical social learning – Personality-Job fit. Perception: Process – Distortions – Factors influencing perception
Unit 2	Learning: Classical, Operant and Social Cognitive Approaches – Managerial implications. Emotions and Emotional Intelligence Attitudes and Values: Attitude-Behaviour Relationship – Sources of Attitude – Work related Attitudes. Motivation: Early Theories and Contemporary theories - Motivation at work - Designing Motivating Jobs
Unit 3	Group Dynamics – Foundations of Group Behaviour – Group and Team - Stages of Group Development–Factors affecting Group and Team Performance - Group Decision making - Intergroup relations. Interpersonal Communication – Communication Process – Barriers to Communication – Guidelines for Effective Communication
Unit 4	Leadership – Trait, Behavioural and Contingency theories Power and Politics: Sources of Power – Political Behaviour in Organisations – Managing Politics. Conflict and Negotiation: Sources and Types of Conflict – Negotiation Strategies – Negotiation Process
Unit 5	Work Stress: Stressors in the Workplace – Individual Differences on Experiencing Stress - Managing Workplace Stress. Organisational Culture and Climate: Concept – Creating and Sustaining Culture – Types of Organisational Culture Organisational Change and Development: Managing Planned Change – Basic Organisational Development Model, OD Interventions, Organisational Learning.

Course Objectives	
Title	**ACCOUNTING FOR MANAGERS**
Course Code	PMF1D
CO-1	arranging, recording, and reporting financial data from several units of an organization.
CO-2	The collected data is then observed and analyzed for budget allocation and funding
CO-3	To enable the students to take decisions using management accounting tools.
CO-4	To use Ratio for Analysis
CO-5	Use Accounting information in management decision making

Course Outcome	
Title	**ACCOUNTING FOR MANAGERS**
Course Code	PMF1D
CO-1	Explain the basic concept of financial accounting and management
CO-2	Apply the tools from ratio analysis and funds flow statement.
CO-3	Apply capital expenditure techniques
CO-4	Cost accounting decision making tool buy or make decision
CO-5	Explain marginal costing, report to management

Syllabus	
Title	**ACCOUNTING FOR MANAGERS**
Course Code	PMF1D
Unit 1	Introduction Management Accounting – Meaning and purpose Financial Accounting: Accounting Principles – Preparation of Journal, Ledger and Trial Balance - Preparation of Income statement and Balance Sheet – Interpretation and Use of these Statements by Management.
Unit 2	Ratio Analysis: Uses and Limitations – Classification of Ratios: Profitability, Liquidity, Financial and Turnover Ratio. Fund flow Statement – Statement of Changes in Working Capital – Computation of Fund from Operations – Working for Computation of various sources and uses – Preparation of Fund Flow Statement - Cash Flow Statement Analysis – Distinction between Fund Flow and Cash Flow Statement.
Unit 3	Capital Expenditure Evaluation – Capital Budgeting concept – Methods – Limitations – Capital Expenditure control. Budgetary Control – Nature and Objective of Budgetary Control – Limitations.
Unit 4	Cost Accounting – Elements of cost – Cost of goods manufactured – Pricing of elements – Basis of allocation – Standard costing and variance analysis – Job and process costing.
Unit 5	Marginal Costing – Cost volume – Profit relationship – Break – Even Analysis – Direct costing vs Absorption costing. Target Costing and ABC Costing Reporting to Management – Uses of Accounting information in Managerial decision-making.

Course Objectives	
Title	Managerial economics
Course Code	PMF1E
CO-1	To help in managerial decision making in order to achieve desired economicgoals.
CO-2	To thinSk systematically while solving business issues and also to forecast thefuture.
CO-3	To enhance the ability to apply fundamental economic concepts to complexbusiness realities
CO-4	To make use of Durable goods
CO-5	To understand Demand and supply of money

Course Outcome	
Title	Managerial economics
Course Code	PMF1E
CO-1	Under the basic of managerial economics
CO-2	Application of demand concept in the economy
CO-3	Describe the production function & market structure
CO-4	Analysis the national income and general fiscal policy in India.
CO-5	Create awareness of commodity & money market in India.

Syllabus	
Title	**MANAGERIAL ECONOMICS**
Course Code	PMF1E
Unit 1	Introduction: Definition of Managerial Economics. Decision Making and the Fundamental Concepts Affecting Business Decisions – the Incremental Concept, Marginalism, Equimarginal Concept, the Time Perspective, Discounting Principle, Opportunity Cost Principle.
Unit 2	Utility Analysis and the Demand Curve: Elasticity of Demand - Demand Analysis: Basic Concepts, and tools of analysis for demand forecasting. Use of Business Indicators: Demand forecasting for consumer, Consumer Durable and Capital Goods. Input-Output Analysis.
Unit 3	The Production Function: Production with One Variable Input – Law of Variable Proportions – Production with Two Variable Inputs – Production Isoquants – Isocost Lines Estimating Production Functions – Cost Concepts. Market Structure: Perfect and Imperfect Competition – Monopoly, Duopoly, Monopolistic Competition – Pricing Methods.
Unit 4	National Income – Concepts – Gross Domestic Product, Gross National Product, Net National Product – Measurement of National Income, Savings, Investment - Business Cycles and Contracyclical Policies – Role of Fiscal Policy – Indian Fiscal Policy
Unit 5	Commodity and Money Market: Demand and Supply of Money – Money Market Equilibrium – Monetary Policy – Inflation – Deflation – Role of Economic Policies - Government Policy towards Foreign Capital and Foreign Collaborations – Globalization and its Impact.

Course Objectives	
Title	**Innovation & entrepreneurship**
Course Code	**PMFAA**
CO-1	The ability and action of an entrepreneur are known as entrepreneurship.
CO-2	On the other hand, Entrepreneurship is the study of taking a calculative risk
CO-3	In both creating new enterprise and managing the enterprise effectively and efficiently.
CO-4	Ability to finance a new venture
CO-5	To prepare the best business plan

Course Outcome	
Title	**Innovation & entrepreneurship**
Course Code	**PMFAA**
CO-1	Discuss the concept of successful entrepreneur.
CO-2	Application of innovation in business.
CO-3	Discuss the venture capital analysis with reference of feasibility analysis.
CO-4	Outline of business plan preparation
CO-5	Detail review of financing NVC.

Syllabus	
Title	**Innovation & entrepreneurship**
Course Code	**PMFAA**
Unit 1	Introduction: The Entrepreneur – Definition – Characteristics of Successful entrepreneur. Entrepreneurial scene in India: Analysis of entrepreneurial growth in different communities – Case histories of successful entrepreneurs. Similarities and Distinguish between Entrepreneur and Intrapreneur.
Unit 2	Innovation in Business: Types of Innovation – Creating and Identifying Opportunities for Innovation – The Technological Innovation Process – Creating New Technological Innovation and Intrapreneurship – Licensing – Patent Rights – Innovation in Indian Firms
Unit 3	New Venture Creation: Identifying Opportunities for New Venture Creation: Environment Scanning – Generation of New Ideas for Products and Services. Creating, Shaping, Recognition, Seizing and Screening of Opportunities. Feasibility Analysis: Technical Feasibility of Products and Services - Marketing Feasibility: Marketing Methods – Pricing Policy and Distribution Channels
Unit 4	Business Plan Preparation: Benefits of a Business Plan – Elements of the Business Plan – Developing a Business Plan – Guidelines for preparing a Business Plan – Format and Presentation
Unit 5	Financing the New Venture: Capital structure and working capital Management: Financial appraisal of new project, Role of Banks – Credit appraisal by banks. Institutional Finance to Small Industries – Incentives – Institutional Arrangement and Encouragement of Entrepreneurship.

Course Objectives	
Title	**: Legal system in business**
Course Code	**: PMF2G**
CO-1	This subject includes the attitude of the government towards business. etc.
CO-2	While pursuing an MBA, students learn about the historical development
CO-3	The field, current trends, policies, control in taxation, competition, freedom of the market, etc.
CO-4	To study the acts in business
CO-5	To understand the law relating to a company

Course Outcome	
Title	**Legal system in business**
Course Code	**PMF2G**
CO-1	The objective of securing financial relief in cases of sickness, maternity, Providing medical benefits to employees of factories.
CO-2	Concept of sales and agreement to sell rights of an unpaid sellers.
CO-3	The aim of the formation of the partnership should be to earn profit and share them among partners.
CO-4	Labour law aims to correct the imbalance of power between workers and Employee
CO-5	The objective of securing financial relief in cases of sickness, maternity, Providing medical benefits to employees of factories

Syllabus	
Title	**Legal system in business**
Course Code	**PMF2G**
Unit 1	The Law of Contracts: Definition of Contact Offer and Acceptance – Essential Elements of a Valid Contract: Free Consent – Competency of Parties – Lawful Consideration – Legality of Object. Void, Voidable, Unenforceable and Illegal Contracts – Performance of Contracts – Privity of Contracts – Assignment of Contracts – By Whom Contract must be Performed – Time and Place of Performance – Performance of Reciprocal Promises – Contracts which need not be performed, Discharge of Contracts: By Performance, By Agreement, By Impossibility, By Lapse of Time, By Operation of Law and By Breach of Contracts – Remedies for Breach of Contracts
Unit 2	Sale of Goods Act: Definition of a Sale and a Contract of Sale – Difference between (1) Sale and an Agreement to Sell (2) Sale and a Contract Form (3) Sale and Balient (4) Sale and Mortgage of Goods (5) Sale and Time Purchase Conditions and Warranties – Passing of Property of Goods – Rights of an Unpaid Seller. Negotiable Instruments Act: Negotiable Instruments in General: Cheques, Bills of Exchange and Promissory Notes – Definition and Characteristics
Unit 3	Partnership Act: Evolution – Definition of Partnership – Difference between Partnership and Joint Family Business – Kinds of Partnerships – Registration – Rights and Liabilities of Partners – Dissolution Company Law: Evolution of Company Form of Organisation – Companies Separate Legal Entity – Comparison of Company with Partnership and Joint Hindu Family Business – Kinds of Companies – Comparison of Private and Public Companies – Formation of Companies – General Idea About Memorandum and Articles of Association, Prospectus, Statement in lieu of Prospectus – Management of Companies – General Idea of Management of Companies – Officers, Meetings – Resolutions – Account and Audit – Winding up of Companies – General Idea of the Different Modes of Winding Up
Unit 4	Labour Law: Factories Act, Minimum Wages Act, Industrial Disputes Act, Workmen's Compensation Act, Payment of Bonus Act
Unit 5	ESI Act, CPF ACT 1952, Employees Family Pension Scheme, 1971, Payment of Gratuity Act 1972. Intellectual Property Rights: Types of Intellectual Property – Trademarks Act 1999 – The Copyright Act 1957 – International Copyright Order, 1999 – Design Act, 2000

Course Objectives	
Title	**Applied operations research**
Course Code	**PMF2H**
CO-1	Quantitative methods lay emphasis on objective measurements
CO-2	Statistical and mathematical analyses of data collected through polls, surveys
CO-3	By manipulating pre-existing records and data using computational techniques
CO-4	To analyze PERT & CPM
CO-5	To study Replacement theory

Course Outcome	
Title	**Applied operations research**
Course Code	**PMF2H**
CO-1	Describe the process decision making explain the application of LP.
CO-2	The main goal of which to decide how to transfer goods from various sending locations
CO-3	Help greatly in completing the various jobs on schedule
CO-4	To design balanced system that serve customs quickly and efficiently but do not cost too much to be sustainable.
CO-5	To distinguish a game situation from a pure individuals decision problem.

Syllabus	
Title	**APPLIED OPERATIONS RESEARCH**
Course Code	**PMF2H**
Unit 1	Introduction: Origin and Development of Operations Research (OR) – Applications of OR – Concept, Methodology and Scope of Operations Research Linear Programming: Formulation of a Linear Programming Problem – Graphical Method – Simplex Method – Big M Method – Duality – Application in Management
Unit 2	Transportation Problem: North West Corner Solution – Least Cost Method – Vogel's Approximation Method (VAM) – MODI Method for Optimal Solution. Assignment Problem: Hungarian Method of Optimal Assignment
Unit 3	PERT / CPM: Network Scheduling by PERT / CPM – Network and Basic Components – Rules of Network Construction – CPM Analysis – PERT – Distinction between PERT and CPM
Unit 4	Queuing Theory: Techniques - Single Server Models Sequencing: Sequencing of 'n' jobs and 2 machines – 'n' jobs and 3 machines
Unit 5	Game Theory: Games and Strategies – Pure and Mixed Game - Principle of Dominance Replacement Theory: Replacement of items that deteriorate gradually – replacement of items that fails suddenly – Individual Replacement vs. Group Replacement.

Course Objectives	
Title	**Human resources management**
Course Code	**PMF2J**
CO-1	To Understand the HRM Principle and Practices in the Domestic Context.
CO-2	To Study the Global HRM Practices with Multicultural Nature compounded byGeographical Dispersion
CO-3	To Adopt the best Practices of Global HRM and its application to the Domestic andMNCs operating in India.
CO-4	To make use of human resources optimally
CO-5	To evaluate the performance

Course Outcome	
Title	**Human resources management**
Course Code	**PMF2J**
CO-1	Concepts and practices within the field of HRM provide innovation Solution to problem in the fields.
CO-2	Ensure the best fit between employees and jobs while avoiding man Power shortages.
CO-3	Creativity and problem-solving goals
CO-4	Improve performance, engagement employees to a business value and are able.
CO-5	To review every aspect of management of HR, each programmed. in an organization.

Course Objectives	
Title	**MARKETING MANAGEMENT**
Course Code	PMF2K **PMF2J**
CO-1	It is an organizational management subject that focuses on the practical application of marketing orientation.
CO-2	Marketing Management coaches' students with various methods
CO-3	Techniques to track an organization's market resources and activities.
CO-4	Examine buyer behaviors.
CO-5	To evaluate E-marketing strategies
	recruitment and selection, Relative merits and demerits of the different methods; Personnel Search, Selection Instruments, Reduction of recruitment costs. Functions of Human Resources Management from Procurement to Separation: Placement, Induction, Transfers, Promotions, Disciplinary actions, Termination of Services: Resignation, Dismissal, Retrenchment and Voluntary Retirement Schemes, Exit Interviews, Prevention of employee turnover.
Unit 3	Performance Evaluation: Ranking, rating scales, critical incident method, Removing subjectivity from evaluation, MBO as a method of appraisal, Job evaluation, Criteria for Promotions and job enrichment.
Unit 4	Rewards Management: Wage and Salary Administration: Meanings, Calculation of Wage, Salary, Perquisites, Compensation Packages, Cost of Living Index and Calculation of Dearness Allowance, Rewards and Incentives: Financial and non-financial incentives, Productivity – linked Bonus, Compensation Criteria.
Unit 5	HR Audit: Nature and Scope – Approaches to HR Audit Management of Differences: Grievance Handling – Discipline and Domestic Enquiry – Handling of Sexual Harassment in the Work Place – Introduction to Industrial Relations – Current Trends and Issues in HRM and Case Studies.

Course Objectives	
Title	**MARKETING MANAGEMENT**
Course Code	PMF2K
CO-1	It is an organizational management subject that focuses on the practical application of marketing orientation.
CO-2	Marketing Management coaches' students with various methods
CO-3	Techniques to track an organization's market resources and activities.
CO-4	Examine buyer behaviors
CO-5	To evaluate E-marketing strategies

Course Outcome	
Title	**MARKETING MANAGEMENT**
Course Code	PMF2K
CO-1	Critically evaluate the key analytical frameworks and tools used in marketing.
CO-2	Apply key marketing theories, frameworks and tools to solve Marketing problems.
CO-3	Utilize information of a firm's external and internal marketing environment to identify and priorities appropriate marketing strategies.
CO-4	Consumer psychology knowledge
CO-5	Self-promotion and a more competitive skillset. Marketing studies gives a unique competitive advantage: You can learn how to promote yourself and your work

Syllabus	
Title	**MARKETING MANAGEMENT**
Course Code	PMF2K
Unit 1	Introduction: Marketing Management Philosophies – What is marketing – The concepts of marketing. - E-Marketing – Social Media Marketing
Unit 2	Strategic Planning – Marketing Management Process – Analysis of Marketing opportunities, Selecting Target Consumers, Developing Marketing Mix Analysis of Macro and Micro environment Marketing Research as an Aid to Marketing, Marketing Research Process – Sales Forecasting – Techniques
Unit 3	Buyer behaviour: Factors Influencing Consumer Behaviour – Buying Situation – Buying Decision Process – Industrial Buyer Behaviour. Market Segmentation: Targeting and Positioning - Competitive Marketing Strategies.
Unit 4	Product Policies – Consumer and Industrial Product Decisions, Branding, Packaging and Labeling – New Product Development and Product life Cycle Strategies. Pricing – Pricing strategies and approaches
Unit 5	Promotion Decisions: Promotion Mix - Advertising – Sales Promotion - Sales Force decisions, Selection, Training, Compensation and Control – Publicity and Personal Selling – Channel Management: Selection, Co-operation and Conflict Management – Vertical, Horizontal and Multi-channel Systems Consumer Protection – Awareness of Consumer Rights in the Market Place.

Course Objectives	
Title	**OPERATIONS MANAGEMENT**
Course Code	PMF2L
CO-1	To introduce the production Process and Planning Process
CO-2	To Familiarize the concepts of Operations
CO-3	To expose the students to various models and technique
CO-4	To evaluate the plant layout
CO-5	To understand production and inventory control

Course Outcome	
Title	**OPERATIONS MANAGEMENT**
Course Code	PMF2L
CO-1	Included in operations management is everything involved in turning raw materials into deliverable product or service
CO-2	This can include designing manufacturing systems, employee training, facilities planning, supply chain management, inventory management, product design, quality control
CO-3	The study of Operations Management will give you information on why some things work and some things do not work
CO-4	It will also provide you with modalities to implement in your own style.
CO-5	Operations management (OM) is the business function responsible for managing the process of creation of goods and services

Syllabus	
Title	**OPERATIONS MANAGEMENT**
Course Code	PMF2L
Unit 1	Introduction: Nature and Scope of Operations Management Production design & Process planning: Plant Capacity - Capacity Planning – Make or Buy Decisions – Use of Crossover Chart for Selection Processes. Plant location: Factors to be considered in Plant Location – Choice of General Region, Particular Community and Site – Multiple Plant Location Decision – Plant Location Trends.
Unit 2	Layout of Manufacturing facilities: Principles of a Good Layout – Layout Factors – Basic Types of Layouts – Service Facilities – Principles of Materials Handling – Materials Handling Equipment. Human Factors in Job-Design: Consideration of Man and Machine in Job–Design, Adaptation of Machine to Man – Ergonomics – Working Environment – Worker Safety.
Unit 3	Production and Inventory Control: Basic types of production, Intermittent, Batch, Continuous – Routing, Scheduling, Activating and Monitoring – Basic Inventory Models – Economic Order Quantity, Economic Batch Quantity – Reorder point – Safety stock – Classification and Codification of stock - ABC classification – Procedure for Stock Control, Materials Requirement Planning (MRP). JIT. Implications for Supply Chain Management. Maintenance: Preventive vs. Breakdown Maintenance – Break-down Time Distribution – Maintenance of Cost Balance – Procedure for Maintenance.
Unit 4	Methods Analysis and Work Measurement: Methods Study Procedures – The Purpose of Time Study – Stop Watch Time Study – Performance Rating – Allowance Factors – Standard Time – Work Sampling Technique. Quality Control: Purposes of Inspection and Quality Control – Acceptance Sampling by Variables and Attributes – Control Charts for Variables, Fraction Defectives and Defects. Dynamic Purchasing: Purchasing Function – Selection of Materials and Vendors – Purchasing Organisation – Concept of Value Analysis
Unit 5	Service Operations Management: Introduction – Types of Service – Service Encounter - Service Facility Location – Service Facility Design and Layout - Service Operations Planning and Control - Resource Utilization - Managing Waiting Lines – Service Processes and Service Delivery.

Course Objectives	
Title	**FINANCIAL MANAGEMENT**
Course Code	PMF2M
CO-1	The course provides an analytical framework of Financial Management
CO-2	It enables how cross-border financing, valuation, risk management
CO-3	It analyses exchange rates, tax and legal issues and country risk
CO-4	To make use of financial planning
CO-5	To study the capital management

Course Outcome	
Title	**FINANCIAL MANAGEMENT**
Course Code	PMF2M
CO-1	It allows them to improve their processes over time in such a way that it reduces costs and improves efficiency
CO-2	It allows them to improve their processes over time in such a way that it reduces costs and improves efficiency
CO-3	It allows them to improve their processes over time in such a way that it reduces costs and improves efficiency
CO-4	It allows them to improve their processes over time in such a way that it reduces costs and improves efficiency
CO-5	It allows them to improve their processes over time in such a way that it reduces costs and improves efficiency

Syllabus	
Title	**FINANCIAL MANAGEMENT**
Course Code	PMF2M
Unit 1	Introduction: Nature and Scope of Financial Management - Finance Function — Its relationship with Other Functions – Finance Organization – Role and Functions of the Financial Manager – Objectives of Financial Management Interpretation and Analysis of Financial Statements – Financial Forecasting – Actual proforma and Model statements – Preparation and Uses
Unit 2	Financial Planning and Control – Break-even Analysis – Operating Leverage – Profit Cost (and volume) Analysis Liquidity Management: Current assets management – Cash, Receivables, Inventory, Liquidity, Profitability and Solvency criteria
Unit 3	Current Liabilities Management – Size and Sources – Money Market – Banks – Regulation of Working Capital Finance Working Capital Management: Definition and Objectives – Working Capital Policies – Factors Affecting Working Capital Requirements – Forecasting Working Capital Requirements (Problems) – Cash Management – Receivables Management – Inventory Management – Working Capital Financing – Sources of Working Capital and Implications of Various Committee Reports
Unit 4	Long term Capital Management: Cost of Capital – Basic concepts, rational and assumptions – Cost of equity capital – Cost of debt – Cost of preference – Cost of retained earnings.
Unit 5	Capital structure decision of the Firm – Compositions and Sources of Long-term Funds – Financial Leverage – Factors Determining Funds Requirements. Dividend Policy – Types of Dividend Policy – Dividend Policy and Share valuation - CAPM Budgetary control – Performance Budgeting – Zero base Budgeting

Course Objectives	
Title	**:INTERNATIONAL BUSINESS**
Course Code	PMFAB
CO-1	To understand India's contribution in International Trade and Service
CO-2	To know the Export and Import Documents used in Global Trade
CO-3	To identify future opportunities and challenges of India's Foreign Trade
CO-4	Examine FDI
CO-5	To evaluate the international business strategy

Course Outcome	
Title	**INTERNATIONAL BUSINESS**
Course Code	PMFAB
CO-1	Explain business expansion abroad and key issues related to their operations in other countries
CO-2	Compare and contrast cultures and societies globally using socioeconomic and cultural frameworks.
CO-3	Solve commercial challenges
CO-4	Trading in countries around the world
CO-5	Demonstrate effective skills in written and oral communications using appropriate technologies.

Syllabus	
Title	**INTERNATIONAL BUSINESS**
Course Code	PMFAB
Unit 1	Introduction: The Globalization of the World Economy – Emergence of Global Institutions – Changing Nature of International Business – Managing in the Global Market Place
Unit 2	National Differences in Political Economy: Introduction – Political Systems – Economic Systems – Legal Systems – The Determinants of Economic Development – States in Transition Differences in Culture: Introduction – Social Structure – Religion – Language – Education – Culture and the Workplace – Cultural Change – Cross-cultural Literacy – Culture and Competitive Advantage.
Unit 3	International Trade Theory: Introduction – Mercantilism – Absolute Advantage – Comparative Advantage – Heckscher-Ohlin Theory – The New Trade Theory – National Competitive Advantage – Porter's Diamond – WTO & Development of World Trade – Regional Grouping of Countries and its Impact.
Unit 4	Foreign Direct Investment: Introduction – FDI in the World Economy – Horizontal and Vertical Foreign Direct Investment – Advantages of Host and Home Countries. The Global Monetary System: An Introduction to Foreign Exchange Market – Functions of Foreign Exchange Market.
Unit 5	International Business Strategy: Introduction – Strategy and the Firm – Profiting from Global Expansion – Pressures for Cost Reductions and Local Responsiveness – Strategic Choice. Mode of Entry and Strategic Alliances: Introduction – Entry Modes – Selecting an Entry Mode – Strategic Alliances – Making Alliances Work. Exporting, Importing and Counter Trade: Introduction – The Promise and Pitfalls of Exploring – Improving Export Performance – Export and Import Financing – Export Assistance – Counter Trade.

Course Objectives	
Title	**STRATEGIC MANAGEMENT**
Course Code	**:**PMF3R
CO-1	Strategic Analysis involves the study of researching an organization's business.
CO-2	Strategic Analysis involves the study of researching an organization's business.
CO-3	Planning for decision making and the smooth working of an organization.
CO-4	Formulation of strategy
CO-5	Strategy implementation in business

Course Outcome	
Title	**STRATEGIC MANAGEMENT**
Course Code	PMF3R
CO-1	Effectively develop and implement corporate strategies.
CO-2	Set up realistic business objectives
CO-3	Perform daily tasks efficiently
CO-4	Strategy management teaches you to ensure the company's resources, in terms of products and services
CO-5	Provides a Framework for Decision-Making

Syllabus	
Title	**STRATEGIC MANAGEMENT**
Course Code	PMF3R
Unit 1	Introduction: Strategy – Strategic Management Process – Developing a Strategic Vision - Setting Objectives – Crafting Strategy – Strategies and Tactics – Importance of Corporate Strategy – the 7-S Framework – Board of Directors: Role and Functions – Board Functioning – Top Management: Role and Skills
Unit 2	Society and Business: Social Responsibility of Business – Corporate Governance and Ethical Responsibility Corporate Policy: Importance – Characteristics – Objectives - Policy Formulation and Development – Types of Business Policies - Implementation of Policies.
Unit 3	Environmental Analysis: Environmental Scanning – Industry Analysis - The Synthesis of External Factors - Internal Scanning – Value Chain Analysis – SWOT Audit – Stockholders' Expectations – Scenario planning
Unit 4	Strategy Formulation and Analysis: Strategy Formulation – Strategic Factors Analysis Summary Matrix – Business Strategy – Corporate Strategy – Functional Strategy – Strategic Choice – Generic, Competitive Strategies
Unit 5	Strategy Implementation: Strategy Implementation - Corporate Culture – Matching Organisation Structure to Strategy – Strategic Leadership Strategic Control: Strategic Control Process – Du Pont's Control Model – Balanced Score Card – Michael Porter's Framework for Strategic Management – Future of Strategic Management – Strategic Information System

Course Objectives	
Title	**MANAGEMENT INFORMATION SYSTEMS**
Course Code	PMF3S
CO-1	The objective of MIS is to provide information for decision making on planning, initiating, organizing, and controlling
CO-2	The operations of the subsystems of the firm and to provide a synergistic organization in the process.
CO-3	It facilitates the decisions-making process by furnishing information in the proper time frame
CO-4	To analyze database and information management
CO-5	To understand Business ethics

Course Outcome	
Title	**MANAGEMENT INFORMATION SYSTEMS**
Course Code	PMF3S
CO-1	Prepares students for the role that information technology plays in today's businesses
CO-2	Topics include advanced software applications, networking and the Internet, and business communications.
CO-3	MIS plays a very important role in the organization
CO-4	Creates an impact on the organization's functions, performance and productivity.
CO-5	The impact of MIS on the functions is in its management with a good MIS supports the management of marketing, finance, production and personnel becomes more efficient

Syllabus	
Title	**MANAGEMENT INFORMATION SYSTEMS**
Course Code	PMF3S
Unit 1	Introduction: Definition of System – Information System – Information System Activities And Resources – Types of Information Systems – Managerial Challenges of Information Technology – Strategic Uses of Information Technology.
Unit 2	Database and Information Management: Organizing Data in Traditional File Environment – The Database Management Approach – Data warehousing – Data Mining – Database Structures Telecommunication Networks: Business Use of the Internet – Role of Intranets and Extranets – Types of Telecommunication Networks
Unit 3	Developing Business/IT Solutions: Systems Development Life Cycle – Prototyping – Feasibility Studies - System Analysis – Systems Design – End user Development Functional Business Systems: Marketing Systems – Manufacturing Systems – Human Resource Systems – Accounting Systems – Financial Management Systems.
Unit 4	Decision Support Systems: Decision Making Process - DSS Components – What-if Analysis – Sensitivity Analysis – Goal-seeking Analysis Artificial Intelligence Technologies in Business: Overview of Artificial Intelligence – Neural Networks – Fuzzy Logic Systems – Genetic Algorithms – Expert Systems – Virtual Reality
Unit 5	Security and Ethical Challenges: Information Systems Controls – Risks of Online Operations – Security Measures – Systems Controls and Audits – Ethical Responsibility of Business Professionals: Business Ethics and Technology Ethics – Ethical Guidelines

Course Objectives	
Title	**MARKETING RESEARCH & CONSUMER BEHAVIOUR (Marketing Elective)**
Course Code	PMF01
CO-1	To understand what consumer behaviour is and the different types of consumers
CO-2	To understand the relationship between consumer behaviour and the marketing concept, the societal marketing concept, as well as segmentation, targeting and positioning
CO-3	To understand the relationship between market and customer
CO-4	To gain knowledge on current markets
CO-5	Evaluate customer decision making process

Course Outcome	
Title	**MARKETING RESEARCH & CONSUMER BEHAVIOUR (Marketing Elective)**
Course Code	PMF01
CO-1	Establish the relevance of consumer behaviour theories and concepts to marketing decisions.
CO-2	Implement appropriate combinations of theories and concepts
CO-3	Recognize social and ethical implications of marketing actions on consumer behaviour
CO-4	Use most appropriate techniques to apply market solutions.
CO-5	Consumer behaviour is the study of customers and organizations to determine how they select and use products and services:

Syllabus	
Title	**MARKETING RESEARCH & CONSUMER BEHAVIOUR(Marketing Elective)**
Course Code	PMF01
Unit 1	Introduction: Nature and scope of Marketing Research – Marketing Research as an aid to marketing decision making – Scientific method – Research designs – Exploratory, descriptive and conclusive – Secondary and Primary Data Collection Methods – Questionnaire Construction Procedure.
Unit 2	Sampling: Sampling Techniques – Sample Size Determination per survey Application of Marketing Research: Motivation Research – Advertising Research – Product Research
Unit 3	Models of Consumer Behaviour: Nicosia Model - Howard-Sheth Model – Engel-Blackwell-Miniard Model Environment Influences on Consumer: Culture – Social Class – Social Groups – Family – Personal Influence and Opinion Leadership
Unit 4	Individual Determinants of Consumer Behaviour: Motivation and Involvement – Information Processing – Learning – Personality and Self Concept – Attitude Theories and Change
Unit 5	Consumer Decision Processes: Problem Recognition – Search and Evaluation – Purchasing – Post-purchase Behaviour.

Course Objectives	
Title	**CORPORATE FINANCE(finance Elective)**
Course Code	PMF02
CO-1	The objective of the firm is to maximize the value of the firm.
CO-2	A narrower objective is to maximize stockholder wealth.
CO-3	When the stock is traded and markets are viewed to be efficient, the objective is to maximize the stock price
CO-4	Understand the concept of leasing
CO-5	Evaluate the concept of investment decision

Course Outcome	
Title	**CORPORATE FINANCE (Finance Elective)**
Course Code	PMF02
CO-1	apply best practice tools and methods in corporate finance and investment management to different settings
CO-2	apply appropriate methods and analytical procedures to conduct analysis of practical financial problems and propose valid solutions based on this analysis
CO-3	Research and sources of empirical knowledge in corporate finance
CO-4	Have knowledge and understanding of scientific subjects
CO-5	theoretical foundations and methods of corporate financial management

Syllabus	
Title	**CORPORATE FINANCE (Finance Elective)**
Course Code	PMF02
Unit 1	Introduction: Corporate Finance – Nature and Scope - Role of Financial Institution - Valuation of the Firm – Dividend Valuation Model - Dividend Policies – Walter Model – Gordon Model – Payment Ration divided as a residual payment – M.M. Irrelevance Doctrine.
Unit 2	Investment Decision: Investment Analysis – Risk Analysis Probability Approach. Business Failures, Mergers, Consolidations and liquidation
Unit 3	Capital Markets – Fiscal Policies, Government Regulations affecting Capital Market – Role of SEBI – Stock Markets.
Unit 4	Lease Financing - Venture Capital - MutualFunds - Inflation and Financial Decisions. Derivatives – Futures and Options
Unit 5	Foreign Collaboration – Business Ventures Abroad. International Financial Institutions & Multinational Corporations

Course Objectives	
Title	**SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT (Finance Elective)**
Course Code	PMF05
CO-1	Introduce students to common stock, the stock market, stock options, and approaches to investing in the stock market and building stock portfolios.
CO-2	Particular emphasis is given to three competing approaches to stock investment
CO-3	Fundamental analysis, technical analysis and efficient market analysis.
CO-4	Derivatives and future market operations
CO-5	Investment Decisions

Course Outcome	
Title	**SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT (Finance Elective)**
Course Code	PMF05
CO-1	To provide a theoretical and practical background in the field of investments
CO-2	Designing and managing the bond as well as equity portfolios in the real word
CO-3	Valuing equity and debt instruments.
CO-4	Measuring the portfolio performances.
CO-5	To provide conceptual foundation

Syllabus	
Title	**SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT (Finance Elective)**
Course Code	PMF05
Unit 1	Introduction: Security Analysis – Valuation and Return -Evaluation of Fixed Income Securities. - Evaluation of Ordinary Shares.
Unit 2	Fundamental Analysis – Risk and Return sources of Risk – Dividend Policy and valuation – Leverage and valuation. Technical Analysis - Security price movements – Market Hypotheses – Behaviour of stock prices
Unit 3	Evaluation of Securities – Objectives and Principles. – Measures of Return – Risk Adjusted Measures of Performance
Unit 4	Derivatives – Futures and Options – Trading in Derivatives- - Mutual Funds.
Unit 5	Portfolio Analysis – Selection and Management - Investment Decisions under uncertainty - Investment preference under policies - Individual Investors - Utility Analysis - Assessment of Portfolio performance and portfolio revision

Course Objectives	
Title	**SERVICE MARKETING (Marketing Elective)**
Course Code	PMF10
CO-1	Topics include an overview of services marketing; understanding the customer in services marketing
CO-2	standardizing and aligning the delivery of services; the people who deliver and perform services
CO-3	managing demand and capacity; and promotion and pricing strategies in services marketing
CO-4	Marketing Mix
CO-5	Marketing Of Service with Special Reference: Financial Services – Health Service - Hospitality Services

Course Outcome	
Title	**SERVICE MARKETING (Marketing Elective)**
Course Code	PMF10
CO-1	Critically evaluate the key analytical frameworks and tools used in marketing.
CO-2	Apply key marketing theories
CO-3	frameworks and tools to solve Marketing problems.
CO-4	Utilize information of a firm's external and internal marketing
CO-5	environment to identify and priorities appropriate marketing strategies.

Syllabus	
Title	**SERVICE MARKETING (Marketing Elective)**
Course Code	PMF10
Unit 1	Marketing Services: Introduction - Growth of the service sector - The Concept of Service - Characteristics of Service – Classification of Service – Designing of the Service, Blueprinting, Using Technology, Developing Human Resources, Building Service Aspirations.
Unit 2	Marketing Mix In Service Marketing: The Seven Ps: Product Decision, Pricing, Strategies And Tactics, Promotion Of Service And Placing Of Distribution Methods For Services. Additional Dimension In Services Marketing – People, Physical Evidence And Process
Unit 3	Effective Management Of Service Marketing: Marketing Demand And Supply through Capacity Planning and Segmentation – Internal Marketing of Services – External versus Internal Orientation of Service Strategy.
Unit 4	Delivering Quality Service: Causes Of Service – Quality Gaps. The Customer Expectations Versus Perceived Service Gap. Factors And Techniques To Resolve This Gap Customer Relationship Management. Gaps in Services – Quality Standards, Factors and Solutions – The Service Performance Gap – KeyFactorsandStrategiesforClosingtheGap.ExternalCommunicationtotheCustomers The Promise versus Delivery Gap – Developing Appropriate and Effective Communication about ServiceQuality
Unit 5	Marketing Of Service with Special Reference: Financial Services – Health Service - Hospitality Services including travel, hotels and tourism - Professional Service - Public Utility Services – EducationalServices.

Course Objectives	
Title	**Human resource development (HR elective)**
Course Code	PMF15
CO-1	Evaluate the human resource planning
CO-2	Climate and culture in organisation
CO-3	Being transparency in organisation
CO-4	Training and development Programme
CO-5	Planning career

Course Outcome	
Title	**Human resource development (HR Elective)**
Course Code	PMF15
CO-1	Analyse the factors influencing human behaviour
CO-2	Determine the learning Strategies
CO-3	Being loyalty and committed towards work
CO-4	How to select training methods
CO-5	Promote Research in HRD

Syllabus	
Title	**Human resource development (HR elective)**
Course Code	PMF15
Unit 1	Introduction**:** Definition, Evolution of HRD from Personnel Management - Developmental Perspective of HRD - HRD at macro and micro levels: Outcomes of HRD in the National and Organizational contexts. Qualities and Competencies required in a HRD professional. Importance of HRD in the Present Context.Development of HRD Movement in India. Theory and Practice of HRD**:** HRD concepts - Subsystems of HRD - Human Resource Planning – Potential - Potential Appraisal - Assessment Center
Unit 2	Human Resource Development System: HRD Mechanisms – Climate and Culture – Influences of Employee Behaviour – Model of Employee Behaviour – External and Internal Factors Influencing Employee Behaviour. Learning and HRD: Learning Principles – Maximizing Learning – Individual Differences in the Learning Process – Learning Strategies and Styles – Recent Developments in Instructional and Cognitive Psychology.
Unit 3	Developing Human Capacity**:** Aptitude - Knowledge - Values - Skills of Human Relations - Responsiveness - Loyalty and Commitment - Transparency - Leadership Development. Evaluating HRD**:** Human Resource Accounting - HR Audit and Benchmarking - Impact Assessment of HRD initiatives on the bottom-line of an organization.
Unit 4	Training and Development**:** Meaning and Scope of training - education and development; Training need analysis - Types of training Internal and external - Outbound Training - Attitudinal training - Principles Involved in Selection of Training Method – Techniques of Training Different Levels - Training effectiveness.
Unit 5	Career planning and succession planning Recent trends in HRD -training for trainers and HRD professionals promoting research in HRD

Course Objectives	
Title	**Industrial And Labour Relations (HR Elective)**
Course Code	PMF23
CO-1	To know about the industrial relations
CO-2	Importance of settling Disputes
CO-3	Evaluate the Growth of trade union
CO-4	Develop the idea of social justice
CO-5	Analyze the method of collective bargaining

Course Outcome	
Title	**Industrial And Labour Relations (HR elective)**
Course Code	PMF23
CO-1	Determine the changing concepts of industrial relations
CO-2	Know how to settle industrial disputes
CO-3	Analyse the concept of workers participation in management
CO-4	Evaluate the concept of joint consultation
CO-5	know the overview of structure and governing Trade union

Syllabus	
Title	**Industrial And Labour Relations (HR Elective)**
Course Code	PMF23
Unit 1	Industrial Relations: The changing concepts of Industrial relations- Factors affecting employee stability. Application on Psychology to Industrial Relations.
Unit 2	Industrial Harmony and Conflict: Harmonious relations in industry- importance and means; cause of industrial disputes- Machinery for settling of disputes- Negotiation- Conciliation Mediation - Arbitration and Adjudication- Strikes- Lock-outs- Layout and Retrenchment codes of discipline- Grievance procedure-Labour management co-operation; Worker's participation in management.
Unit 3	Labour Relations: Changing concept of management labour relations- Statute laws- Tripartite conventions- development of the idea of social justice- limitation of management prerogatives increasing labour responsibility in productivity. Joint Consultation: Principal types- Attitude of trade unions and management- Joint consultation in India.
Unit 4	Trade Unions: Trade Unions and their growth- economic- social and political conditions leading to the development of trade unionism- Theories of trade unionism- Aim and objectives of trade unions- Structure and governing of trade unions. Problems and Role of Indian Trade Unions: Recognition and leadership- Finances and Membership- Compulsory versus free membership- Political activities- Welfare- Legislation Majority and Minority unions- Social responsibilities- positive role in economic and social development.
Unit 5	Collective Bargaining: Meaning- Scope- Subject matter and parties- Methods and tactics Administrations of collective bargaining agreements- Fair and unfair labour practice. Tripartite Machinery: At the centre and in the states- I.L.O. – Its functions and role in labour movement – Industrial health and safety- Industrial legislations.

Course Objectives	
Title	**MERCHANT BANKING AND FINANCIAL SERVICES (Finance Elective)**
Course Code	PMF14
CO-1	The objective of this paper is to know the different aspects of Investment banking and financial services such as Issue Management, Leasing
CO-2	Hire Purchase, Factoring and Forfaiting, Insurance, Credit Rating, Securitization and Venture
CO-3	Capital Financing, Mergers and acquisition and the detailed SEBI
CO-4	Role of SEBI
CO-5	NSE & OTCEI

Course Outcome	
Title	**MERCHANT BANKING AND FINANCIAL SERVICES (Finance Elective)**
Course Code	PMF14
CO-1	Have a broad understanding of Indian Financial System, Merchant Banking in India, Institutional Structure, Functions of Merchant Bank, Recent Developments and Challenges,
CO-2	Have understanding of the Role of Merchant Banker in Designing Capital Structure and Instruments, Book Building, Preparation of Prospectus, Advertising, Underwriting and Private Placement.
CO-3	Have an analytical understanding of Financial Services, Leasing, Evolution of Indian Leasing Industry. Legal Aspects of Leasing: present Legislative Framework and Hire purchase
CO-4	Have a broad understanding **of** Factoring, Securitization / Mortgages andDepository
CO-5	Process of Dematerialization and Dematerialization.

Syllabus	
Title	**MERCHANT BANKING AND FINANCIAL SERVICES (Finance elective)**
Course Code	PMF14
Unit 1	Introduction: Merchant Banking in India – An overview – Recent developments and challenges ahead – Institutional Structure – Functions of Merchant Banking.
Unit 2	Legal & Regulatory Framework and Relevant Provisions of Companies Act, SERA, SEBI guidelines, FERA, etc., - Relation with stock exchanges, OTCEI and NSE.
Unit 3	Issue Management – Appraisal of projects, designing capital structure and instruments – Issue pricing – Preparation of prospectus – Offer for sale – Selection of Bankers, Advertising consultants, etc., - Role of Registrars – underwriting arrangements, Placement with Fis, MFs, FIISs, etc. Issue Marketing – Advertising strategies – Brokers and Investors, NRI Marketing Dealing with Bankers to the issue, underwriters, Registrars, brokers, etc., - Post issue activities – Private placement – Bought out deals – Off-shore issues – GDRS,etc
Unit 4	Mergers and Acquisitions, Portfolio Management Services, Leasing and Hire purchase, Bills discounting, Credit syndication.
Unit 5	Financial Services – Recent developments in Factoring & Forfeiting, Consumer finance – Credit cards – Venture Capital, Mutual Funds, Real Estate Financing, and Credit rating

Course Objectives	
Title	**ORGANISATIONAL DEVELOPMENT (HR Elective)**
Course Code	PMF18
CO-1	To increase satisfaction and commitment level of the employees,
CO-2	To increase the interpersonal trust level of the employees,
CO-3	To solve problems effectively rather than neglecting, To increase employee collaboration
CO-4	To understand development of an organization
CO-5	To reduce stress

Course Outcome	
Title	**ORGANISATIONAL DEVELOPMENT (HR Elective)**
Course Code	PMF18
CO-1	Gaining knowledge about organizational development process
CO-2	How to change and develop organizations.
CO-3	Better understanding of the change management model.
CO-4	Skills needed to develop an action plan for the development process.
CO-5	As a result of increased productivity and innovation, profits and efficiency increase.

Syllabus	
Title	**ORGANISATIONAL DEVELOPMENT (HR Elective)**
Course Code	PMF18
Unit 1	Approaches to Understanding Organizations: Key Organizational Designs - Procedures - Differentiation & Integration - Basic Design - Dimensions Determination of Structure - Forces Reshaping Organization – Life Cycles in Organization Organizational Development and Change: Organizational Development Alternative Interventions - Change Agents: Skills - Resistance to change- Managerial the resistance - Levin's change model - Organizational reality
Unit 2	Organizational culture – Key Role of Organizational Culture - Functions & Effects of Organizational Culture - Leader's role in shaping and reinforcing culture, Developing a Global Organizational Culture
Unit 3	Work Groups & Teams - Preparing for the world of work Group Behavior Emerging issues of Work Organization and Quality of Working life – Career stage model – Moving up the career ladder
Unit 4	Stress and Well Being at Work: Four approaches to stress - Sources of stress at work, consequences of stress - Prevalent Stress Management - Managerial implications
Unit 5	Alternative Interventions - Change Agents: Skills - Resistance to change- Managerial the resistance - Levin's change model - Organizational reality

Course Objectives	
Title	**ADVERTISING MANAGEMENT AND SALES PROMOTION (Marketing Elective)**
Course Code	PMF03
CO-1	To increase sales by publicity through the media which are complementary to press and poster advertising.
CO-2	To disseminate information through salesmen, dealers etc.,
CO-3	so as to ensure the product getting into satisfactory use by the ultimate consumers
CO-4	To make plans for sales promotion
CO-5	Use of advertisements for sales and understand consumer behaviors

Course Outcome	
Title	**ADVERTISING MANAGEMENT AND SALES PROMOTION (Marketing Elective)**
Course Code	PMF03
CO-1	Advertising and Promotion. Promotion consists of advertising, publicity, personal selling and sales promotion technique
CO-2	Businessmen today have to face a lot of competition
CO-3	Every seller needs effective promotion to survive and succeed in this competitive business world.
CO-4	Description Marketing management course enables a student
CO-5	To understand the fundamentals of marketing concept and the role marketing plays in business

Syllabus	
Title	**ADVERTISING MANAGEMENT AND SALES PROMOTION (Marketing Elective)**
Course Code	PMF03
Unit 1	Advertising: Advertising, objectives, task and process, market segmentation and target audience – Message and copy development.
Unit 2	Media: Mass Media - Selection, Planning and Scheduling – Web Advertising – Integrated programme and budget planning.
Unit 3	Implementation: Implementing the programme coordination and control – Advertising agencies – Organization and operation.
Unit 4	Sales Promotion: Why and When Sales promotion activities, Consumer and sales channel oriented – planning, budgeting and implementing and controlling campaigns.
Unit 5	Control: Measurement of effectiveness – Ethics, Economics and Social Relevance.

JAYA COLLEGE OF ARTS AND SCIENCE
(AFFILIATED TO UNIVERSITY OF MADRAS)
THIRUNINRAVUR – 602024
DEPARTMENT OF COMPUTER APPLICATIONS(P.G.)

Program : MCA

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	Computational Knowledge: Understand and apply mathematical foundation, computing and domain knowledge for the conceptualization of computing models from defined problems
PO-2	Problem Analysis: Ability to identify, critically analyze and formulate complex computing problems using fundamentals of computer science and application domains
PO-3	Design / Development of Solutions: Ability to transform complex business scenarios and contemporary issues into problems, investigate, understand and propose integrated solutions using emerging technologies
PO-4	Conduct Investigations of Complex Computing Problems: Ability to devise and conduct experiments, interpret data and provide well informed conclusions
PO-5	Modern Tool Usage: Ability to select modern computing tools, skills and techniques necessary for innovative software solutions

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Ability to pursue careers in IT industry/ consultancy/ research and development, teaching and allied areas related to computer science.
PSO-2	Comprehend, explore and build up computer programs in the areas allied to Algorithms, System Software, Multimedia, Web Design and Big Data Analytics for efficient design of computer-based systems of varying complexity.
PSO-3	Student will be able to adapt the skills to implement effective solutions for need based problems by appling knowledge gained through different programming languages , tools and software covered in the syllabus of program.
PSO-4	The ability to understand,analyse and deveolp computer programs int the areas related to algorithms ,system software,multimedia ,web design and networking for efficient design of computer-based systems of varying complexity.
PSO-5	The ability to understand the changes in computing technologies,apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success,real world problems and meet the challenges of the future.

Course Objectives	
Title	**C++ and Data Structures**
Course Code	PC21A
CO-1	The basic programming and OOPs concepts
CO-2	Creating C++ programs
CO-3	Tokens, expressions and control structures in C++
CO-4	Arranging same data systematically with arrays
CO-5	Be familiar with basic techniques of algorithm analysis

Course Outcome	
Title	**C++ and Data Structures**
Course Code	PC21A
CO-1	Classify different data structures such as stack, queues, linked list, trees and graphs
CO-2	Analyze and implement various searching and sorting techniques
CO-3	Describe OOPs concepts
CO-4	Use functions and pointers in your C++ program
CO-5	Understand tokens, expressions, and control structures

Syllabus	
Title	**C++ and Data Structures**
Course Code	PC21A
Unit 1	Introduction to C++; Tokens, Keywords, Identifiers, Variables,Operators Manipulators, Expressions andControlStructuresinC++; Pointers-FunctionsinC++- MainFunction-FunctionPrototyping-ParametersPassinginFunctions-ValuesReturnbyFunctions-InlineFunctions-FriendandVirtualFunctions
Unit 2	ClassesandObjects;ConstructorsandDestructors;andOperatorOverloadingandType Conversions -Type of Constructors -Function overloading. Inheritance:SingleInheritance-MultilevelInheritance- MultipleInheritance-HierarchicalInheritance- HybridInheritance. Pointers, Virtual Functions and Polymorphism;Managing Console I/Ooperations
Unit 3	WorkingwithFiles: ClassesforFileStreamOperations-OpeningandClosingaFile -End-of-File Deduction -File Pointers -Updating aFile -Error Handling duringFile Operations -Command-line Arguments. DataStructures: Definition ofaDatastructure-primitiveandcompositeDataTypes,Asymptoticnotations,Arrays,Operations onArrays,Orderlists.
Unit 4	- Applications of Stack - Infix to Postfix Conversion, Recursion,Maze Problems - Queues- Operations onQueues, QueueApplications, Circular Queue.Singly Linked List- Operations, Application - Representation of a Polynomial,PolynomialAddition;DoublyLinkedList-Operations,Applications.
Unit 5	TreesandGraphs:BinaryTrees-ConversionofForesttoBinaryTree,Operations- Tree Traversals; Graph - Definition, Types of Graphs, Hashing Tables andHashing Functions,Traversal-ShortestPath;Dijkstra'sAlgorithm.

Course Objectives	
Title	**Digital Computer Fundamentals**
Course Code	PC21B
CO-1	Give students an in-depth understanding of why computers are essential components in business, education and society.
CO-2	Introduce the fundamentals of computing devices and reinforce computer vocabulary, particularly with
CO-3	Rrespect to personal use of computer hardware and software, the Internet, networking and mobile computing.
CO-4	Provide hands-on use of Microsoft Office 2013 applications Word, Excel, Access and PowerPoint.
CO-5	Completion of the assignments will result in MS Office applications knowledge and skills.

Course Outcome	
Title	**Digital Computer Fundamentals**
Course Code	PC21B
CO-1	Describe the usage of computers and why computers are essential components in business andsociety.
CO-2	Utilize the Internet Web resources and evaluate on-line e-business system.
CO-3	Solve common business problems using appropriate Information Technology applications andsystems.
CO-4	Identify categories of programs, system software and applications. Organize and work with files and folders.
CO-5	Describe various types of networks network standards and communication software

Syllabus	
Title	**Digital Computer Fundamentals**
Course Code	PC21B
Unit 1	Number System – Converting numbers from one base to another – Complements – Binary Codes – Integrated Circuits – Boolean algebra – Properties of Boolean algebra – Boolean functions – Canonical and Standard forms – Logical Operations – Logic gates – Karnaugh Map up to 6 variables – Don't Care Condition – Sum of Products and Products of Sum simplification – Tabulation Method.
Unit 2	Adder – Subtractor – Code Converter – Analyzing a combinational Circuit – Multilevel NAND and NOR circuits – Properties of XOR and equivalence functions – Binary Parallel Adder – Decimal Adder – Magnitude Comparator – Decoders – Multiplexers – ROM – PLA.
Unit 3	Flip Flops – Triggering of flip-flops – Analyzing a sequential circuit – State reduction – excitation tables – Design of sequential circuits – Counters – Design with state equation – Registers – Shift Registers – Ripple and synchronous Counters.
Unit 4	Memory Unit – Processor Organization - Bus Organization – Scratch Pad memory – ALU – Design of ALU – Status Register – Effects of Output carry – Design of Shifter – Processor Unit – Microprogramming – Design of specific Arithmetic Circuits
Unit 5	Accumulator – Design of Accumulator – Computer Design – System of Configuration – Instruction and Data formats – Instruction sets – Timing and Control – Execution of Instruction – Design of Computer – Hardwired control – PLA Control and Microprogram control

Course Objectives	
Title	**Database Management Systems**
Course Code	PC21C
CO-1	Knowledge of DBMS, both in terms of use and implementation/design
CO-2	Experience with SQL
CO-3	Increased proficiency with the programming language C++
CO-4	Experience working as part of team
CO-5	Experience with analysis and design of (DB) software

Course Outcome	
Title	**Database Management Systems**
Course Code	PC21C
CO-1	Describe the fundamental elements of relational database management systems
CO-2	Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
CO-3	Design ER-models to represent simple database application scenarios
CO-4	Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
CO-5	Improve the database design by normalization.

Syllabus	
Title	**Database Management Systems**
Course Code	PC21C
Unit 1	Introduction to Database Systems – Relational Model – Structure – Relational Algebra – Null Values – SQL – Set Operation – Views – Advanced SQL – Embedded SQL – Recursive Queries – The Tuple Relational Calculus – Domain Relational Calculus.
Unit 2	E-R Model – Constraints – E-R- Diagrams Weak Entity Sets – Reduction to Relational Schemes – Relational Database Design – Features of Relational Design – Automatic Domains and First Normal Form – Decomposition using Functional Dependencies – Multivalued Dependencies – More Normal Forms – Web Interface – Object – Based Databases – Structured Types and inheritance in SQL – Table inheritance – Persistent.
Unit 3	Storage and File Structure – RAID – File Organization – Indexing and Hashing – B Tree – B Tree Index files - Static and Dynamic Hashing – Query Processing – Sorting & Join Operators – Query Optimization – Choice of Evaluation Plans.
Unit 4	Transaction Management – Implementation of Atomicity and Durability – Serializability – Recoverability – Concurrency Control – Dead Lock Handling – Recovery System – Buffer Management.
Unit 5	Database – System Architecture – Client Server – Architectures – Parallel System – Network Types – Distributed Database – Homogeneous and Hetrogeneous Database – Directory System – Case Study

Course Objectives	
Title	**Design and Analysis of Algorithms**
Course Code	PC22A
CO-1	Analyze the asymptotic performance of algorithms.
CO-2	Write rigorous correctness proofs for algorithms
CO-3	Demonstrate a familiarity with major algorithms and data structures.
CO-4	Apply important algorithmic design paradigms and methods of analysis.
CO-5	Synthesize efficient algorithms in common engineering design situations

Course Outcome	
Title	**Design and Analysis of Algorithms**
Course Code	PC22A
CO-1	Argue the correctness of algorithms using inductive proofs and invariants.
CO-2	Analyze worst-case running times of algorithms using asymptotic analysis.
CO-3	Describe the divide-and-conquer paradigm and explain when an algorithmic design
CO-4	situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-and- CO5:conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms
CO-5	Argue the correctness of algorithms using inductive proofs and invariants.

Syllabus	
Title	**Design and Analysis of Algorithms**
Course Code	PC22A
Unit 1	Introduction - Definition of Algorithm – pseudocode conventions – recursive algorithms – time and space complexity –big-“oh” notation – practical complexities – randomized algorithms – repeated element – primality testing **-** Divide and Conquer:General Method - Finding maximum and minimum – merge sort.
Unit 2	Divide and conquer contd. – Quicksort, Selection, Strassen's matrix multiplication – Greedy Method:General Method –knapsack problem - Tree vertex splitting - Job sequencing with dead lines – optimal storage on tapes.
Unit 3	Dynamic Programming: General Method - multistage graphs – all pairs shortest paths – single source shortest paths - String Editing – 0/1 knapsack.Search techniques for graphs – DFS-BFS-connected components – biconnected components.
Unit 4	Back Tracking: General Method – 8-queens - Sum of subsets - Graph Coloring – Hamiltonian cycles. Branch and Bound: General Method - Traveling Salesperson problem.
Unit 5	Lower Bound Theory:Comparison trees - Oracles and advisory arguments - Lower bounds through reduction - Basic Concepts of NP-Hard and NP-Complete problems.

Course Objectives	
Title	**Object Oriented Analysis and Design**
Course Code	PC22B
CO-1	To understand the Object-based view of Systems
CO-2	To develop robust object-based models for Systems
CO-3	To inculcate necessary skills to handle complexity in software de-sign
CO-4	To learn the basis of OO Analysis and design
CO-5	To have clear idea about traditional and modern SW development Methodologies and OOPS concepts.

Course Outcome	
Title	**Object Oriented Analysis and Design**
Course Code	PC22B
CO-1	Analyse, design, document the requirements through use case driven approach.
CO-2	Identify, analyse, and model structural and behavioural concepts of the system.
CO-3	Develop,explore the conceptual model into various scenarios and applications.
CO-4	Ability to analyze and model software specifications.
CO-5	Ability to abstract object-based views for generic software systems.

Syllabus	
Title	**Object Oriented Analysis and Design**
Course Code	PC22B
Unit 1	System Development - Object Basics - Development Life Cycle - Methodologies - Patterns - Frameworks - Unified Approach - UML.
Unit 2	Use-Case Models - Object Analysis - Object relations - Attributes - Methods – Class and Object responsibilities - Case Studies.
Unit 3	Design Processes - Design Axioms - Class Design - Object Storage - Object Interoperability - Case Studies.
Unit 4	User Interface Design - View layer Classes - Micro-Level Processes - View Layer Interface - Case Studies.
Unit 5	Quality Assurance Tests - Testing Strategies - Object orientation on testing - Test Cases - test Plans - Continuous testing - Debugging Principles - System Usability - Measuring User Satisfaction - Case Studies.

Course Objectives	
Title	**Artificial Intelligence**
Course Code	PC22C
CO-1	The aim of Artificial Intelligence & Machine Learning course is to prepare students for career in computer science & engineering where knowledge of AI & ML techniques leading to the advancement of research and technology
CO-2	Artificial Intelligence and Machine Learning are the terms of computer science.
CO-3	Machine Learning is the learning in which machine an learn by its own without being explicitly programmed.
CO-4	It is an application of AI that provide system the ability to automatically learn and improve from experience
CO-5	Have a broad understanding of the fundamental theories,concepts and applications of artificial intelligence.

Course Outcome	
Title	**Artificial Intelligence**
Course Code	PC22C
CO-1	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CO-2	Demonstrate proficiency in applying scientific method to models of machine learning.
CO-3	Discuss the awareness of ANN and different optimizations techniques
CO-4	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CO-5	Demonstrate proficiency in applying scientific method to models of machine learning.

Syllabus	
Title	**Artificial Intelligence**
Course Code	PC22C
Unit 1	Introduction: What Is AI? - Foundations of Artificial Intelligence-The History of Artificial Intelligence- The State of the Art- Risks and Benefits of AI. Intelligent Agents: Agents and Environments - The Concept of Rationality - The Nature of Environments- The Structure of Agents.
Unit 2	Solving problem by Searching: Problem-Solving Agents - Example Problems - Search Algorithms: Best-first search - Search data structures - Redundant paths - Measuring problem-solving performance - Uninformed Search Strategies: BFS-DFS- Depth limited and iterative deepening search. Heuristic Search Strategies: Greedy best-first search - A* search - Search contours - Inadmissible heuristics and weighted A* - Heuristic Functions
Unit 3	Solving problem by Searching: Problem-Solving Agents - Example Problems - Search Algorithms: Best-first search - Search data structures - Redundant paths - Measuring problem-solving performance - Uninformed Search Strategies: BFS-DFS- Depth limited and iterative deepening search. Heuristic Search Strategies: Greedy best-first search - A* search - Search contours - Inadmissible heuristics and weighted A* - Heuristic Functions
Unit 4	Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems - Constraint Propagation: Inference in CSPs - Backtracking Search for CSPs - Local Search for CSPs - The Structure of Problems. Logical agent and Logics: Propositional Logic - Propositional Theorem Proving - Effective Propositional Model Checking - Agents Based on Propositional Logic - First-Order Logic: Syntax and Semantics of First-Order Logic - Using First-Order Logic - Knowledge Engineering in First-Order Logic. Inference in First-Order Logic: Unification and First-Order Inference - Forward Chaining - Backward Chaining – Resolution.
Unit 5	Knowledge Representation and Reasoning : Ontological Engineering - Categories and Objects - Events - Mental Objects and Modal Logic - Reasoning Systems for Categories - Reasoning with Default Information. Automated Planning: Definition of Classical Planning - Algorithms for Classical Planning - Heuristics for Planning. Quantifying Uncertainty: Acting under Uncertainty - Basic Probability Notation - Inference Using Full Joint Distributions - Independence - Bayes' Rule and Its Use - Naive Bayes Models

Course Objectives	
Title	**Web Based Application Development**
Course Code	PC222
CO-1	Understand the principles of creating an effective web page, including an in-depth consideration of information architecture.
CO-2	Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice.
CO-3	Develop skills in analyzing the usability of a web site.
CO-4	Understand how to plan and conduct user research related to web usability.
CO-5	Learn the language of the web: HTML and CSS.

Course Outcome	
Title	**Web Based Application Development**
Course Code	PC222
CO-1	Students will be able to write a well formed / valid XML document.
CO-2	Students will be able to connect a java program to a DBMS and perform insert, update and delete operations on DBMS table.
CO-3	Students will be able to write a server side java application called Servlet to catch form data sent from client, process it and store it on database.
CO-4	Students will be able to write a server side java application called JSP to catch form data sent from client and store it on database
CO-5	As much as possible,programming project assignment will be representative of typical real-world business applications.

Syllabus	
Title	**Web Based Application Development**
Course Code	PC222
Unit 1	OVERVIEW OF ASP.NET - The .NET framework – The C# Language: Data types – Declaring variables- Scope and Accessibility- Variable operations- Object Based manipulation- Conditional Structures- Loop Structures- Methods. Types, Objects and Namespaces : The Basics about Classes- Value types and Reference types- Understanding name spaces and assemblies - Advanced class programming.
Unit 2	Developing ASP.NET Applications - The Anatomy of a Web Form – Writing Code - Visual Studio Debugging. Web Form Fundamentals: The Anatomy of an ASP.NET Application - Introducing Server Controls - HTML Control Classes - The Page Class - Application Events - ASP.NET Configuration. Web Controls: Web Control Classes - List Controls - Web Control Events and AutoPostBack - A Simple Web Page.
Unit 3	Error Handling, Logging, and Tracing: Common Errors - Exception Handling - Handling Exceptions - Throwing Your Own Exceptions - Logging Exceptions - Page Tracing. State Management: View State - Transferring Information Between Pages – Cookies - Session State - Session State Configuration - Application State. Validation: Understanding Validation - The Validation Controls.
Unit 4	Rich Controls: The Calendar - The AdRotator - Pages with Multiple Views - User Controls and Graphics - User Controls - Dynamic Graphics . Website Navigation: Site Maps - URL Mapping and Routing - The SiteMapPath Control - The TreeView Control - The Menu Control. ADO.NET Fundamentals: The Data Provider Model - Direct Data Access - Disconnected Data Access.
Unit 5	Data Binding: Single-Value Data Binding - Repeated-Value Data Binding - Data Source Controls - The Data Controls: The GridView - Formatting the GridView - Selecting a GridView Row - Editing with the GridView - Sorting and Paging the GridView - Using GridView Templates - The DetailsView and FormView – XML: The XML Classes - XML Validation - XML Display and Transforms. Website Security: Security Fundamentals - Understanding Security - Authentication and Authorization - Forms Authentication - Windows Authentication.

Course Objectives	
Title	**Machine Learning**
Course Code	PC23A
CO-1	The aim of Artificial Intelligence & Machine Learning course is to prepare students for career in computer science & engineering where knowledge of AI & ML techniques leading to the advancement of research and technology.
CO-2	Artificial Intelligence and Machine Learning are the terms of computer science. Machine Learning is the learning in which machine an learn by its own without being explicitly programmed .
CO-3	It is an application of AI that provide system the ability to automatically learn and improve from experience.
CO-4	Introduce some concepts and techniques that are core to machine learning.
CO-5	Understand analytical learning and reinforced learning.

Course Outcome	
Title	**Machine Learning**
Course Code	PC23A
CO-1	Demonstrate fundamental understanding of artificial intelligence (AI) and expertsystems.
CO-2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CO-3	Demonstrate proficiency in applying scientific method to models of machine learning.
CO-4	Discuss the awareness of ANN and different optimizations techniques
CO-5	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

Syllabus	
Title	**Machine Learning**
Course Code	PC23A
Unit 1	The Fundamentals of Machine Learning: The Machine Learning Landscape - Types of Machine Learning Systems - Main Challenges of Machine Learning - Testing and Validating. End-to-End Machine Learning Project - Look at the Big Picture - Get the Data - Discover and Visualize the Data to Gain Insights - Prepare the Data for Machine Learning Algorithms - Select and Train a Model - Fine-Tune Your Model - Launch, Monitor, and Maintain Your System.
Unit 2	Ingredients of machine learning: Tasks – Models – Features. Supervised Learning: Classification – Binary classification and related tasks – Scoring and ranking – class probability estimation – Multi-class classification. Unsupervised Learning: Regression – Unsupervised and descriptive learning. Concept Learning: The hypothesis space – paths through the hypothesis space – beyond conjunctive concepts – learnability.
Unit 3	Tree Models: Decision trees – Ranking and probability estimation trees – tree learning as variance reduction. Rule Models: Learning ordered rule lists – learning unordered rule sets – descriptive rule learning – first–order rule learning. Linear Models: The least-squares method – The perceptron – Support vector machines.
Unit 4	Distance-based Models: Neighbours and exemplars – Nearest-neighbour classification – Distance-based clustering – K-Means algorithm – Hierarchical clustering. Probabilistic Models: The normal distribution and its geometric interpretations – probabilistic models for categorical data – Naïve Bayes model for classification – probabilistic models with hidden values – Expectation-Maximization.
Unit 5	Features: Kinds of features – Feature transformations – Feature construction and selection. Model ensembles: Bagging and random forests – Boosting – Mapping the ensemble landscape. Machine Learning experiments: What to measure – How to measure it – How to interpret it.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF APPLIED ELECTRONICS

Program: M.Sc.(AE)

Program Outcomes	
On completion of the programme, the student will be able to	
PO-1	Pursue a diverse range of careers as Electronic Designers, Consultants and Entrepreneurs.
PO-2	Continue their education leading to research in interdisciplinary areas to emerge as Competent Technologist, Experts, Educators and Scientist.
PO-3	Innovate in ever changing global economic and technological environment maintaining professional discipline and high ethical standard.
PO-4	To enable graduates to acquire technical and managerial leadership positions in their chosen fields.
PO-5	Develop practical skills by providing hands-on experience to succeed in industry / technical profession through meticulous education.

Program Specific Outcomes	
On completion of the programme, the student will be able to	
PSO-1	Capable to achieve state-of-art knowledge in Electronics, to discriminate, evaluate, analyze and create existing and new knowledge, and integration of the same for enhancement of knowledge.
PSO-2	Discover, formulate, review and analyze intricate emerging electronics problems to make intellectual knowledge for conducting research in a wider theoretical and practical.

PSO-3	Extract information about important problems and apply suitable techniques, resources, and modern electronic software tools towards contributing to the development of scientific/technological knowledge in Electronics.
PSO-4	Comprehend Professional and ethical responsibility in the field of Electronics Profession.
PSO-5	Identify the need for, and have the preparation and ability to engage in independent and life-long learning with enthusiasm and commitment in the broadest context of technological change.
PSO-6	Design, develop and implement electrical and electronics and allied interdisciplinary projects to meet the demands of industry and to provide solutions to the current real time problems.
PSO-7	Solve real-world problems with in-depth and up-to-date knowledge and relevant skills required by the industry by applying modern tools and techniques in Electronics/Communication/Power System area.
PSO-8	Recognize the need and ability in engaging in lifelong continual learning, thereby, contributing to their own professional development and growth.
PSO-9	Communicate effectively about the engineering and related issues to the team members as well as to the broader audience.
PSO-10	Design reliable systems, devices, components or processes in Electronics/Communication/Power System area that meets the design specifications and requirements under certain constraints.

Course Objectives	
Title	**-ELECTRONICS MATERIALS & SEMICONDUCTOR DEVICES**
Course Code	MDS1A
CO-1	Describe the phase transitions in materials.
CO-2	Discover the need for dielectric and ferro electric materials.
CO-3	Understand the uses of semiconductor in day to day life.
CO-4	Illustrate the energy band diagrams of diodes, Zener diodes, transistors, FET etc.,

Course Outcome	
Title	**-ELECTRONICS MATERIALS & SEMICONDUCTOR DEVICES**
Course Code	MDS1A
CO-1	Identify the crystal types
CO-2	Compare the properties of dielectric and ferroelectric materials
CO-3	Define and describe the types of metallic materials
CO-4	Recognize the intrinsic and extrinsic semiconductors
CO-5	Analyze I-V Characteristics of various semiconductor diodes.

Syllabus	
Title	**-ELECTRONICS MATERIALS & SEMICONDUCTOR DEVICES**
Course Code	MDS1A
Unit 1	**FUNDAMENTALS OF MATERIALS SCIENCE:** Relative stability of Phases, Phase rule Phase Diagram. **Phase Transformations:** Elementary idea of Nucleation and Growth, methods of crystal growth. **Defects in crystals:** Elementary idea of point, line and planar defects. **Materials in thin film form:** Concept of thin films, preparation of thin films, Deposition of thin film using sputtering methods (RT and glow discharge).
Unit 2	**DIELECTRIC AND FERROELECTRIC MATERIALS:** Dielectric materials as capacitive elements, polar dielectrics, properties and applications in electronics. **Ferro electrics:** physical properties and classification, properties modifications, non-linearity, applications in electronic devices.
Unit 3	**SPECIAL MATERIALS IN ELECTRONICS: COMPOSITE MATERIALS:** Composites of glasses, polymers metals and ceramics, Properties and applications. **Polymers:** Mechanism of polymerization, conducting polymers, application of polymers in electronics. **Metallic Materials:** Functional gradient materials, shape memory alloys, amorphous materials, IC package materials. Liquid crystal polymers: Optical properties of cholesteric (ChLCD) and chiralnematics liquid crystal displays, optical fibre materials.
Unit 4	**PHYSICS OF SEMICONDUCTORS: SEMICONDUCTOR IN EQUILIBRIUM:** Charge carriers in semiconductors, dopant atoms and energy levels, extrinsic semiconductors, Statistics of donors and acceptors, charge neutrality, position of Fermi energy level. **Carrier transport phenomena:** Charge, effective mass, state & carrier distributions, Carrier drift, carrier diffusion, graded impurity distribution, resistivity, Hall Effect. **Non-equilibrium excess carriers in semiconductors:** Carrier generation and recombination, characteristics of excess carriers, ambipolar transport, quasi-Fermi energy levels, excess carrier lifetime, surface effects.
Unit 5	**SEMICONDUCTOR DEVICES: DIODE:** Junction terminologies, Poisson's equation, built-in potential, depletion approximation, diode equation, Qualitative and Quantitative analysis, Reverse-bias breakdown, avalanching, Zener process, C-V characteristics, Transient response. **BJT:** Terminology, electrostatics and performance parameters, Eber - Moll model, two port model, hybrid – pi model, device models in Spice, Modern BJT structures – polysilicon emitter BJT, hetro-junction Bipolar transistor (HBT) **MOSFET:** Fundamentals, Capacitance-voltage characteristics, I-V characteristics, Qualitative Theory of Operation, ac response, spice models.

Course Objectives	
Title	**MATHEMATICAL METHODS**
Course Code	MDS1B
CO-1	To familiarize the ideas of complex variable.
CO-2	To understand the fourier series and implement it in solving the waveforms.
CO-3	To choose laplace transform in solving in electrical network circuit to LCR etc.
CO-4	To implement the ideas of problematic in studying the permutations functions.
CO-5	To study interpolation in solving numerical methods problem.

Course Outcome	
Title	**MATHEMATICAL METHODS**
Course Code	MDS1B
CO-1	Use advanced mathematical method and theories on various mathematical problems
CO-2	Develop the skill of problem solving ability
CO-3	Use Laplace transform to solve differential equations
CO-4	Apply probability to calculate mathematical expectation.
CO-5	Recognize the advantages of numerical methods.

Syllabus	
Title	**MATHEMATICAL METHODS**
Course Code	MDS1B
Unit 1	**COMPLEX VARIABLES:** Analytic functions – Cauchy-Riemann conditions – Laplace equation in two dimensions – Expression for exp z – Euler's formula – Generalization of trigonometrical and hyperbolic functions – Cauchy's theorem – Cauchy integral formulae – Zeros and poles – Taylor series and Laurent series – Residue theorem – Applications of complex variables: Resolution into partial fractions – Zeros of normalized Butterworth polynomials and Butterworth poles in the s-plane – Circuit Analysis – Evaluation of real integrals using contour integration – Application in transfer functions.
Unit 2	**FOURIER TRANSFORMS:** Fourier integral theorem – Generation of a table of Fourier transforms – Fourier cosine and sine transforms – Form Fourier integral to Laplace transform – Simple applications in digital signal processing – Inverse Fourier Transform –Properties of Inverse Fourier Transform.
Unit 3	**LAPLACE TRANSFORMS:** Generation of a Table of Laplace transforms – Inverse Laplace transform using calculus of residues – Solution to linear differential equations with constant coefficients – Simple applications in feedback control systems, electrical Network, circuits with L.C.R for periodic and non-periodic signals, poles and zeroes of Network functions, time and frequency domain response from pole zero plot – Voltage transfer function.
Unit 4	**SETS, FUNCTIONS AND PROBABILITY:** Set theory: - Relationships between sets – Operations on sets – Set indenties – Principle of inclusion and exclusion – Minsets. Relations: - Binary relations – Partial orderings – Equivalence relations. Functions: Properties of functions – Composition of functions – Inverse functions – Permutation functions.DiscreteProbability**:** Finite probability – Probability distributions – Conditional probability – Independence – Bayes' theorem – Mathematical expectation.
Unit 5	**NUMERICAL METHODS:** Interpolation with equally spaced and unevenly spaced points (Newton forward and backward interpolations, Lagrange interpolation) - Curve fitting - Polynomial least-squares fitting - Cubic spline fitting Numerical differentiation - Numerical integration - Trapezoidal rule - Simpson's rule - Error estimates - Gauss-Legendre, Gauss-Laguerre, Gauss-Hermite and Gauss-ChebyshevQuadrature - Numerical solution of ordinary differential equations - Euler and Runge-Kutta methods - Introduction to C programming.

Course Objectives	
Title	**DIGITAL ELECTRONICS & MICROPROCESSOR**
Course Code	MDS1C
CO-1	To study the architecture of 8086 microprocessor.
CO-2	To understand the systems associated with digital electronics.
CO-3	To understand the programming concepts of 8086.
CO-4	To perform the interrupt concepts in 8086.
CO-5	To understand the ideas of interfacing of 8086.

Course Outcome	
Title	**DIGITAL ELECTRONICS & MICROPROCESSOR**
Course Code	MDS1C
CO-1	Understand the basics of sequential and combinational logic circuits.
CO-2	Know about the architecture of 8086 microprocessor.
CO-3	Perform the functions of various instruction set of 8086 microprocessor.
CO-4	Recognize the various types of interrupts in 8086.
CO-5	Analyze the concept of interfacing DAC, ADC, Stepper Motor etc.,

Syllabus	
Title	**DIGITAL ELECTRONICS & MICROPROCESSOR**
Course Code	MDS1C
Unit 1	**DIGITAL ELECTRONICS:** Combinational circuits – Combinational logic - representation of logic functions-SOP and POS forms, K-map representations minimization using K maps - simplification and implementation of combinational logic - multiplexers and de-multiplexers - code converters, adders, subtractors. Sequential circuits - Flip-Flops R-S, D, T, J-K and Master slave J-K. Flip-Flops Registers, Buffer and shifts Registers, Binary Ripple counter of Mod-N. Synchronous counters, Ring counters, semiconductor memories, Memory Addressing logic, ROM, EPROM & RAM memories.D-A Conversion: Weighted Register and Ladder Method, Sample and Hold Circuit, A-D convertor, Simulation methods, Continuous method, counter method, Successive approximation.
Unit 2	**INTRODUCTION TO MICROPROCESSOR 8086:**8086 Architecture and programming model, pin description, Registers, flags, interfacing of memory RAM and EPROM. **Hardware features of 8086:** Bus buffering, latching, timing diagrams, wait state, MIN/MAX modes of operation. **Addressing modes:** Immediate addressing, register addressing, memory addressing, base indexed addressing with displacement as the general memory addressing mode, I/O port addressing.
Unit 3	**PROGRAMMING THE 8086:** Instruction template for 8086 instructions, code generation using template. **Data Transfer Instruction:** Move date to register/memory from register/memory/immediate data, data transfer between a segment register and register/memory, PUSH and POP, exchange, data transfer with I/O ports. **Data Conversion instructions:** XLAT, LEA, LDS, LES, LAHF and SAHF instructions. **Arithmetic Instructions:** Add, subtract, negate, compare, CBW, CWD, multiply and divide instructions. **Logical Instructions:** AND, OR, EX-OR, Test, NOT, ROTATE and shift instructions. **Process Control Instructions**: Instructions to set/reset flags, halt, wait, lock, prefix and escape to co-processor instructions. **String Instructions:** CMPS, MOVS, LODS, STOS, and SCAS instructions. **Branch Instructions:** JMP, conditional jump, LOOP, LOOPE, LOOPNE, JCXZ, CALL, and RET.
Unit 4	**INTERRUPTS OF 8086:** Hardware interrupt, software interrupt and exception, priority of interrupts, 8259A priority interrupts controller (block diagram and its operational description).**BIOS and DOS Services:** Binary search, print screen operation, check for password, and rename a file C-language programs using BIOS and DOS services: create sub-directory, get file attributes, control of display on CRT
Unit 5	**INTERFACING OF 8086:** Interfacing with RAMs, ROMs along with the explanation of timing diagrams. Interfacing with peripheral ICs like 8255, 8254, 8279, 8259, 8259 etc. Interfacing with key boards, LEDs, LCDs, ADCs, and DACs etc.Stepper Motor Interface.

Course Objectives	
Title	**DIGITAL ELECTRONICS AND MICROPROCESSOR LABORATORY**
Course Code	MDS11
CO-1	To design the Counter circuits.
CO-2	To understand the concepts of DAC using IC741.
CO-3	To study the programming based on 8086 microprocessor.
CO-4	To study to interface with other I/O devices.
CO-5	To design the Counter circuits.

Course Outcome	
Title	**DIGITAL ELECTRONICS AND MICROPROCESSOR LABORATORY**
Course Code	MDS11
CO-1	Learn about counters.
CO-2	Demonstrate ability to handle arithmetic and logical operations.
CO-3	Understand the concepts related to I/O interfacing.

Syllabus	
Title	**DIGITAL ELECTRONICS AND MICROPROCESSOR LABORATORY**
Course Code	MDS11
Unit 1	**Advanced Digital Electronics** 1. Digital to analog converter using IC 741 and R/2R ladder. 2. Up/Down counters using IC 7476/7473. 3. Design of synchronous counters – MOD 3, MOD 5 and MOD 10.
Unit 2	**. Microprocessor 8086 Programs** 1. Basic arithmetic and Logical operations 2. Code conversion, sorting and searching 3. Data transfer operations 4. Password checking 5. Print RAM size and system date
Unit 3	**Peripherals and Interfacing Experiments** 1. Traffic light control 2. Stepper motor control 3. Digital clock 4. Key board and Printer status 5. Serial interface and Parallel interface 6. Trouble shooting

Course Objectives	
Title	**POWER ELECTRONICS**
Course Code	MDSAA
CO-1	To understand the concepts of the thyristors and power MOSFET.
CO-2	To learn the functioning of rectifiers and converters.
CO-3	To apply the ideas of inverters.
CO-4	To understand the various chopper circuits.
CO-5	To illustrate the concepts of various control circuits and its application.

Course Outcome	
Title	**POWER ELECTRONICS**
Course Code	MDSAA
CO-1	Explain the working of thyristors, TRIAC, Power diodes and MOSFETs
CO-2	Analyze the various functions of rectifiers and converters
CO-3	Build the inverters using thyristors, SMPS and Boost Regulators
CO-4	Recognize the various types of DC and AC Choppers
CO-5	Implement the concepts for PCB designing, UPS, DC and AC Drive

Syllabus	
Title	**POWER ELECTRONICS**
Course Code	MDSAA
Unit 1	**THYRISTORS AND RELATED DEVICES:** Thyristors – Triacs – Power diodes – Power transistors – Power MOSFETs – GTOs and insulated gate transistors – Steady state and switching characteristics – Protection circuits – Series and parallel operation – Thyristor commutation techniques
Unit 2	**RECTIFIERS AND CONVERTERS:** Phase control – Half-wave Thyristors rectifiers with R, RL and RLC load – Effect of freewheeling diode – Full-wave Thyristors rectifiers – Single phase half-controlled and fully-controlled Thyristor bridge converters - Load voltage, load current and input power factor for continuous current operation – Three-phase half-controlled and fully-controlled Thyristor - Converters – Dual converters.
Unit 3	**INVERTERS:** Series and parallel inverters using Thyristors – Inverter circuits using devices other than Thyristors – Single phase and three phase bridge inverters – Voltage and wave form control – Current source inverters – Cyclo-converters. Switch mode regulators: Buck regulators – Boost regulators –Buck/Boost regulators – CUK regulation –SMPS.
Unit 4	**CHOPPERS :**DC chopper circuit using devices other than Thyristors – Single quadrant DC – Chopper with R,RL,RLC load - Time ratio control – Load voltage and load current for continuous current operation – Two quadrant and four quadrant DC choppers – AC choppers (AC voltage controller) using Thyristors and Triacs – ON-Off control and phase control – Single phase full-wave controller with R & RL load – load voltage, load current and input power factor – circuits for three phase half-wave and full-wave controllers.
Unit 5	**CONTROL CIRCUITS AND APPLICATIONS:** Generation of control pulses – Microprocessor based implementation – DC and AC drives – HVDC systems – Static circuit breakers – Regulated power supply – UPS

Course Objectives	
Title	**COMPUTER ORGANIZATION AND ARCHITECTURE**
Course Code	MDSAB
CO-1	To impart knowledge of basic structure of computers.
CO-2	To understand the concepts of arithmetic and logic units.
CO-3	To explore the processing units and gain the knowledge about bus organization.
CO-4	To provide the concepts of working of memory system.
CO-5	To familiarize the various I/O devices.

Course Outcome	
Title	**COMPUTER ORGANIZATION AND ARCHITECTURE**
Course Code	MDSAB
CO-1	Understand the basic structure of computer hardware
CO-2	Analyze the various functions of Arithmetic and logic unit.
CO-3	Identify the multiple bus organization, pipelining and data hazards.
CO-4	Analyze the various types of semiconductor RAM and ROM.
CO-5	Know about the standard I/O organization and its interface.

Syllabus	
Title	**COMPUTER ORGANIZATION AND ARCHITECTURE**
Course Code	MDSAB
Unit 1	**BASIC STRUCTURE OF COMPUTERS :** Functional units – Basic operational concepts - Bus structures – Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations
Unit 2	**ARITHMETIC UNIT :**Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers – Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.
Unit 3	**BASIC PROCESSING UNIT :**Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control – Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration.
Unit 4	**BASIC PROCESSING UNIT :**Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control – Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration.
Unit 5	**I/O ORGANIZATION:** Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, and USB).

Course Objectives	
Title	**ELECTROMAGNETIC THEORY AND APPLICATIONS**
Course Code	MDS2A
CO-1	To familiarize the fundamentals of electromagnetic theory and applications to electromagnetic induction.
CO-2	To give the student a firm understanding of the basics of Electricity & magnetism.
CO-3	To understand the maxwell's equation and solve the probles.
CO-4	To recognize the types of wave propogation and learn about electric dipoles.
CO-5	To design the waveguides after a study of propogation of waves.

Course Outcome	
Title	**ELECTROMAGNETIC THEORY AND APPLICATIONS**
Course Code	MDS2A
CO-1	Familiarize mathematical concepts and boundary conditions used in classical Electrodynamics.
CO-2	Understand magnetic properties of materials.
CO-3	Analyze transmission of Electromagnetic wave through waveguide.
CO-4	Apply Maxwell's equations to material medium and analyze its Electrical and Magnetic
CO-5	Derive formulas to Experimentally measurable quantities (like electric and magnetic susceptibility).

Syllabus	
Title	**ELECTROMAGNETIC THEORY AND APPLICATIONS**
Course Code	MDS2A
Unit 1	**ELECTROSTATICS AND MAGNETOSTATICS:** Electrostatic field - Divergence and curl of electrostatic fields - Electric potential - Laplace equation - Method of images - Multipole expansion - Lorentz force law - Biot-Savart law - Divergence and curl of ***B***- Magnetic vector potential.
Unit 2	**ELECTROSTATIC AND MAGNETOSTATIC FIELDS IN MATTER:** Polarization - Field of polarized object - Electric displacement - Linear dielectrics - Magnetization - Field of magnetized object - Auxiliary field ***H*** - Linear and non-linear media.
Unit 3	**MAXWELL'S EQUATIONS AND ELECTROMAGNETIC WAVES:** Correspondence of field equations and circuit equations – Applications of circuit and field theory – Series Circuit – Maxwell's equations – Generalization of circuit equations – Maxwell's equations in free space and for harmonically varying fields – Continuity equations – Poynting theorem – Uniform plane wave – Concept of intrinsic impedance of free space – Boundary conditions
Unit 4	**WAVE PROPAGATION:** Uniform plane wave propagation in good conductor, in poor conductor, in lossy dielectric – Plane wave propagation in metallic film coating - Plastic substrate and application to thin film technology - Oscillating electric dipole – Power radiated by current element - Radiation resistance.
Unit 5	**GUIDED WAVES AND WAVE GUIDES: Guided waves**: Transverse electric (TE) waves - Transverse magnetic (TM) waves - Transverse electromagnetic (TEM) waves - Velocity of propagation - Attenuation in parallel-plane guides - Wave impedances. Wave Guides: Rectangular guides (RGs) - TM waves and TE waves in RGs - Impossibility of TEM wave in wave guides - TM and TE waves in circular guides - Wave impedances and characteristic impedances - Dielectric slab wave guide.

Course Objectives	
Title	**CONTROL SYSTEM**
Course Code	MDS2B
CO-1	To understand the concepts of process control system.
CO-2	To familiarize the loop characteristics in control system.
CO-3	Learn to implement the computer in process control.
CO-4	To know about various discrete state controllers.
CO-5	To apply the process control ideas in designing various devices.

Course Outcome	
Title	**CONTROL SYSTEM**
Course Code	MDS2B
CO-1	Understand the various parameters and applications of dynamic system.
CO-2	Understand the basic knowledge of open loop and closed loop frequency response of system.
CO-3	Analyze the concepts of programmable Controllers, CAM, CAD, CIM and CNC.
CO-4	Describe the terminologies of discrete state controllers.
CO-5	Understand the principles of control theory and the various components and applications of Control system.

Syllabus	
Title	**CONTROL SYSTEM**
Course Code	MDS2B
Unit 1	**INTRODUCTION TO PROCESS:** Identification of functiona elements - Control system evaluation-Analog and digital processing - Application specific selection of transducers for measurement o process parameters: temperature, pressure, flow level, density safety and weight sensors- Synchro/Servo motors- Control valves Solenoids-Electropneumatic converters- Indicators- annunciators Alarms-Displays-Recorders- Loggers, etc.
Unit 2	**CONTROL LOOP CHARACTERESTICS:** Process characteristics : Process equation, process lead, process lag and self-regulation - Control system parameters : Error, variable range, control parameter range, control lag, dead time, cycling- Controller modes: discontinuous controller modes, two position mode, multiposition mode and floating control mode, continuous controller modes, proportional (P), integral (I) and differential (D) control modes, composite controller modes – PI, PD and PID - Control loop characteristics- Control system configurations – Single variable and cascade control- Multivariable control system- Stability- Process loop tuning- Open loop transient response method- Ziegler-Nicholas method and Frequency response method.
Unit 3	**COMPUTER IN PROCESS CONTROL:** Programmable controllers- Data logging- Supervisory control- Computer based controller- Hierarchical control- Controller software- Computer aided integrated manufacturing (CIM)- The product cycle and CAD/CAM- Fundamentals of CAD- Computer aided process planning- Computerized scheduling- Material requirement planning and shop floor control- NC, CNC and computer controlled robots- Computer aided quality control- Implementation of CIM's – Introduction to LABVIEW.

Unit 4	**DISCRETE STATE CONTROLLERS:** Definitions and terminologies- Characteristics of the system-Discrete state variables- Process space and event sequence description- Ladder diagram- Programmable logic controllers (PICs)- Use of microcontrollers- Fuzzy logic control.
Unit 5	**PROCESS CONTROL SYSTEMS:** Batch process control and automation- Boiler control- Chiller control- Clean room control- Compressor control - Cooling tower to crystallizers control- Distillation control -Dryer control - Evaporation control- Extruder controls-Furnace control- Heat exchangers- PH control- Pump controls- Reactor controls- Rolling mill control- Steam turbine control -Water treatment control.

Course Objectives	
Title	**ELECTRONICINSTRUMENTATION**
Course Code	MDS2C
CO-1	To familiarize the characteristic of an instrument.
CO-2	To study the basic concepts of transducers & sensors.
CO-3	To understand basic electronics instruments terminology and measurement instruments.
CO-4	To introduce the basic concepts related to the bridge measurement.
CO-5	To understand the proper application of electronic instruments.

Course Outcome	
Title	**ELECTRONICINSTRUMENTATION**
Course Code	MDS2C
CO-1	Understand the characteristics of different Instruments.
CO-2	Identify the principles of various types of transducers and sensors.
CO-3	Analyze the different terminology related to measurements and testing the Instruments.
CO-4	Employ appropriate instruments to measure given sets of parameters.
CO-5	Know about the concepts of MEMS, signal conditioners and Diagnostic equipments.

Syllabus	
Title	**ELECTRONICINSTRUMENTATION**
Course Code	MDS2C
Unit 1	**CHARACTERISTICS OF AN INSTRUMENT:** Functional elements of a measurement system – Static characteristics – Accuracy, precision, bias, linearity, threshold, resolution, hysteresis, dead space, scale readability, span, static stiffness, input impedance, repeatability and reproducibility - Errors and calculation of errors in overall system – Dynamic characteristics – Zero, first and second order instruments - Responses for step, impulse, ramp and sinusoidal inputs
Unit 2	**TRANSDUCERS AND SENSORS:** Definition of transducer and sensor – Classification of transducers – Pressure (strain gauge, piezoelectric transducer), displacement (potentiometric, LVDT),

	temperature (thermometer, thermistor, thermocouple) and photosensitive (Vacuum & gas filled phototubes, photomultiplier, photoconductive cell, photovoltaic cell) transducers.
Unit 3	**BRIDGE MEASUREMENTS:** Introduction - Wheatstone bridge - Kelvin bridge – Guarded Wheatstone bridge - AC bridges and their applications – Maxwell bridge – Hay bridge - Schering bridge - Wien bridge. **TESTING INSTRUMENTS:** Oscilloscopes – Block diagram – CRT Circuits – Vertical and horizontal deflection systems – Delay line, multiple trace – Probes – Special oscilloscopes.
Unit 4	**MEASURING INSTRUMENTS:** Galvanometer – DC Ammeter & Voltmeter – Series and shunt type ohm meters – Calibration of DC Instruments - Multimeter – Alternating current indicating instruments - Watt-hour meter – Power factor meters – Pen recorders – Servo-recorders – MagNetic recorders- Digital voltmeter – Multimeter – DMM circuits – Accuracy of digital voltmeters - Guarding techniques. **Data acquisition systems:** Block diagram, brief description of preamplifier, signal conditioner, instrumentation amplifier, waveform generator, A/D and D/A converter blocks, computer controlled test and measurement system with examples.
Unit 5	**BIO-MEDICAL INSTRUMENTATION:** Origin of bio-electric signals, electrodes for ECG, EEG, and EMG, block diagram of ECG and EEG systems, brief analysis of graphs**MEMS:**Definition of MEMS,MEMS history and development- Mechanical sensors and actuators - pressure sensors, accelerometers, rate gyroscopes. Thermal sensors and actuators – Micro-opto-electro mechanical system (MOEMS) – Magnetic sensors and actuators - MEMS applications

Course Objectives	
Title	**EMBEDDED SYSTEM LABORATORY**
Course Code	MDS 21
CO-1	To introduces the assembly language programming of Microcontroller.
CO-2	To develop the student's Assembly language programming skills and gives practical training of interfacing the peripheral devices with the Microcontroller.
CO-3	To know about the Ardino based programming.

Course Outcome	
Title	**EMBEDDED SYSTEM LABORATORY**
Course Code	MDS21
CO-1	Understand the basics of assembly language programming.
CO-2	Learn about the Ardino based programs.

Syllabus	
Title	**EMBEDDED SYSTEM LABORATORY**
Course Code	MDS21
Unit 1	1. Assembly language programming of the 8031/8051 (16-bit Addition, Subtraction, Multiplication & Division) 2. Interfacing of LED array to generate different sequences, use of timer for delay generation Matrix Keyboard interface with LCD 3. DAC interfacing (sine, staircase, triangular, square wave) use of timer
Unit 2	1. ADC interfacing using 8051. 2. DC motor control using PWM / Intensity control of LED – with CCP 3. Serial EEPROM / EEPROM interface using SPI protocol
Unit 3	1. Real time clock (RTC) using 8051. 2. Stepper motor Interfacing using 8051. 3. Dot matrix rolling display using 8051.
Unit 4	1. Introduction to Arduino board. 2. LED Blink using Arduino. 3. LM35 Temperature control using Arduino.
Unit 5	1. Introduction to Arduino board. 2. LED Blink using Arduino. 3. LM35 Temperature control using Arduino.

Course Objectives	
Title	**OPTO ELECTONICS & FIBRE OPTIC COMMUNICATION (OFC)**
Course Code	MDSAC
CO-1	To understand how fibre optic communication system work.
CO-2	To understand the concepts of multi mode & single mode fibre.
CO-3	To gain knowledge about the optical processes in semiconductor.
CO-4	To explore the fundamentals of fibre optics.
CO-5	To study the optical communication fibre and processes.

Course Outcome	
Title	**OPTO ELECTONICS & FIBRE OPTIC COMMUNICATION (OFC)**
Course Code	MDSAC
CO-1	Explain the basics of Semiconductor Opto electronics devices.
CO-2	Understand the basic elements of optical fiber communication link.
CO-3	Know about the optical fiber testing and parameter measurements.
CO-4	Design the simple fiber optic communication.
CO-5	Understand the applications of mobile communication and satellite communication system.

Syllabus	
Title	**OPTO ELECTONICS & FIBRE OPTIC COMMUNICATION (OFC)**
Course Code	MDSAC
Unit 1	**OPTO ELECTRONICS:** Generic Optical Systems and Fundamental Building Blocks; Basics of Semiconductor Optoelectronics: Elemental and Compound Semiconductors; Electronic Properties and Optical Processes in Semiconductors; P-N Junction Theory, LEDs and Photodetectors; Heterostructures, Confinement of Electron Waves, Optical Waveguides and Guided Modes; Semiconductor Optical Amplifiers and Fabry-Perot Lasers; Coupled Mode Theory, DBR and DFB Lasers; Silicon Photonics: Integrated Optical Passive and Active Components; Tunable Filters, Delay-Lines and Switching Circuits in SOI Platform; CMOS Technology: Electrical vs. Optical Interconnects
Unit 2	**FUNDAMENTALS OF FIBRE OPTICS:** Optical fiber theory and applications - parameters and types of optical fibers - single and multimode fibers, dispersion – intermodal and intramodal - step and graded index fibers - construction of optical fiber cables, loss mechanisms - absorption and scattering, connector types and splices, misalignment and mismatch losses, power budget of optical fiber link.
Unit 3	**OPTICAL COMMUNIICATION DEVICES AND PROCESSES:** Optical fiber testing and parameter (cut off wavelength, loss per unit length, numerical aperture, bending loss, connector/splice loss) measurement. Power meter, OTDR- principle and uses.Spectrum analyzer, Optical Amplifiers, semiconductor optical amplifiers, EDFA, Raman Amplifier. WDM and DWDM systems
Unit 4	**FIBER OPTIC COMMUNICATION:** System: design:considerations for point to point link - System architecture - optical transmitters and receivers - elctro optic modulators, Non-linear effects and system performance, Dispersion management, Soliton propagation. Analog and digital modulation, bit error rate, eye diagram.Optical add-drop multiplexers.

	Optical fiber Networks, SONET, SDH.
Unit 5	**MOBILE COMMUNICATION SYSTEMS:** Cellular concepts - role of base station and mobile switching centers - Hand-off considerations – Communication frequency bands - frequency reuse – roaming - SMS, GSM, GPRS, CDMA and EDGE - Speech coding techniques - Vocoders. Satellite communication principles and GPS.

Course Objectives	
Title	**-EMBEDDED SYSTEMS**
Course Code	MDSAC
CO-1	To familiarize the development cycle of Embedded system.
CO-2	To learn various bus standards and communication through it.
CO-3	To study the architecture of AVR microcontroller.
CO-4	To study the architecture of PIC microcontroller.
CO-5	To provide knowledge of real time Embedded system.

Course Outcome	
Title	**-EMBEDDED SYSTEMS**
Course Code	MDSAC
CO-1	Know about the basic concepts of Embedded system.
CO-2	Analyze the Bus standards techniques and communication protocols in embedded system.
CO-3	Understand the architecture and interfacing features of AVR microcontroller.
CO-4	Explain the architecture and interfacing features of PIC microcontroller.
CO-5	Develop the technical hardware and software programming skills in real time embedded

Syllabus	
Title	**-EMBEDDED SYSTEMS**
Course Code	MDSAC
Unit 1	**INTRODUCTION TO EMBEDDED SYSTEM:** Embedded System: components, examples, development cycle of embedded system, embedded System Development Environment - algorithm, flow chart, IDE, ICE, programmer Processor Architectures: Harvard architecture, Von-Neumann architecture, RISC and CISC.
Unit 2	**BUS STANDARDS AND COMMUNICATION:** Communication Protocols: I2C bus- specification, general characteristics, bus signals and address mechanism. Serial Peripheral Interface (SPI): specifications, master slave configuration, Bus Standards- RS 232, RS 485, USB, Bluetooth, Zigbee Controller Area Network (CAN): specifications, basic concepts, frame types, bus signals, error handling and addressing.
Unit 3	**AVR MICROCONTROLLER:** Architecture (Atmega16), instruction set, addressing modes, memory organization, timers, I/O, ADC, interrupts, serial communication Design of General Purpose Target Board: reset, oscillator circuit, derivatives of AVR Basic Assembly Programs: arithmetic, logical, code converter, block data transfer, I/O programming C Programs: ADC, timer, I/O ports, interrupts, Inter-Integrated Circuit (I2C), serial communication, PWM. Real world interfacing with the microcontrollers and programming in C: DAC, LED, SSD, dot matrix display, and LCD displays (text and graphic), keyboard and motors (DC, stepper, and servo), I2C and SPI based RTC, EEPROM, DAC and ADC, coding assembly in C and code optimization.
Unit 4	**PIC MICROCONTROLLER:** Architecture (PIC18F4550, 18F458), instruction set, addressing modes, memory organization, timers, I/O, ADC, interrupts, serial communication Design of General Purpose Target Board: reset, oscillator circuit, derivatives of PIC Basic Assembly Programs: arithmetic, logical, code converter, block data transfer, I/O programming C Programs: ADC, timer, I/O ports, interrupts, I2C, serial communication, PWM Real world interfacing with the microcontrollers and programming in C: DAC, LED, SSD, dot matrix display, and LCD displays (text and graphic), keyboard and motors 22 (DC, stepper, and servo), I2C and SPI based RTC, EEPROM, DAC and ADC, coding assembly in C and code optimization
Unit 5	**REAL – TIME EMBEDDED SYSTEMS:** Architecture of the kernel – Task and task scheduler – Interrupt service routines- Semaphores – Mutex – Mailboxes – Message queues – Event registers – Pipes – Signals – Timers – Memory management – Priority inversion problems – Embedded operating systems – Embedded linux – Real-time operating systems – RT linux – Handheld operating systems – Windows CE

Course Objectives	
Title	**DATA COMMUNICATION AND COMPUTER NETWORKING**
Course Code	MDS3A
CO-1	To learn data communicatiobn and various multiplexing techniques.
CO-2	To familiarize data transmission, data compression, analog and digital transmission.
CO-3	To understand the computer communications and Network techniques.
CO-4	To understand the basics of computer architecture, protocols and interfaces.
CO-5	To familiarize the advances in telecommunication systems.

Course Outcome	
Title	**DATA COMMUNICATION AND COMPUTER NETWORKING**
Course Code	MDS3A
CO-1	Explain the basic concepts of data communication and data link protocols.
CO-2	Recognize the concepts of data transmission technologies.
CO-3	Understand and apply the knowledge to identify the different types of network topologies LAN, TREE LANs etc.,
CO-4	Analyze the TCP/IP, RS232, RS432 architecture and their communication protocols.
CO-5	Compare various internet devices and their functions in modern telecommunications.

Syllabus	
Title	**DATA COMMUNICATION AND COMPUTER NETWORKING**
Course Code	MDS3A
Unit 1	**DATA COMMUNICATION:** Introduction to data communication: A digital communication system - Data terminal equipment (DTE) - Line control unit (LCU) - Data communication Equipment (DCE) - Transmission media and communication link - Communication system formats - Data link protocols : General protocols, Character oriented protocols, Synchronous Data Link Control (SDLC), High level data control (HDLC) and XMODEM communications protocols - Low speed data communications - Frequency shift keying- FSK link and FSK modems- High speed modems and systems - Balanced modulator - Phase shift Keying- Differential PSK Bit splitters - PSK modulator- Quadrature Phase shift keying (QPSK)- QPSK modems - QPSK demodulator- Higher data rate modems- Multi channel data communications : Frequency division multiplexing (FDM) - FDM groups and subgroups - Multichannel data distribution- Data under voice (DUV)- Digital T carriers and Time division multiplexing (TDM)-Multichannel TDM- Sampling theorem- Sampling using TDM- Natural sampling- Sample and hold- Quantization - Pulse code modulation- Delta modulation - Adaptive delta modulation- CODECS Vocoders.
Unit 2	**DATA COMMUNICATION:** Introduction to data communication: A digital communication system - Data terminal equipment (DTE) - Line control unit (LCU) - Data communication Equipment (DCE) - Transmission media and communication link - Communication system formats - Data link protocols : General

	protocols, Character oriented protocols, Synchronous Data Link Control (SDLC), High level data control (HDLC) and XMODEM communications protocols - Low speed data communications - Frequency shift keying- FSK link and FSK modems- High speed modems and systems - Balanced modulator - Phase shift Keying- Differential PSK Bit splitters - PSK modulator- Quadrature Phase shift keying (QPSK)- QPSK modems - QPSK demodulator- Higher data rate modems- Multi channel data communications : Frequency division multiplexing (FDM) - FDM groups and subgroups - Multichannel data distribution- Data under voice (DUV)- Digital T carriers and Time division multiplexing (TDM)-Multichannel TDM- Sampling theorem- Sampling using TDM- Natural sampling- Sample and hold- Quantization - Pulse code modulation- Delta modulation - Adaptive delta modulation- CODECS Vocoders.
Unit 3	**COMPUTER COMMUNICATIONS AND NETWORKS:** Open system Network models : Data topologies - Data switching- Types of Networking- The open system interconnection (OSI) model-System Network architecture (SNA)- SNA layers- Logical units- SNA message formats- Local area Networks – Selection issues – Types – Protocols – Performance – High speed and bridged area Networks - Interconnection methods - High speed LAN - Bridges - Transparent bridges – Source routing bridges – Performance issues – LAN technology – Architecture – BUS/TREE LANs, Ring LANs, Star LANs and Wireless LANs. **CHARACTERISTIC OF PUBLIC NETWORKS** - Packet switched data Networks – Circuit switched data Networks – Integrated services digital Networks – Private Networks – Inter

	Network architecture – Network layer structure - Internet protocol standards – Frame relay protocols architecture – Frame relay call control - User data transfer - Network function - Congestion control.
Unit 4	**ARCHITECTURE, PROTOCOLS AND INTERFACES:** Protocols and architecture - TCP/IP protocols – Principles of inter-Networking and intra-Networking - Current loop interface – RS232- RS432 interface – BASIC test - Breakout box and line monitors – Pattern generators and bit error rate analyzers – Protocol analyzers – Time domain refractometry – Fiber optic systems
Unit 5	**ADVANCES IN TELECOMMUNICATIONS:** Enhanced features of telephone : Conference calls -Call transfers- Call queuing- Priority calls and automatic directory search- PBXs- Picture phone- Still picture video telephone - Telephotograph transmission- Facsimile services- Radio paging- Radio telephone- Mobile/cellular telephone-Vehicle location monitoring- Vehicle traffic control-Remote control of machines-Emergency communication -Interactive TV (shopping, advertisement and games)- Data broadcasting - Mail gram- Voice gram -Electronic mail delivery-Electronic fund/cash transfer (banking) - Person identification systems (security systems) - Computer assisted instructions

Course Objectives	
Title	**DIGITAL SIGNAL PROCESSING**
Course Code	MDS3B
CO-1	To introduce signals, systems, time and frequency domain concepts, and DSP techniques.
CO-2	To acquire the knowledge of design, implementation, analysis and comparison of digital
CO-3	filters for processing of discrete time signals.
CO-4	To program DSP Processor for various applications.
CO-5	To know about the typical Digital signal processing boards.

Course Outcome	
Title	**DIGITAL SIGNAL PROCESSING**
Course Code	MDS3B
CO-1	Understand the basic fundamental concepts of Digital Signal Processing.
CO-2	Classify the discrete time signals and systems.
CO-3	Apply Z-transform and Fourier transform for different types of signals and systems.
CO-4	Determine the convolution of discrete time signals and digital filter designs.
CO-5	Discuss the different transform techniques used in DSP

Syllabus	
Title	**DIGITAL SIGNAL PROCESSING**
Course Code	MDS3B
Unit 1	**FUNDAMENTALS OF DSP:** Signals and graph terminology – Mean and standard deviation – Histogram – Normal distribution – Digital noise generation – Precision and accuracy – Quantization – Sampling theorem – Digital to analog conversion – Analog filters for data conversion – Selecting the antialias filter – Multirate& single bit data conversion
Unit 2	**SIGNALS AND SYSTEMS:** Basics of signals - Discrete sequences - Signal amplitude – Magnitude - Power - Sampling rate - aliasing - Discrete linear systems - Time-invariant systems – Frequency domain representation of discrete time signals – Transfer function - Types of transfer functions – All pass, minimum-phase and maximum-phase - Complementary transfer functions – Discrete-time processing of random signals.
Unit 3	**TRANSFORM TECHNIQUES IN DSP:** Laplace transform – Discrete Fourier transform – Computation of the DFT - Fast Fourier transform – Decimation in time – Decimation in frequency – Bit reversal – Radix-2 Butterfly structures - Z-transform – Chirp Z-transform – Hilbert transform.
Unit 4	**DIGITAL FILTER DESIGN:** Fundamentals and basic structures of FIR & IIR filters – Convolution - Low-pass, band-pass, high-pass FIR filters – Design of IIR filters – Impulse invariance method – Bilinear transform method – Design of digital IIR notch filter – Low-pass IIR digital filter design – Comparison of IIR & FIR digital filters.
Unit 5	**DSP TECHNIQUES IN TYPICAL DSP HARDWARE:** DSP circuits – Different DSP hardware – Typical DSP board (Analog devices/Texas Instruments/Motorola/AT&T) – Functional block diagram– Program Language - Fixed point – Floating point – Number precision – – DSP software – Introduction to CCS - Applications of DSP.

Course Objectives	
Title	**BASIC VLSI DESIGN & VHDL**
Course Code	MDS3C
CO-1	To Study the design and realization of combinational & sequential digital circuits.
CO-2	Architectural and performance tradeoffs involved in designing and realizing the circuits in CMOS.
CO-3	To know about the VHDL statements.
CO-4	To understand the concepts of design process computational techniques.
CO-5	Study and design digital circuits using Verilog HDL.

Course Outcome	
Title	**BASIC VLSI DESIGN & VHDL**
Course Code	MDS3C
CO-1	Know about the MOS and BiCMOS circuit design rules and layout diagrams.
CO-2	Analyze the basic circuit concepts and scaling of MOS circuits.
CO-3	Understand the logic of subsystem design and computational elements.
CO-4	Learn the VHDL language and implement various types of programming models.
CO-5	Discuss the various types of statements in VHDL programming.

Syllabus	
Title	**BASIC VLSI DESIGN & VHDL**
Course Code	MDS3C
Unit 1	**MOS AND BI-CMOS CIRCUIT DESIGN PROCESSES:**MOS Layers –Stick Diagrams –Design Rules and Layout –General Observations on the Design Rules –2um Double Metal, Double Poly. CMOS/Bicomos Rules –1.2um Single Metal, Single Poly. CMOS Rules –Layout Diagrams –A Brief Introduction –Symbolic Diagrams – Translation to Mask Form.y
Unit 2	**BASIC CIRCUIT CONCEPTS:** Sheet resistance (Rs) –Sheet resistance concept applied to MOS transistors and inverters –Area capacitances of layers –Standard unit of capacitance Cg –Standard unit of capacitances calculation –The delay unit –Inverter delays –Driving large capacitive loads –Propagation delay –Wiring capacitances. **SCALING OF MOS CIRCUITS:** Scaling models and scaling factors –Scaling factors for device parameters –Some discussion on and limitations of scaling.
Unit 3	**SUBSYSTEM DESIGN AND LAYOUT:** Some architectural issues –Switch logic –Gate (restoring) logic –Examples of structured design (combinational logic) –Some clocked sequential circuits –Other system considerations. **DESIGN PROCESS–COMPUTATIONAL ELEMENTS:** Some observations on the design process –Regularity –Design of an ALU subsystem –A further consideration of adders –Multipliers
Unit 4	**INTRODUCTION TO VHDL:** Introduction to Computer-aided design tools for digital systems. Hardware description languages introduction to VHDL, data objects, classes and data types Operators, Overloading, logical operators. Types of delays Entity and Architecture declaration. Introduction to behavioral, dataflow and structural models.
Unit 5	**VHDL STATEMENTS:** Assignment statements, sequential statements and process, conditional statements, case statement Array and loops, resolution functions, Packages and Libraries, concurrent statements. Subprograms: Application of Functions and Procedures Structural Modelling, component declaration, structural layout and generics.

Course Objectives	
Title	**DSP LABORATORY & MATLAB**
Course Code	MDS3B
CO-1	To design and apply digital signal processing techniques to design discrete time systems and digital filter .
CO-2	To compile and solve the digital signal processing problems using MAT lab.
CO-3	To interpret to analyze the importance of various transformation techniques in signal processing.

Course Outcome	
Title	**DSP LABORATORY & MATLAB**
Course Code	MDS3B
CO-1	Design FIR and IIR filters.
CO-2	Enumerate the basic concepts of signals and systems and their interconnections in a simple and easy-to-understand manner using MATLAB.
CO-3	Process images using techniques of smoothing, sharpening, histogram processing, and filtering.

Course Objectives	
Title	**MACHINE VISION AND ITS APPLICATIONS**
Course Code	MDSAD
CO-1	To understand the basic concepts of sensors for vision system.
CO-2	To know about the knowledge in machine vision.
CO-3	To explain the functions of robotics and robotic sensors.
CO-4	To implement the Robots in various application.

Course Outcome	
Title	**MACHINE VISION AND ITS APPLICATIONS**
Course Code	MDSAD
CO-1	Analyze the working of sensors for 2D and 3D vision system.
CO-2	Learn the hardware, algorithms and components used in machine vision.
CO-3	Describe the characteristics of robots and classify based on its coordinate systems.
CO-4	Understand the concepts of robot programming language and various types of sensors in artificial intelligence
CO-5	Know about the application of robots in various fields.

Syllabus	
Title	**MACHINE VISION AND ITS APPLICATIONS**
Course Code	MDSAD
Unit 1	**SENSORS FOR VISIONSYSTEM:** Sensing Range, proximity, Position, velocity, acceleration, Touch, Force, Torque. Optical &laser sensors. 2D & 3D vision: Competing technologies, principle, CCD, Videocon and other cameras, data capture. Triangulation geometry, resolution, passive and active 3-D stereo imaging, data processing
Unit 2	**MACHINE VISION :** Machine vision components, hardware's and algorithms, image function and characteristics, image formation & image sensing frequency space analysis, Fourier transform, convolution algorithms, image Gaussian, image enhancement, image analysis and segmentation data reduction, feature extraction, edge detection, image recognition m/c learning, image processing, machine vision edges detection, inspection part identification, industrial robot control, mobile robot application

Unit 3	**ROBOTICS:**Definition of robot, classification of robots according to coordinate system and control method, Main components of robots – manipulator, sensors, controller etc, Robot characteristics – payload, reach, repeatability, accuracy, resolution
Unit 4	**ROBOTIC SENSORS:** Sensors and Artificial Intelligence 6L Characteristics of Sensors, Position sensors, velocity sensors, acceleration sensors, force and pressure sensors, force and torque sensors, micro switches, touch and slip sensors, non-contact proximity sensors, Robot Vision System, Robot programming Languages – VAL, AML/2, ARM BASIC
Unit 5	**APPLICATION OF ROBOTS:** Handling, loading, & unloading, Welding, Spray painting, Assembly, Machining, Inspection, Rescue robots, Underwater robots, Parallel robot, and Medical robot.

Course Objectives	
Title	**DIGITAL IMAGE PROCESSING**
Course Code	MDSBB
CO-1	To introduce the fundamental concepts and techniques in digital image processing and their applications.
CO-2	To emphasize on the Image Transforms, Image Enhancement, Restoration and Compression, Image segmentations and Image Analysis.
CO-3	To improve the students ability to use mathematical tools required for the design and development of image processing algorithms to solve image processing problems.

Course Outcome	
Title	**DIGITAL IMAGE PROCESSING**
Course Code	MDSBB
CO-1	Know about the fundamentals of digital image processing.
CO-2	Classify the types of image enhancement techniques.
CO-3	Describe the concepts of color image processing techniques.
CO-4	Analyze the types of restoration filters for noise removal.
CO-5	Understand the concepts of morphological image processing and image segmentation

Syllabus	
Title	**DIGITAL IMAGE PROCESSING**
Course Code	MDSBB
Unit 1	**DIGITAL IMAGE FUNDAMENTAL:** Elements of Visual Perception, Digital Image Processing, Fundamental Steps in Digital Image Processing, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic relationships Between Pixels, Linear and Nonlinear Operations.
Unit 2	**IMAGE ENHANCEMENTS:** Image Enhancement in the Spatial Domain**,** Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations, Basics of Spatial Filtering, Smoothing and Shaping using Spatial Filtering. Image Enhancement in the Frequency Domain, Introduction to the Fourier Transform and the Frequency Domain**,** Smoothing and shaping using Frequency Domain Filtering, Homomorphic Filtering.
Unit 3	**COLOR IMAGE PROCESSING:** Color Fundamentals, Color Models, Pseudo color Image Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening, Color Segmentation, Noise in Color Images.
Unit 4	**IMAGE RESTORATION:** Model of the Image

	Degradation/Restoration Process, Restoration in the Presence of Noise Only–Spatial Filtering, Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering, Geometric Mean Filter, Geometric Transformations.
Unit 5	**MORPHOLOGICAL IMAGE PROCESSING:** Preliminaries, Dilation and Erosion, Opening and Closing, The Hit-or-Miss Transformation, Basic Morphological Algorithm, Extensions to Gray-Scale Images. **Image Segmentation:** Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation, Segmentation by Morphological Watersheds.

Course Objectives	
Title	**NEURALNETWORKS & ARTIFICIAL INTELLIGENCE**
Course Code	MDS4A
CO-1	To familiarize the concepts of artificial intelligence.
CO-2	To know about the simple neuralnets techniques for pattern classification.
CO-3	To understand the basics of artificial intelligence and production system.

Course Outcome	
Title	**NEURALNETWORKS & ARTIFICIAL INTELLIGENCE**
Course Code	MDS4A
CO-1	Know about the ANN biological neural networks and its applications.
CO-2	Analyze the neural nets design rules and applications based on their pattern.
CO-3	Describe the patterns associated with neural network memory and its application.
CO-4	Learn the applications of neural nets based on their competitive network.
CO-5	Understand the concepts of AI formulation, production and their characteristics.

Syllabus	
Title	**NEURALNETWORKS & ARTIFICIAL INTELLIGENCE**
Course Code	MDS4A
Unit 1	**INTRODUCTION:** Definition of ANN-Biological Neural Networks-Applications of ANN-Typical Architectures-Setting the weights-Common Activation functions-Development of Neural Networks-McCulloch-Pitts Neuron
Unit 2	**SIMPLE NEURALNETS FOR PATTERN CLASSIFICATION:** General discussion – Hebb Net – Perceptron- Adaline– Back propagation Neural Net- Architecture-Delta Learning Rule Algorithm-Applications
Unit 3	**PATTERN ASSOCIATION:** Training Algorithm for Pattern Association-Hetero-associative Memory Neural etwork Applications-Auto-associative Net-Iterative Auto-associative Net-Bidirectional Associative Memory-Applications

Unit 4	**NEURALNETS BASED ON COMPETITION: Fixed** Weights Competitive Nets- Kohonen's Self-Organizing Map –Applications Learning Vector Quantization-Applications-Counter Propagation Network Applications.
Unit 5	**INTRODUCTION TO Al AND PRODUCTION SYSTEMS:** Introduction to AI-Problem formulation, Problem Definition - Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized production system- Problem solving methods - Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction - Related algorithms, Measure of performance and analysis of search Algorithms.

Course Objectives	
Title	**MICROWAVE ELECTRONICS**
Course Code	MDS4B
CO-1	To analysis the microwave circuits and systems
CO-2	Understand the concepts of Microwaves, Microwave transmission modes, Transmission lines, Microwave Amplifiers and Oscillators.
CO-3	To understand the functions of microwave tubes.
CO-4	To explore the fundamentals of strip lines and MIC's.
CO-5	To apply the microwave concepts in various applications.

Course Outcome	
Title	**MICROWAVE ELECTRONICS**
Course Code	MDS4B
CO-1	.Understand the theory of microwave and Maxwell's equations.
CO-2	Discuss the working of microwave waveguides and components
CO-3	Design and analyze the microwave tubes, amplifiers, oscillators and devices.
CO-4	Describe the characteristic of strip Lines and MICs, and its detection and measurement.
CO-5	Understand the basics of Radar Technology.

Syllabus	
Title	**MICROWAVE ELECTRONICS**
Course Code	MDS4B
Unit 1	**BASICS:** Motion of an electron in an electric field and magnetic fields. Review of Gauss's law, Laplace's equation, Faraday's law and Ampere's law. Maxwell's equations, boundary conditions, Poynting's energy theorem.
Unit 2	**INTRODUCTION TO MICROWAVES:** Microwave frequency bands, microwave transmission lines - transmission line equations and solutions, reflection and transmission coefficients, standing waves and standing wave ratio, line impedance and admittance, Smith chart, impedance matching – single stub and double stub matching. **Microwave waveguides and components:** Rectangular waveguides, TE and TM modes, power transmission and power losses, excitation of modes in rectangular waveguides. Circular waveguides, possible modes, power transmission and power losses, co-axial waveguides. Microwave cavities – rectangular and circular cavity resonators, resonant cavities, Q factor of a cavity resonator. Waveguide tees, magic tee, hybrid ring, waveguide corners, bends and twists, two-hole directional coupler, hybrid coupler, microwave circulators and isolators.
Unit 3	**MICROWAVE TUBES:** High frequency limitation of conventional vacuum tubes, Klystron, multicavity klystron amplifier, helix and coupled cavity TWT, cylindrical magnetron – construction, principle of operation, performance characteristics

	and applications. **Microwave solid state devices and circuits:** Principle, structure, construction and working of Gunn diodes, modes of operation, LSA diode, READ diode, IMPATT, TRAPATT and BARRIT diode, HEMT, tunnel diodes, parametric devices.
Unit 4	**STRIP LINES AND MICs:** Characteristic impedance of microstrip lines, losses and Q-factor of micro strip lines, parallel strip lines, distributed parameters, characteristic impedance and attenuation losses, coplanar and shielded strip lines. **Detection and measurement:** Crystal detectors, slotted line measurements, measurement of VSWR, frequency power and impedance.
Unit 5	**APPLICATIONS OF MICROWAVES**: Radar systems, radar equation, duplexer, pulsed radar, CW Doppler, radar, FMCW radar. Industrial applications of microwaves. **Microwave radiation hazards**: HERP, HERO, radiation hazard limits, radiation protection.

Course Objectives	
Title	**ELEMENTS OF NANOTECHNOLOGY IN ELECTRONICS**
Course Code	MDSAE
CO-1	To introduce the students to Nano Electronics, Nano Devices, and Nano Materials.
CO-2	To identify characterization Techniques behind Nano Electronics.
CO-3	To describe the principle and the Applications of Nano Electronic Devices.
CO-4	To know about the ideas of Nano structuring.
CO-5	To introduce the students to Nano Electronics, Nano Devices, and Nano Materials.

Course Outcome	
Title	**ELEMENTS OF NANOTECHNOLOGY IN ELECTRONICS**
Course Code	MDSAE
CO-1	Understand the fundamentals properties and different types of nano materials.
CO-2	Learn Quantum dots, wells and wires.
CO-3	Study the morphological and size of the nano particles using various analytical techniques.
CO-4	Tune the size and shape of the nanomaterials for diverse applications.
CO-5	Synthesis nanomaterials using various physic..al, chemical and biological properties.

Syllabus	
Title	**ELEMENTS OF NANOTECHNOLOGY IN ELECTRONICS**
Course Code	MDSAE
Unit 1	**INTRODUCTION OF NANOTECHNOLOGY:** Definition of nanoscale – Significance of nanoscale: Surface-volume, Grain boundary, Examples of Critical sizes in phenomena - Property Enhancements: Quantum mechanical aspects – nanosize and energy bands –confinement effects, discretisation and tunnelling – lithography at nanoscale.
Unit 2	**NANOSCALE FORMATIONS AND ELECTRONICS:** Nanoparticles – production methods: Gas condensation, laser ablation, decomposition (thermal and ultrasonic), chemical methods, mechanical milling – Application of nanoparticles. Nanolayers – production methods: deposition (PVD, CVD, Epitaxy - ion implantation – Applications of nanolayers. Nanotubes – carbon nanotubes – types – production – properties – applications in electronics.
Unit 3	**NANOSTRUCTURING:** Nano polishing - Etching of

	nanostructures – Lithography: optical, electron beam, ion beam, x-rays lithography procedures (principles and methodologies) – Nano imprinting – Nanostructure characterisation tools: AFM, Near-field Optics and Electron microscopy (principles and procedure in each of these).
Unit 4	**CONVENTIONAL DEVICES BY NANOTECHNIQUES:** MOS transistors: structure and technology – electrical characteristics of sub-100 nm MOS devices- limitations – low-temperature aspects – future trends. Bipolar transistors: Structure and technology at nanoscale – trends
Unit 5	**NOVEL DEVICES BASED ON NANOSTRUCTURES:** Resonant Tunnelling Diode: principles and technology – applications -- Quantum Cascade Laser: Principles and structure – applications – Single Electron Transistor: Principle – technology – applications – Carbon Nanotube devices: structure and technology – CNT transistors.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF BIOCHEMISTRY(P.G.)

Program : **M.Sc. BIOCHEMISTRY**

Program Outcomes	
	On Completion of Program
PO-1	In order to make students more career oriented and nurturing their scientific temperaments students will get exposure to the depth of core understanding of various dimensions of Biochemistry during these two years the study
PO-2	The training provided will give students the breadth and depth of scientific knowledge
PO-3	A strong understanding of fundamentals of biochemical process at an advanced level.
PO-4	Better understanding of major thrust areas of the discipline Knowhow on current developments in the biochemical research
PO-5	Perfect gain insight into biochemical research ethics for production of quality research and publication
PO-6	An ability to get engages them in lifelong learning to foster their growth as a successful researcher and established as an entrepreneur in the field of biochemistry
PO-7	To provide advanced-level training in biochemistry so that graduates of the programme can carry out research and out-reach activities, and innovation in the medical, agricultural and industrial sectors.
PO-8	To produce well trained, nationally and internationally competent post graduates
PO-9	To develop a fascination and passion for science that enables them to strive for success in scientific settings
PO-10	Be able to do analyses, research and innovation in their work

Program Specific Outcomes	
	On Completion of Program
PSO-1	Understanding of the scientific basis of life process and orientation towards the application of knowledge acquired in solving clinical problem
PSO-2	Biochemistry master's students will be able to demonstrate an understanding of fundamental biochemical principles, metabolic pathways and the regulation of biochemical processes
PSO-3	Enhancing student's skills & employability through academic, research and internship opportunities (PG service learning).
PSO-4	Exposure to basic research through the provision of PG research based project
PSO-5	Developments of analytical and Cognitive skills in Biochemistry that allow independent exploration of biological science through research methods
PSO-6	Acquiring an appreciation of impact of life science on society
PSO-7	Analysis & interpretation of investigative data in life science
PSO-8	They will gain the hands on knowledge of various techniques useful in biochemistry which can help them to stand with a skillful job at various industries and research labs
PSO-9	Students get ready to apply informatics and statistics to explore biological data for experimental and research purpose.
PSO-10	They acquire communication skill, team work strength and leadership qualities through various activities during their course work

Course Objectives	
Title	**BIOMOLECULES**
Course Code	**MEN1A**
CO-1	The objective is to study about the structure and biological functions of macromolecules such as proteins, polysaccharides, lipids, and nucleic acids, as well as small molecules such as primary metabolites, secondary metabolites, and natural products
CO-2	Analyse and study the chemical and biochemical properties of bio molecules
CO-3	To understand relationships between biological molecules and human health

Course Outcome	
Title	**BIOMOLECULES**
Course Code	**MEN1A**
CO-1	Understand biochemistry at the atomic level, draw molecules and reaction mechanisms perfectly
CO-2	Understand in detail about amino acid structures, types of amino acids, classifications, structure of proteins and types of proteins
CO-3	Learn the molecular structures of amino acids, differentiating essential and nonessential amino acids, biologically important modified amino acids and their functions. Recognize thes tructural levels of organization of proteins,3D structure of proteins, its functions, denaturation (hemoglobin, myoglobin etc.).
CO-4	Describe/recognize lipid and porphyrin structures, lipoproteins and functions of porphyrins (heme, chlorophyll etc.). Chemistry and Metabolism of Proteins and Lipids and Porphyrins
CO-5	Understand the relationship between the properties of macromolecules and cellular activities, cell metabolism and chemical composition

Syllabus	
Title	**BIOMOLECULES**
Course Code	**MEN1A**
Unit 1	Carbohydrates- classification, structure, function and properties of monosaccharides (glucose, galactose, fructose), Disaccharides (lactose, cellobiose, sucrose, maltose). Homopolysaccharides (starch, glycogen, cellulose, inulin, dextrin, agar, pectin, dextran) Glycosaminoglycans– source, structure, functions of hyaluronic acid, chondroitin sulphates, heparin, keratan sulphate, proteoglycans. O- Linked and N- linked glycoproteins. Bacterial cell wall (peptidoglycans, teichoic acid) and plant cell wall carbohydrates
Unit 2	Lipids – classification of lipids, structure, properties and functions of fatty acids, triglycerides, phospholipids, glycolipids, sphingolipids and steroids. Eicosanoids- classification, structure and functions of prostaglandins, thromboxanes, leukotrienes. Lipoproteins – structure, function and mechanism of transport
Unit 3	Amino acids – classification, structure and properties of amino acids. Proteins – classification based on composition, structure and functions. Primary, secondary, super secondary and quaternary structure of proteins. Determination of amino acid sequence. Forces involved in stabilization of protein structure. Ramachandran plot. Folding of proteins. Structural characteristics of collagen and hemoglobin.
Unit 4	Nucleic acids – types and forms (A, B, C and Z) of DNA. Watson-Crick model- Primary, secondary and tertiary structures of DNA. Triple helix and quadruplex DNA Mitochondrial and chloroplast DNA. DNA supercoiling. Determination of nucleic acid sequences by Maxam Gilbert and Sanger‟s methods. Forces stabilizing nucleic acid structure. Properties of DNA and RNA. C-value, C-value paradox, Cot curve. Structure and role of nucleotides in cellular communications. Major and minor classes of RNA and their structure.
Unit 5	An overview of vitamins – source, structure and functions of water soluble and fat soluble vitamins – vitamin preparation, enrichment and fortification – overload and criteria of food sources. Antioxidants and oxidative stress. Phytochemicals – structure and functions of carotenoids, flavonoids, triterpenoids, polyphenols and lipoic acid.

Course Objectives	
Title	**BIOCHEMICAL TECHNIQUES**
Course Code	**MEN1B**
CO-1	To develop the skills of the application of basic and advanced techniques employed in quantitative and qualitative analysis of biomolecules

Course Outcome	
Title	**BIOCHEMICAL TECHNIQUES**
Course Code	**MEN1B**
CO-1	Demonstrate broad knowledge in modern analytical instrumentation with deep knowledge in its core concepts and its applications.
CO-2	Understand the principle, Instrumentation of different types of Light microscopy and electron microscopy and its applications in various fields of research
CO-3	Acquire knowledge about the basics and latest developments in the instrumentation techniques of Centrifugation, Electrophoresis (IEF, 2D PAGE) and Chromatography and their applications in various research fields
CO-4	Demonstrate skill to explain about principle, Bioinstrumentation and applications of latest spectroscopy techniques like Turbidometry, AAS, NMR, ESR and Nephelometry
CO-5	Learn about basic Radioactivity principles, measurement method and its biological applications. Get exposed to latest technology of Biosensors and its wide range of applications ranging from clinical, environmental and agricultural field.
CO-6	Acquire cognitive, technical and creative skills which enables students to gain an established knowledge and practice concerning modern analytical instrumentation and measurement techniques
CO-7	Understand the importance and applications of advanced biochemical instrumentation techniques in modern day research

Syllabus	
Title	**BIOCHEMICAL TECHNIQUES**
Course Code	**MEN1B**
Unit 1	General approaches to biochemical investigation. Organ and tissue slice technique, cell distribution and homogenization techniques, cell sorting, and cell counting, tissue culture techniques. Cryopreservation, and manometric techniques. Electrochemical techniques: Basic principles. The pH electrode. Ion-selective, gas-sensing and oxygen electrodes. Biosensors- principle and applications
Unit 2	Basic principles of chromatography- adsorption and partition techniques. Chiral Chromatography and counter current Chromatography. Adsorption Chromatography - Hydroxy apatite chromatography and hydrophobic interaction Chromatography. Affinity chromatography. Gas liquid chromatography- principle, instrumentation, column development, detectors-flame ionisation detectors (FID), nitrogen phosphorus detectors (NPD),electron capture detector (ECD), Flame photometric detector. Rapid scanning fourier transform infrared detector, Mass spectrometer detector and applications. Low pressure column chromatography - principle, instrumentation, column packing, detection, quantitation and column efficiency, High pressure liquid chromatography- principle, instrumentation, delivery pump, sample injection unit, column packing, development, detection and application. Reverse HPLC, capillary electro chromatography and perfusion chromatography
Unit 3	General principles of electrophoresis, supporting medium, factors affecting electrophoresis, Isoelectric focusing-principle, ampholyte, development of pH gradient and application. PAGE-gel casting-horizontal, vertical, slab gels, sample application, detection-staining using CBB, silver, fluorcescent stains. SDS PAGE-principle and application in molecular weight determination principle of disc gel electrophoresis ,2D PAGE. Electrophoresis of nucleic acids-agarose gel electrophoresis of DNA, DNA sequencing gels, pulsed field gel electrophoresis- principle, apparatus, application. Field inversion gel electrophoresis. Electrophoresis of RNA, capillary electrophoresis- principle, instrumentation and calibration curve. Microchip electrophoresis. Immuno electrophoresis-qualitative, rocket, 2D electrophoresis

Unit 4	Basic laws of light absorption- principle, instrumentation and applications of UV- Visible, IR, ESR, NMR, Mass spectroscopy, Turbidimetry and Nephlometry. Luminometry (Luciferase system, chemiluminescence). Atomic flame and flameless spectrophotometry. Principle, working and uses of x-ray diffraction, optical rotatory dispersion (ORD) and circular dichroism
Unit 5	Principle, working and applications of light microscope, dark field, phase contrast and fluorescent microscope. Electron microscope-Principle, instrumentation of TEM and SEM, Specimen preparation and applications-shadow casting, negative staining and freeze fracturing.Nature of radioactivity-detection and measurement of radioactivity, methods based upon ionisation (GMcounter) and excitation (scintillation counter), autoradiography and applications of radioactive isotopes, Biological hazards of radiation and safety measures in handling radioactive isotopes

Course Objectives	
Title	**PHYSIOLOGY & CELL BIOLOGY**
Course Code	**MEN1C**
CO-1	Learn fundamentals of the cell and its various components study
CO-2	membrane structure and transmembrane transport mechanisms
CO-3	understand the physiology of cell organelles learn fundamentals of
CO-4	nuclear structure and function study the concept of cell division and
CO-5	cellular differentiation
CO-6	This course will enable the students to – Learn fundamentals of the cell and its various components study membrane structure and transmembrane transport mechanisms understand the physiology of cell organelles
CO-7	Aim to understand such remarkable processes as how the heart develops and works to pump blood, how neurons communicate with one another, how insulin regulates blood sugar, and how specific gene products determine the morphology and functional capacity of the nervous system

Course Outcome	
Title	**PHYSIOLOGY & CELL BIOLOGY**
Course Code	**MEN1C**
CO-1	Describe the origin of life, from the abiotic world to multicellular organisms, including an account of endosymbiosis
CO-2	Explain the structural characteristics of prokaryotic and eukaryotic cells
CO-3	Explain the structure, properties and functions of various classes of macromolecules in cells
CO-4	Describe the intricate relationship between various cellular organelles and their corresponding functions
CO-5	Understand the inter relationships within and between anatomical and physiological systems of the human body
CO-6	Describe the structure of major human organs and explain their role in the maintenance of healthy individuals

Syllabus	
Title	**PHYSIOLOGY & CELL BIOLOGY**
Course Code	**MEN1C**
Unit 1	Major classes of cell junctions- anchoring, tight and gap junctions. Major families of cell adhesion molecules (CAMs)- cadherins, integrins. Types of tissues. Epithelium- organization and types. The basement membrane. Connective tissue and extracellular matrix- proteoglycans, glycoproteins and glycosaminoglycans
Unit 2	Composition of membranes- the lipid bilayer, peripheral and integral proteins. The fluid mosaic model. Brief account of membrane rafts. Endocytosis and exocytosis. Membrane transport: types. Diffusion- passive and facilitated. General classes of transport systems-uniport, symport, antiport. Active transport- primary and secondary. The P-type ATPases (Na^+K^+-ATPase), F-type ATPases (ATP synthases), ABC transporters, ionophores, aquaporins, ion channels (ligand-gated and voltage-gated).

Unit 3	Digestive system- structure and functions of different components of digestive system, digestion and absorption of carbohydrates, lipids and proteins, role of bile salts in digestion and absorption, mechanism of HCl formation in stomach, role of various enzymes and hormones involved in digestive system. Composition of blood, lymph and CSF. Blood cells - WBC, RBC and energy metabolism of RBC, Blood clotting mechanism and blood groups- ABO and Rhesus system
Unit 4	Respiratory system-Gaseous transport and acid-base homeostasis. Mechanism of the movement of O_2 and CO_2 through lungs, arterial and venous circulation. Bohr effect, oxygen and carbon dioxide binding hemoglobin. pH maintenance by cellular andintracellular proteins. Phosphate and bicarbonate buffers, Metabolic acidosis and alkalosis. Respiratory acidosis and alkalosis. Regulation of fluid and electrolyte balance.
Unit 5	Sensory transduction, Nerve impulse transmission- nerve cells, synapses, reflex arc structure, resting membrane potential, Nernst equation, action potential, voltage gated ion-channels, impulse transmission, neurotransmission, neurotransmitter receptors, synaptosomes, synaptotagmin, rod and cone cells in the retina, changes in the visual cycle, photochemical reaction and regulation of rhodopsin, odour receptors, learning and memory. Chemistry of muscle contraction – actin and myosin filaments, theories involved in muscle contraction, mechanism of muscle contraction, energy sources for muscle contraction.

Course Objectives	
Title	**MICROBIOLOGY**
Course Code	**MENAA**
CO-1	To produce microbiologist having profound knowledge of general microbiology and develop ability in students to meet the challenges of modern world
CO-2	To provide theoretical and practical education with vision of helping students in accumulating microbiological techniques and ideas essential for working in various field which is directly or indirectly concerned with microbiology
CO-3	To provide students the knowledge so that they can contribute to the invention and innovation in the field of agricultural, medical, industrial, environmental microbiology
CO-4	To provide students the knowledge so that they can contribute to the invention and innovation in the field of agricultural, medical, industrial, environmental microbiology
CO-5	To make students capable of providing expert ideas, counsel and consultancy in various aspects concerning microbiology

Course Outcome	
Title	**MICROBIOLOGY**
Course Code	**MENAA**
CO-1	Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures
CO-2	Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea Know various Culture media and their applications and also understand various physical and chemical means of sterilization
CO-3	Know General bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae
CO-4	Master aseptic techniques and be able to perform routine culture handling tasks safely and effectively Comprehend the various methods for identification of unknown microorganisms
CO-5	Gaining knowledge and hands on experience on general microbiological concepts like staining, enrichment and isolation of microbes

CO-6	Understand the basic microbial structure and functions of various physiological groups of prokaryotes and eukaryotes and also learn the theory and practical skills in microscopy handling and staining techniques
CO-7	Know various Culture media and their applications and understand various physical and chemical means of sterilization and also learn various techniques for isolation of pure cultures
CO-8	Understand the microbial physiology and know the various Physical and Chemical growth requirements of bacteria and get equipped with various methods of bacterial growth measurement

Syllabus	
Title	**MICROBIOLOGY**
Course Code	**MENAA**
Unit 1	Molecular taxonomy- bacteria, viruses (DNA, RNA), algae, fungi and protozoa. Lytic cycle and lysogeny. Distribution and role of microorganisms in soil, water and air. Types of culture media, isolation of pure culture, growth curve and the measurement of microbial growth.
Unit 2	Contamination and spoilage of foods – cereals, cereal products, fruits, vegetables, meat, fish, poultry , eggs, milk and milk products. General principles of food preservation- low temperature, drying, radiation, canning. Food fermentation- cheese, yoghurt, pickles and bread
Unit 3	Food poisoning- bacterial food poisoning, *Salmonella*, *Clostridium blotulinum* (botulism), *Staphylococcus aureus*, fungal food poisoning – aflatoxin, food infection – *Clostridium, Staphylococcus* and *Salmonella*. Pathogenic microorganisms, *E. coli, Pseudomonas, Klebsilla, Streptococcus, Haemophilus , & Mycobacterium*, causes, control, prevention and cure
Unit 4	Antimicrobial chemotherapy, General characteristics of antimicrobial agents. Mechanism of action – sulfonamides, sulphones and PAS . Penicillin, streptomycin- spectra of activity, mode of administration, mode of action, adverse effects and sensitivity test. Antiviral, and antiretroviral agents
Unit 5	Isolation, screening and maintenance of isolates of microbial strains, strain improvement through mutant selection. Downstream processing and *in situ* recovery of products. Industrial production of alcohol and α-amylase. Industrial production of antibiotics- streptomycin. Organic acids- citric acid. Biofertilizers- Example, Rhizobium species and blue green algae. Single cell protein and biomass production

Course Objectives	
Title	**ENZYMES & ENZYME TECHNOLOGY**
Course Code	**MEN2A**
CO-1	This paper aims to provide a basic understanding of biological catalysis, Mechanism of action of enzymes, structure and function relationship, Understanding the enzyme kinetics and role of coenzymes/ co-factors and an overview of Industrial application of enzymes.

Course Outcome	
Title	**ENZYMES & ENZYME TECHNOLOGY**
Course Code	**MEN2A**
CO-1	Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms
CO-2	Apply biochemical calculation for enzyme kinetics
CO-3	Discuss the factors affecting enzymatic reactions
CO-4	Describe the concepts of co-operative behaviour, enzyme inhibition and allosteric regulation
CO-5	Compare methods for production, purification, characterization and immobilization of enzymes
CO-6	Describe the major applications of enzymes in industry, understand the principles of enzyme immobilisation techniques and enzyme extraction procedures
CO-7	Develop new ideas for the development of enzyme-based drugs
CO-8	Discover the current and future trends of applying enzyme technology for the commercialization purpose of biotechnological products.

Syllabus	
Title	**ENZYMES & ENZYME TECHNOLOGY**
Course Code	**MEN2A**
Unit 1	Enzyme techniques- Isolation and purification of enzymes. Criteria of purity of enzymes , Enzyme activity units. Katal and International units.Enzyme assay- Different types - coupled enzyme assay. Applications of stopped flow techniques. Isoenzymes and their separation by electrophoresis with special reference to LDH. Significance of LDH and CK isoenzymes
Unit 2	Enzyme kinetics – Rate of enzymatic reaction , effect of substrate and enzyme concentration , pH, temperature on enzyme activity. M-M equation, L-B plot, Eadie Hofsee Plot. Determination of Km .Catalytic efficiency, Sigmoidal kinetics , Allosteric enzymes = significance , structure and regulatory functions with special reference to aspartate transcarbomylase. Role of covalent modification in regulation of enzymes- regulation of glutamine synthase , glycogen synthase and glycogen phosphorylase
Unit 3	Coenzymes – cofactors and prosthetic groups. Structures and functions of coenzymes- reactions involving CoA, TPP, NAD+, NADP, biotin, folic acid, FMN, FAD, tetrahydrofolate and cobamide. Multienzyme complexes . Functions of pyruvate dehydrogenase and fatty acid systhase complexes. Methanogenesis, coenzymes involved in methanogenesis. Significance of Vitamin K- dependent carboxylation in blood clotting process.
Unit 4	Mechanism of enzyme action- Enzyme active site, mapping of active site, identification of amino acids like lysine, cysteine, serine and histidine in the active site. Enzyme specificity. Mechanism of enzyme action . Mechanisms of enzyme catalysis- covalent catalysis, proximity and orientation effect, acid-base catalysis
Unit 5	Enzyme technology – production and industrial uses of enzymes like amylase, protease, pectinase, lipases and cellulose. Designer enzymes, abzymes, biosensors and ribozyme, Methods of Immobilization of enzymes and their applications. Enzymes as therapeutic agents

Course Objectives	
Title	**INTERMEDIARY METABOLISM-I**
Course Code	**MEN2B**
CO-1	The paper intends to provide a basic understanding of the biochemical reactions of molecules, Role of enzymes as key elements that govern the biochemical transformations, break-down and synthesis of various biomolecules and the turnover of carbohydrates, proteins, lipids and nucleic acids

Course Outcome	
Title	**INTERMEDIARY METABOLISM-I**
Course Code	**MEN2B**
CO-1	Discuss the overall concept of cellular metabolism – anabolic and catabolic pathways, energy storage and release, production of building blocks for macromolecule synthesis
CO-2	Explain glucose homeostasis (pathways and hormonal regulation). Discuss Krebs cycle, electron transport, and the pentose phosphate pathway
CO-3	Analyze the role of fat in energy production, membrane synthesis, and production of bioactive molecules
CO-4	Explain nucleotide biosynthetic pathways. Describe diseases associated with defective nucleotide biosynthesis and therapies that utilize the biosynthetic pathways
CO-5	Explain biosynthesis & degradation of heme
CO-6	Understanding the versatile role of coenzymes

Syllabus	
Title	**INTERMEDIARY METABOLISM-I**
Course Code	**MEN2B**
Unit 1	Glycolysis – aerobic and anaerobic, inhibitors, and regulation. Feeder pathway- entry of hexoses into glycolysis, Pyruvate dehydrogenase complex-mechanism and regulation. Citric acid cycle- regulation. ATP/ADP cycle. Glyoxalate cycle and its regulation. Gluconeogenesis- source, key enzymes, reaction sequence and its regulation. Synthesis and degradation of starch.
Unit 2	Pentose phosphate pathway- significance and its regulation. Metabolism of glycogen and its regulation. Uronic acid pathway. Biosynthesis of N-linked and O-linked glycoproteins, mucopolysaccharides- Chondroitin sulphate, bacterial cell wall polysaccharide
Unit 3	Metabolism of nucleotides-De novo synthesis and salvage pathways of purine and pyrimidine nucleotides. Regulation and inhibitors of nucleotide biosynthesis. Role of ribonucleotide reductase and its regulation. Degradation of purine and pyrimidine nucleotides
Unit 4	Versatile role of PLP as coenzyme.-transamination, deamination and decarboxylation. Trans methylation and one carbon transfer. Regulation of urea cycle, Inherited disorders of urea cycle enzymes. Conversion of amino acids to specialized products- Serotonin, GABA, epinephrine, nor-epinephrine, melanin, creatinine and NAD
Unit 5	Biosynthesis and degradation of heme. Oxidation and reduction of inorganic sulphur compounds by microbes and plants. Sulpho transferases and their biological role- rhodanases, sulphatases, 3-mercapto pyruvate sulphur transferases. Oxidation of cysteine to sulphate and inter conversion of sulphur compounds.

Course Objectives	
Title	**INTERMEDIARY METABOLISM-II**
Course Code	**MEN2C**
CO-1	Students will learn the biochemical pathways for synthesis and breakdown of complex biomolecules and metabolic disorders arise out of malfunction of metabolic pathways

Course Outcome	
Title	**INTERMEDIARY METABOLISM-II**
Course Code	**MEN2C**
CO-1	Analyze the role of fat in energy production, membrane synthesis, and production of bioactive molecules
CO-2	Describe the structure, biosynthesis, oxidation and storage of fatty acids
CO-3	Describe the basic metabolic pathways of cholesterol, bile acids, sphigolipids and lipoproteins.
CO-4	Describe common pathways of amino acid catabolism to release ammonia (handled by the urea cycle) and carbon skeletons
CO-5	Differentiate between ketogenic and glucogenic amino acids, and diseases resulting from defective catabolism and biosynthesis of non-essential amino acids

Syllabus	
Title	**INTERMEDIARY METABOLISM-II**
Course Code	**MEN2C**
Unit 1	Oxidation of fatty acids-oxidation of saturated and unsaturated fattyacids (α, β & ω oxidation) Oxidation of fatty acids with odd and even numbered carbon atoms. Regulation of β oxidation. Ketogenesis and its regulation. Biosynthesis of fatty acid – saturated and unsaturated, chain elongation, regulation.
Unit 2	Biosynthesis and degradation of triacylglycerol, phosphoglycero lipids-lecithin, cephalin, plasmalogens and phosphatidyl inositol, Sphingolipid-sphingomyelin, cerebrosides, sulfatides, and gangliosides. Biosynthesis of prostaglandins, thromboxanes and leukotrienes and hydroxyl eicosanoic acids. Cholesterol biosynthesis and its regulation. Biosynthesis of bile acids. Lipoprotein metabolism-chylomicrons, VLDL, HDL and LDL**.**
Unit 3	Biosynthesis of essential amino acids.- Role and biological significance of glutamate dehydrogenase, glutamine and asparagine synthetase, lysine, proline and phenylalanine hydroxylase. Interconversion of amino acids - proline to glutamate, methionine to cysteine, serine to glycine. Biosynthesis of spermine and spermidine
Unit 4	Degradation of aminoacids –glucogenic and ketogenic aminoacids. Formation of acetate from leucine and aromatic aminoacid, pyruvate from cysteine, threonine and hydroxy proline, α-keto glutarate from histidine and proline , succinate from methionine, threonine, valine and isoleucine, Oxaloacetate from aspartate, glycine and serine
Unit 5	Integration of Metabolism-Interrelationship of carbohydrate, protein and fat metabolism-role of acetyl CoA and TCA cycle. Interconversion of major food stuffs. Metabolic profile of the principal organs and their relationships.

Course Objectives	
Title	**ENERGY & DRUG METABOLISM**
Course Code	**MENAB**
CO-1	Explain what metabolic pathways are
CO-2	State the first and second laws of thermodynamics
CO-3	Explain the difference between kinetic and potential energy
CO-4	Describe endergonic and exergonic reactions
CO-5	Discuss how enzymes function as molecular catalysts

Course Outcome	
Title	**ENERGY & DRUG METABOLISM**
Course Code	**MENAB**
CO-1	Explain the role of catabolic and anabolic pathways in cellular metabolism.
CO-2	Distinguish between kinetic and potential energy.
CO-3	Distinguish between exergonic and endergonic reactions in terms of available energy change
CO-4	List the three main kinds of cellular work and provide examples of each. Explain in general terms how cells obtain the energy to do cellular work.
CO-5	Describe the structure of ATP and identify the major class of macromolecules to which ATP belongs
CO-6	Explain how ATP performs cellular work

Syllabus	
Title	**ENERGY & DRUG METABOLISM**
Course Code	**MENAB**
Unit 1	Thermodynamic- principles in biology- Concept of entropy, enthalpy and free energy change.Redox systems. Redox potential and calculation of free energy. Biological oxidation – Oxidases, dehydrogenases, hydroperoxidases, oxygenases. Energy rich compounds – phosphorylated and non-phosphorylated. High energy linkages
Unit 2	Electron transport chain-various complexes of ETC, Q-cycle. Inhibitors of ETC. Oxidative phosphorylation-P/O ratio, chemiosmotic theory. Mechanism of ATP synthesis - role of F_0-F_1 ATPase, ATP-ADP cycle. Inhibitors of oxidative phosphorylation ionophores, protonophores .Regulation of oxidative phosphorylation.
Unit 3	Light reaction-Hills reaction, absorption of light, photochemical event. Photo ETCcyclic and non-cyclic electron flow. Photophosphorylation-role of CF_0-CF_1 ATPase. Dark reaction-Calvin cycle, control of C3 pathway, and Hatch-Slack pathway (C4 pathway), Photorespiration
Unit 4	Energy sources of brain, muscle, liver, kidney and adipose tissue. Amphibolic nature of Citric acid cycle. Anaplerotic reaction. Inhibitors and regulation of TCA cycle. Transport of extra mitochondrial NADH – Glycerophosphate shuttle, malate aspartate shuttle. Energetics of metabolic pathways – glycolysis, (aerobic and anaerobic) ,citric acid cycle, beta oxidation
Unit 5	Activation of sulphate ions – PAPS, APS, SAM and their biological role. Metabolism of xenobiotics – Phase I reactions – hydroxylation, oxidation and reduction. Phase II reactions – glucuronidation, sulphation, glutathione conjugation, acetylation and methylation. Mode of action and factors affecting the activities of xenobiotic enzymes

Course Objectives	
Title	**EXTRA DISCIPLINARY PAPER-I ESSENTIALS OF BIOCHEMISTRY**
Course Code	**MENBA**
CO-1	Through this course the students are exposed to importance of biological macromolecules
CO-2	They acquire knowledge in the quantitative and qualitative estimation of biomolecules
CO-3	They study the influence and role of structure in reactivity of biomolecules
CO-4	Principles and application of modern imaging techniques
CO-5	Intermediates in enzyme-catalysed reactions and their investigations.

Course Outcome	
Title	**EXTRA DISCIPLINARY PAPER-I ESSENTIALS OF BIOCHEMISTRY**
Course Code	**MENBAVV**
CO-1	Through this course the students are exposed to importance of biological macromolecules
CO-2	They acquire knowledge in the quantitative and qualitative estimation of biomolecules
CO-3	They study the influence and role of structure in reactivity of biomolecules
CO-4	At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions.
CO-5	At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions.

Syllabus	
Title	**EXTRA DISCIPLINARY PAPER-I ESSENTIALS OF BIOCHEMISTRY**
Course Code	**MENBA**
Unit 1	Major nutrients of food - energy yielding and protective food nutrients.Energy value of foods – units of energy, calorific value of carbohydrates, lipids and proteins. Energy requirements for infants, children, adolescents, adults, pregnant women and lactating mothers. Significance of balanced diet.
Unit 2	Nutritional aspects of carbohydrates – Different carbohydrates in the diet – utilization. Glycosuria, Diabetes mellitus – types and symptoms. Dietary management of Diabetes mellitus – food chart for diabetic patients-Diabetic coma
Unit 3	Nutritional aspects of lipids – lipids present in diet and their functions, essential fatty acids, lipoproteins , lipemia –ketosis– atherosclerosis – symptoms. Role of diet in the management of atherosclerosis and hyperlipidemia
Unit 4	Nutritional aspects of proteins – essential amino acids, nitrogen balance, positive and negative nitrogen balance. Dietary sources of proteins – protein malnutrition in children, Kwashiorkor and Marasmus
Unit 5	Vitamins – sources, recommended daily allowance (RDA) and functions of vitamins A, D and B complex (thiamine, riboflavin, niacin, pyridoxine, folic acid and cobalamine . Deficiency disorders of vitamins A, D and B complex). Minerals – essential minerals of calcium and iron. Deficiency disorders of anemia and rickets

Course Objectives	
Title	**PRACTICAL –I**
Course Code	MEN21
CO-1	To gain knowledge about regulation of blood glucose
CO-2	Ability to get knowledge about the importance of tryptophan, energy needed for metabolism and DNA production
CO-3	They study the level of calcium in the blood to overcome its deficiency disorders
CO-4	They acquire knowledge about the measures of marker enzymes
CO-5	Students acquire knowledge about the neurological disorders due to vitamin B_1 and B_2 deficiency

Course Outcome	
Title	**PRACTICAL –I**
Course Code	MEN21
CO-1	Students are exposed to gain knowledge about the estimation and isolation of DNA and RNA
CO-2	Additionally students gain knowledge about the denaturation of DNA and Protein
CO-3	They also acquire knowledge about the starch separation from plant sources also its assessment of purity
CO-4	They develop knowledge about importance of protein and its deficiencies
CO-5	At the end of the course student have complete knowledge about the biochemical studies of macromolecules

Syllabus	
Title	**PRACTICAL –I**
Course Code	MEN21
Unit 1	**I. Biochemical studies and estimation of macromolecules** 1. Isolation and estimation of glycogen from liver. 2. Isolation and estimation of DNA from animal tissue. 3. Isolation and estimation of RNA from yeast. 4. Separation of starch from plant source and assessment of its purity. 5. Denaturation of DNA and absorption studies at 260nm. Denaturation of Protein and absorption studies at 280nm
Unit 2	**II. Colorimetric estimations** 1. Estimation of lactate. 2. Estimation of pyruvate. 3. Estimation of tryptophan. 4. Estimation of protein by Lowry‟s method.
Unit 3	**III. Estimation of minerals and vitamins** 1. Estimation of calcium and iron. Estimation of vitamins – Thiamine, Riboflavin.
Unit 4	**II. Group experiment** Subcellelular Organelles - Separation of Mitochondria and Nucleus and identification of the subcellular organelles using marker enzymes.

Course Objectives	
Title	**PRACTICAL-II**
Course Code	MEN22
CO-1	To acquire knowledge about the pancreatic disorder with the help of enzyme assays
CO-2	To gain knowledge about the effect of pH, temperature, activity on enzyme alkaline phosphatase
CO-3	Ability to identify the blood grouping (Rh type)
CO-4	Gain knowledge about the preparation of culture
CO-5	Developing knowledge about the TLC and SDS - PAGE

Course Outcome	
Title	**PRACTICAL-II**
Course Code	MEN22
CO-1	Students acquire knowledge about the assays of enzymes such as amylase, catalase, superoxide dismutase, acid phosphatase and ATPase
CO-2	To acquire knowledge about the Haemagglutination reaction
CO-3	Students gain knowledge about the preparation of free contamination media
CO-4	Student acquire knowledge about the bioactive compound isolation from TLC
CO-5	Student acquire knowledge about the SDS PAGE

Syllabus	
Title	**PRACTICAL-II**
Course Code	MEN22
Unit 1	Isolation, purification and assay of alkaline phosphatase from kidney. 1. Assay of amylase. 2. Assay of superoxide dismutase. 3. Assay of ATPase. 4. Assay of catalase. 5. Assay of acid phosphatase. 6. Effect of pH, temperature substrate concentration and inhibitors on activity of alkaline phosphatase 7. Test for blood grouping (Haemagglutination). 8. Culture and inoculum preparation. 9. Separation of lipids by TLC. Separation of proteins by SDS-PAGE

Course Objectives	
Title	**BIOTECHNOLOGY**
Course Code	**MEN3A**
CO-1	The ability to develop novel biotechnology ideas and products.
CO-2	Master skills associated with screening of industrially important important strains.
CO-3	Know the various vaccines and their production.
CO-4	Exhibit a knowledge of various case studies in plant genomes and genetically modified foods.

Course Outcome	
Title	**BIOTECHNOLOGY**
Course Code	**MEN3A**
CO-1	Understand the architecture of protein designing, fusion proteins,methods of drug design and delivery
CO-2	Understand production of high value therapeutics, antibody engineering, gene knock out experiments,human gene therapy
CO-3	Comprehend the various methods of microbial mining ,bioremediation and production of microbial polysaccharides
CO-4	Analyse the genetically modified foods and applying the knowledge in maintaining health and lifestyle.
CO-5	Importance of GM foods which are prepared for using recombinant DNA technology .its pros and cons

Syllabus	
Title	**BIOTECHNOLOGYV**
Course Code	**MEN3A**
Unit 1	Basic techniques: Cutting DNA molecules, Restriction digestion, isoschizomers, joining DNA molecules – DNA ligase, double linkers, adaptors, homopolymer tailing, selection of recombinants and screening – genetic methods, immuno chemical methods, South- Western screening, Nucleic acid hybridization methods, synthesis of probes, radioactive and non-radioactive labelling of probes, analysing DNA sequences methods: Automated sequencing, Next Generation Sequencing Analysis (NGS), *in silico* sequence analysis,
Unit 2	Cloning strategies**:** Cloning vectors – plasmids (pBR 322, pUC 18), phage and M 13, cosmids, phasmids, expression vectors, ; pMal; GST; pET-based vectors, Protein purification, His-tag; GST-tag; MBP-tag, Inclusion bodies- Methodologies to reduce formation of inclusion bodies, yeast vectors – YEP, YIP, YRP, YCP and YAC, shuttle vectors. Genomic DNA libraries, chromosome walking, cDNA cloning, RACE, RAPD. Site directed mutagenesis of cloned genes
Unit 3	Animal cell culture- media, primary culture, contamination, disaggregation, subculturing. Introduction of genes into animal cells**:** Reporter genes, selectable markers, viral vectors – SV 40, Retroviruses and Baculovirus, Adenoviruses, Transferring genes

	into animal cells in culture, oocytes, eggs, embryos and specific tissues, transgenic animals, Creation of knock out mice. Hazards and safety aspects of biotechnology. Patents and IPR.
Unit 4	Plant tissue culture- media, callus and protoplast cultures. Production of biochemicals from plant cell culture. Micropropagation Agro bacterium – mediated gene transfer to plant cells, Plant based vectors, Ti and Ri as vectors microprojectiles, transgenic plant technology – for pest resistance, herbicide tolerance, delay of fruit ripening and use of plants to produce commercially important proteins
Unit 5	Applications of recombinant DNA technology: production of insulin and growth hormone in *E. coli*. Genome mapping, types of gene map, molecular markers. The Human Genome Project- goals, results, potential benefits and risks. DNA microarrays. Techniques for separation and identification of proteins, 2D-gel electrophoresis, mass spectrometry, MALDI-TOF. Protein arrays. Applications of proteomics. Bioinformatics-introduction, biological databases, database similarity searches-FASTA, BLAST. Multiple sequence alignment, construction of a phylogenetic tree.

Course Objectives	
Title	**CLINICAL BIOCHEMISTRY-I**
Course Code	**MEN3B**
CO-1	The course aims to provide an advanced understanding of the biochemical mechanisms and pathophysiological processes responsible for common biochemical disorders.
CO-2	The course provides an overview of normal and abnormal metabolic functions, the impact of disorders on metabolic processes, an overall picture about the molecular basis of diseases and novel strategies to prevent the diseases.
CO-3	The main objective is to teach and practice students to learn how they can identify and quantify a variety of analytes in blood and bodily fluids using analytical techniques in clinical laboratory.
CO-4	Understanding the concept of Biochemical analyzing instruments, chemicals and normal ranges of biochemical components in our body.
CO-5	Clinically relevant biochemical analysis for deeper understanding of all biochemical components i.e., Proteins, Electrolytes, Hormones etc

Course Outcome	
Title	**CLINICAL BIOCHEMISTRY-I**
Course Code	**MEN3B**
CO-1	Understand the Basic concepts and principles of Clinical Biochemistry, detail on the various biological specimens including the process of collection, preservation and Storage
CO-2	Gain Knowledge on the collection, and analysis of Amniotic fluid and on the Immunological tests related to diagnosis of anomalies during pregnancy. Understand the Blood groups, Blood banking and adverse reactions of blood Transfusions
CO-3	Describe of the blood clotting pathways and the blood clotting disorders. Enumerate of the different types of anemias based on aetiology
CO-4	Understand the pathophysiological processes responsible for common biochemical disorders such as jaundice, Pancreatitis, Fatty liver etc.
CO-5	Differentiate three types of jaundice and their systematic analysis. Detailed study of Jaundice, Cirrhosis, Hepatitis, Fatty liver and gall stones. Serum enzyme activities in Diseases
CO-6	Understand Formation of urine and gain perception on the various renal function tests and renal disorders
CO-7	Gain understanding of the need for Gastric function tests, Collection of gastric contents, their examination
CO-8	Appreciate the Clinical application of enzymes in diagnosis, Discussion on Isozymes and understanding their role in diagnosis. Understanding the enzyme patterns in diseases of various organs such as pancreas, liver, bones, heart and muscle
CO-9	Understand the aetiology, types, clinical manifestations and treatment of Diabetes mellitus and various disorders of carbohydrate metabolic pathways.

Syllabus	
Title	**CLINICAL BIOCHEMISTRY-I**
Course Code	**MEN3B**
Unit 1	Biochemical investigations in diagnosis, prognosis, monitoring, screening. Specimen collection- blood and urine. Factors influencing biochemical variables. Sample analysis and reporting- precision, accuracy, specificity, sensitivity. Sources of error. Interpretation of results- normal reference ranges. Good laboratory practices.
Unit 2	Applications of Clinical Biochemistry-Biological specimens used for the diagnosis. Preservation of biological specimens -blood, urine, CSF and amniotic fluid. Diabetes mellitus-causes, pathology, types, Metabolic complications- acute and long- term, Diagnosis-by GTT, Glycated Haemoglobin. Management- diet and life-style modifications and anti-diabetic drugs. Hypoglycaemia.
Unit 3	Disorders of blood cells- Hemolytic, iron deficiency and aplasticanemia and diagnosis. Porphyrias, Thrombocytopenia, Causes of leucopenia, leukemia and leucocytosis. Disorders of blood clotting mechanism - Von willebrand‟s disease, Hemophilia A, B and C, diagnostic test for clotting disorders
Unit 4	Disorders of lipid metabolism -Normal levels of blood lipids and their functions. Hyperlipidemia –Atherosclerosis -causes and symptoms-diagnosis. Hypolipidemic agents, Hyper and Hypolipoproteinamia- Types and pathology.
Unit 5	Disorders of calcium and phosphorous metabolism. Factors affecting blood phosphorous and calcium levels..Biological functions of calcium and phosphorous. Role in bone formation. Blood calcium homeostasis. Role of PTH and calcitonin. Hypo and Hypercalcemia**).**

Course Objectives	
Title	**MOLECULAR BIOLOGY**
Course Code	**MEN3C**
CO-1	Acquire knowledge about the genetic inheritance
CO-2	Gain knowledge about the replication of prokaryotes and eukaryotes
CO-3	Develop knowledge about the DNA repair mechanism
CO-4	Aspire knowledge about the Genetic code
CO-5	Acquire knowledge about the post translational modification

Course Outcome	
Title	**MOLECULAR BIOLOGY**
Course Code	**MEN3C**
CO-1	Student gain knowledge about the multiple alleles, gene mapping, mode of gene transformation
CO-2	Students acquire knowledge about the process of replication, transcription and translation also about the enzymes involved in it
CO-3	Students acquire knowledge about the mutations, types and DNA repair mechanism
CO-4	Students develop knowledge about the protein regulation
CO-5	Students develop knowledge about the protein sort signalling

Syllabus	
Title	**MOLECULAR BIOLOGY**
Course Code	**MEN3C**
Unit 1	Genetics-Mendel laws of inheritance-dominance-complete, incomplete and co dominance, multiple alleles-gene mapping in haploids and diploids, recombination mapping- restriction mapping- mode of gene information transfer in bacterial- conjugation, transformation and transduction
Unit 2	The bacterial chromosome and plasmids. Organization of eukaryotic chromatin- nucleosomes, 30 nm fiber, higher order structure. Organization of organelle genomes. Enzymes and mechanism of prokaryotic and eukaryotic replication. Telomeres, telomerase and end replication. Regulation of replication.
Unit 3	Mutation, spontaneous and induced mutation, molecular mechanisms of mutation. DNA repair mechanisms-Direct repair, excision repair, mismatch repair, recombination repair, SOS response, eukaryotic repair system. Recombination and mobile genetic elements- the Holliday model, the general recombination in E.*coli*, site specific recombinations, transposons and retroposons.
Unit 4	Transcription- Prokaryotic and Eukaryotic transcription, Subunits of RNA polymerase, eukaryotic RNA polymerases, E.coli and eukaryotic promoters and enhancers. Transcription factors. mechanism of prokaryotic and eukaryotic transcription. Post Transcriptional modifications- mRNA 5‟ capping and 3‟ polyadenylation, splice, spliceosomes assembly, alternative splicing, Regulation of Transcription- Trp and Lac operon. Gene regulation, levels of gene expression, methylation.
Unit 5	Ribosomes, Genetic code, nature of genetic code, wobble hypothesis, activation, initiation, elongation, termination of translation in prokaryotes, inhibitors of protein synthesis. Protein synthesis in eukaryotes and its regulation. Post translational modification. Protein sorting- signal peptides, targeting of mitochondria, secretor and lysosomal proteins. Protein degradation- the ubiquitin pathway.

Course Objectives

Title	BIOSTATISTICS
Course Code	**MENAB**
CO-1	This course will encompass the methodology and theory of statistics as applied to problems in the field of life sciences. The course will provide students with basic understanding and application of computational biology

Course Outcome

Title	BIOSTATISTICS
Course Code	**MENAB**
CO-1	Understand and explain types and methods of data collection
CO-2	Develop the skills to analyze the collected data
CO-3	Develop the skills to represent the analyzed data
CO-4	Understand the applications of statistical tools like mean, mode, median, mean deviation, standard deviations
CO-5	Describe and use the tool like correlation, regression, ANOVA—t test, Z test, chi square test.
CO-6	Understand and explain the concept, type and applications of probability

Syllabus	
Title	**BIOSTATISTICS**
Course Code	**MENAB**
Unit 1	Nature of biological and clinical experiments – Collection of data in experiment- Primary and secondary data. Methods of data collection. Classification and tabulation. Different forms of diagrams and graphs related to biological studies. Measures of Averages- Mean, Median, and mode. Use of these measures in biological studies.
Unit 2	Measures of Dispersion for biological characters – Quartile deviation, Mean deviation, Standard deviation and coefficient of variation. Measures of skewness and kurtosis. Correlation and regression – Rank correlation – Regression equation. Simple problems based on biochemical data.
Unit 3	Basic concepts of sampling- Simple random sample stratified sample and systemic sampling. Sampling distribution and standard error. Test of significance based on large samples. Test for mean, difference of means, proportions and equality of proportions.
Unit 4	Small sample tests – Students„t‟ test for mean, difference of two way means, tests for correlation and regression coefficients. Chi-square test for goodness of a non independence of attributes. F test for equality of variances. ANOVA- one way and two way. Basic concept related to biological studies
Unit 5	Operating systems and application programmes, MS excel and Statistical package for social sciences (SPSS) for basic statistical functions, Regression, correlation, ANOVA, Chi square test with specific biological examples

Course Objectives	
Title	**ED PAPER- II LIFESTYLE DISEASES PREVENTION**
Course Code	**MENBB**
CO-1	The objective is to make a connection between knowledge of anatomy and physiology and realworld situations, including healthy lifestyle decisions and homeostatic imbalances

Course Outcome	
Title	**ED PAPER- II LIFESTYLE DISEASES PREVENTION**
Course Code	**MENBB**
CO-1	Gain insights about the current lifestyle as a consequence of industrialization
CO-2	Understanding the concepts of cancer
CO-3	Gain knowledge about cardiovascular system and associated disorders
CO-4	Gain knowledge about gastro-intestinal tract and associated disorders
CO-5	Gains knowledge about structure/ function of kidney and associated disorders
CO-6	Have basic understanding of the pathophysiology of addictions (alcohol, smoking, drugs)
CO-7	Understand the socio-economic implications associated with alcohol and drug abuse

Syllabus	
Title	**ED PAPER- II LIFESTYLE DISEASES PREVENTION**
Course Code	**MENBB**
Unit 1	Obesity- prevalance –casuses, consequences, symptoms- Coronary Heart Diseaseand type 2 diabetes mellitus- lifestyle and dietary management of obesity
Unit 2	Hypertension – blood pressure-normal level of blood pressure, dietary management of hypertension, stroke and chronic renal failure due to hypertension. Kidney stone- causes, types, symptoms and treatment (only Lithotropy), dietary management for prevention of kidney stones
Unit 3	Cancer-types of cancer, aetiology of breast cancer diagnosis (self examination, Mammography) and treatment (radiation, chemotherapy, surgery).Cervical cancer- causes, Types of cervical cancer, symptoms, diagnosis and treatment (radiation, chemotherapy, surgery). Cigarette smoking and symptoms, diagnosis and treatment (chemotherapy)
Unit 4	Aging-Factors influencing aging. Age related diseases- dementia, osteoporosis, Osteo arthritis - causes sign and symptoms, preventive measures of aging with special reference to antioxidants
Unit 5	Gallstones- causes, factors, aetiology of gall stones, types of gall stones, symptoms, preventive aspects of gall stone. Drug therapy – ursodeoxy cholic acid, surgical treatment and dietary management. **–** Ulcer – causes and prevention.

Course Objectives	
Title	**HORMONES**
Course Code	**MEN4A**
CO-1	Srudy the historical experiments that lead to the discovery of various hormones
CO-2	Deeply understand the communication between the nervous system and the endocrine system
CO-3	Learn the structure, functions and the disorders associated with the various hormones starting from the pituitary hormones to the gonadal hormones
CO-4	Appreciate and analyze the endocrine regulation of the various metabolisms such as carbohydrate metabolism, Protein metabolism, calcium homeostasis, menstrual cycle, pregnancy and menopause
CO-5	Apply the knowledge of hormones in assay of hormones such as T3, T4 and TSH and understand the strategy behind contraception
Co-6	Learn the etiology of the disorders associated with the carbohydrate, aminoacid, lipid and nucleic acid metabolism.
Co-7	Present a case study on a hormonal and a metabolic disorder

Course Outcome	
Title	**HORMONES**
Course Code	**MEN4A**
CO-1	Understand the basic terminologies of hormones, classification of hormones based on its chemistry
CO-2	Deduce the structure of amino acid derived, protein and steroid hormones
CO-3	Understand the synthesis of various hormones by respective gland
CO-4	Understand the regulation of hormones action by feedback mechanism
CO-5	Understand the mechanism of action of steroid hormones
CO-6	Understand the mechanism of action of pancreatic hormones

CO-7	Understand the mechanism of action of thyroid hormones
CO-8	Understand the mechanism of action of sex hormones
CO-9	Demonstrate various types of second messengers and their action
CO-10	Learn various functions of thyroid, pancreatic and sex hormones
CO-11	Demonstrate the dysfunction of various endocrine glands

Syllabus	
Title	**HORMONES**
Course Code	**MEN4A**
Unit 1	Hormones – Classification, Biosynthesis, circulation in blood, modification and degradation. Mechanism of hormone action, Target cell concept – Feedback control and regulation. Hormones of Hypothalamus and pituitary – Vasopressin and oxytocin, Hypothalamic releasing factors. Anterior pituitary hormones – actions and feedback regulation of synthesis. Growth promoting, Lactogenic hormones. Glysoprotein hormones, the POMC family, Endorphins
Unit 2	Pancreatichormones – cell types of the islets of Langerhans. Insulin – structure, Biosynthesis, regulation of secretion, Biological actions and mechanism of action. Glucagon, somatostatin and pancreatic polypeptide. Insulin like growth factors – structure, biological action. Gastrointestinal hormones – secretin, gastrin, cholecystokinin – biological action, regulation of secretion
Unit 3	Thyroid hormones – synthesis, secretion, transport, biological action, metabolic fate and mechanism of action, regulation. Parathyroid hormone – biological action, regulation of calcium and phosphorus metabolism and the role of calcitonin. Calcitriol – Biosynthesis, transport, functions, mechanism of action
Unit 4	Adrenal hormones – Glucocorticoids, mineralocorticoids, synthesis, secretion, transport, metabolism and excretion. Biological effects. Mechanisms of action, adrenal androgens, metabolic effects and functions. Adrenal medulla – Catecholamines, biosynthesis, storage, metabolism, regulate of synthesis. Chemical nature and biological action of prostaglandins
Unit 5	Gonadal Hormones – Chemical Nature. Biosynthesis, metabolism and metabolism of action of androgen, estrogen and progesterone. Factors involved in the regulation of gonadal hormone activities. Ovarian cycle. Pregnancy, biochemical changes in pregnancy

Course Objectives	
Title	**CLINICAL BIOCHEMISTRY-II**
Course Code	**MEN4B**
CO-1	The course aims to provide an advanced understanding of the biochemical mechanisms and pathophysiological processes responsible for common biochemical disorders.
CO-2	The course provides an overview of normal and abnormal metabolic functions, the impact of disorders on metabolic processes, an overall picture about the molecular basis of diseases and novel strategies to prevent the diseases.
CO-3	The main objective is to teach and practice students to learn how they can identify and quantify a variety of analytes in blood and bodily fluids using analytical techniques in clinical laboratory.
CO-4	Understanding the concept of Biochemical analyzing instruments, chemicals and normal ranges of biochemical components in our body.
CO-5	Clinically relevant biochemical analysis for deeper understanding of all biochemical components i.e., Proteins, Electrolytes, Hormones etc

Course Outcome	
Title	**CLINICAL BIOCHEMISTRY-II**
Course Code	**MEN4B**
CO-1	Understand on the etiology, types, clinical manifestations, diagnosis and treatment of various amino acidurias
CO-2	Detail the nucleic acid metabolism disorders
CO-3	Elaborate on the role of Serum lipids including triglycerides, cholesterol and phospholipids in diseases. Detail the clinical role of serum cholesterol and state the Clinical features of atherosclerosis.
CO-4	Understand the molecular basis of Cancer – cancer cells, difference between cancer and normal cells. To identify the various diagnostic approaches – CT, MRI, PET and SPECT and learn about Tumor marker
CO-5	interpret molecular structure and interactions present in proteins, nucleic acids, carbohydrates and lipids
CO-6	Explain organization and working principles of various components present in living cell.
C0-7	Understand the aetiology, types, clinical manifestations and treatment of Diabetes mellitus and various disorders of carbohydrate metabolic pathways.

Syllabus	
Title	**CLINICAL BIOCHEMISTRY-II**
Course Code	**MEN4B**
Unit 1	Clinical enzymology, functional and non- functional serum enzymes –Normal levels. Clinical significance of AST, ALT, ALP, ACP, CK, γ-GT, amylase, pseudocholinesterase. Enzyme pattern in diseases- myocardial infarction and liver diseases. Isoenzymes – LD, CK and ALP. Enzymes as therapeutic agents
Unit 2	Inborn errors of metabolism- Inborn errors of carbohydrate metabolism- Galactosemia, fructosuria, Glycogen storage diseases -causes and symptoms Inborn errors of lipid metabolism -Taysach‟s disease, Gaucher‟s and Niemannpick‟s disease- causes and symptoms. Inborn errors of aminoacid metabolism-phenyl ketonuria, Tyrosinemia, Maple syrup urine disease and alkaptonuria- causes and symptoms. Amniocentesis, prenatal detection of inborn errors of metabolism in developing fetus- Autosomal recessive mode of inheritance- cystic fibrosis, X linked recessive inheritance- Duchenne muscular dystrophy
Unit 3	Liver function tests based on synthesis, excretion and detoxification. Jaundice- classification, pathology and Differential diagnosis.Plasma protein changes in liver diseases. Hepatitis A,B and C. Cirrhosis and fibrosis. Portal hypertension and hepatic coma. Acute phase proteins -CRP, Haptoglobins, α-fetoprotein, ferritin and transferrin- their clinical significance
Unit 4	Renal function tests -tests for glomerular and tubular function- Acute and chronic renal failure-Glomerulonephritis, Nephrotic syndrome, uraemia-urinary calculi- Nephrocalcinosis and Nephrolithiasis-causes, pathology and symptoms. Dialysis- Hemodialysis and peritoneal dialysis
Unit 5	Hormonal disorders-causes and the pathology of thyroid disorders- Hypothyroidism and Hyperthyroidism-Diagnostic methods – disorders associated with adrenal, pituitary and sex hormones- Addison‟s disease, Cushing‟s syndrome, pituitary tumour, Hypopituitarism, Hypogonadism-Causes, pathology ,symptoms and diagnosis

Course Objectives	
Title	**SIGNAL TRANSDUCTION**
Course Code	**MENAD**
CO-1	To gain insight in the basic concepts of cellular signal transduction
CO-2	To understand the overall concept that alterations in cell signaling pathways are involved in disease development and progression.
CO-3	To gain knowledge on the functioning and regulation of kinases, phosphatases, adhesion receptors, G-protein coupled receptors, nuclear hormone receptors, cytokine and their receptors.
CO-4	To gain insight in the role of the various signaling pathways in development and progression of cancer and atherosclerosis.
CO-5	To understand which elements in the various signaling pathways represent candidate drug targets for treatment of cancer and atherosclerosis.
CO-6	To understand how the host immune system modulates disease progression.

Course Outcome	
Title	**SIGNAL TRANSDUCTION**
Course Code	**MENAD**
CO-1	Identify the types of signals
CO-2	Identify types of receptors, their molecular composition, and the differences among them
CO-3	Describe how a cell propagates a signal
CO-4	Describe how a cell responds to a signal
CO-5	Analys the endocytosis and exocytosis.

Syllabus	
Title	**SIGNAL TRANSDUCTION**
Course Code	**MENAD**
Unit 1	General functions and structure of signaling pathways, Mechanism of intracellular and intercellular signal transduction, Hormone and hormone analogues; Recognition and interaction of hormones with receptors , Signal amplification , regulation of inter and intracellular signaling; Receptor superfamilies and subtypes., intra cellular signaling molecules-secondary messengers; Divergence, convergence and cross talk
Unit 2	Protein kinases and protein phosphatases : Classification, structure protein kinases, ser/ thr protein kinases , Regulation of PKA, PKB, PKC, Ca2+/ calmodulindependent protein kinases , Structure and regulation of phosphatases, I,2A,2B,PP2A; subcellular localization
Unit 3	G- protein coupled signal transduction pathways: Transmembrane Receptors– Structure, Major classes of trimeric G proteins based on Gs unit, mechanism of signal transmission, toxins as tools in characterization of G-protein, GTPase switches, G proteins that regulate ion channels; G-protein and gene control
Unit 4	Signaling and Gene control: TGF receptors; Cytokine receptors and JAK – STAT; Receptor Tyrosine Kinases(RTK), activation of ras, genetic analysis – drosophila eye development; MAPK; Phosphoinositide cascade, NF-kB; signal induced protein cleavage, Down modulation of receptor signaling
Unit 5	Nuclear receptors, Principles of signaling by nuclear receptors, Classification and structure of nuclear receptors, Mechanism of transcriptional regulation by nuclear receptors, transactivation.Steroidhormonesignaling

Course Objectives	
Title	**IMMUNOCHEMISTRY**
Course Code	**MENAC**
CO-1	Main purpose of this course is to gain essential knowledge in the field of immunology.
CO-2	Understanding fundamentals, recognize different types of antigens, appreciate the differences between innate and adaptive immune response.
CO-3	Understand humoral immunity understand cell mediated immunity, appreciate immune system's role in organ transplants, developing tolerance and autoimmunity and immunity against cancer. • This course is intended to equip the student with the knowledge and understanding of the vertebrate immune system, its component and mechanism of immune responses with specific reference to the human immune defence system.
CO-4	Also understand the principles and applications of antigen-antibody reactions
CO-5	Main purpose of this course is to gain essential knowledge in the field of immunology.

Course Outcome	
Title	**IMMUNOCHEMISTRY**
Course Code	**MENAC**
CO-1	Classify fundamentals and anatomy of immune system
CO-2	Describe innate immune system, physiological anatomical and cellular components of innate mechanisms – complement fixation, phagocytosis and toll like receptors.
CO-3	Be able to explain genetic basis of antibody structure and generation of antibody diversity
CO-4	Demonstrate the role of MHC I and MHC II in antigen presentation and the concept of MHC polymorphism
CO-5	Describe the concept of B and T cell maturation and activation and generation of cytokines
CO-6	Explain the basis of hypersensitivity, immune deficiency and autoimmune diseases
C0-7	Apply the principles of immunological techniques, viz. immunoprecipitation, immunoelectrophoresis, ELISA, RIA, FACS, Western blot, Hybridoma technology, generation and applications of monoclonal antibodies.: Demonstrate the role of MHC I and MHC II in antigen presentation and the concept of MHC polymorphism

Syllabus	
Title	**IMMUNOCHEMISTRY**
Course Code	**MENAC**
Unit 1	Scope and advances in immunology. Achievements in the field of immunology Immunity – innate & acquired immunity– factors contributing for innate immunity – role of lymphokines in acquired immunity. Vaccines – different types – Attenuated vaccinesPreventive vaccines-DNA vaccines- . Antigenic competition. Contradictions in vaccinotherapy and Production of vaccines.
Unit 2	Antibodies – classification, structure, properties & biological functions – abnormal immunoglobulins – isohemeagglutinins. Monoclonal antibodies – commercial production by hybridoma technique & applications. Cooper Antigens – nature & different types, classification based on epitope. Iso and neo antigens. MHC gene arrangement and functions of Class I and Class II antigens in human and mice.Factors affecting antigenicity and immunogenicity of antigens. Complement system- activation by direct and alternate pathways. Biological functions of complements
Unit 3	Antigen – Antibody reactions- General mechanism – Qualitative and quantitative determination of antigen-antibody reactions. Diagnostic tests based on antigen- antibody reactions – with special reference to typhoid, syphilis, HIV & Retro virus infection. ELISA, RIA and immuno fluorescence techniques. Cross reaction with examples
Unit 4	Immune response – humoral & cell mediated immune response – ontogeny of T & B cells – clonal selection theory of antibody formation. Primary & secondary immune response. Immune response against bacterial, viral and fungal antigens. Immuno survielence
Unit 5	Pathology of immune system – Autoimmune disorders – causes and effects – systemic & localized types. Hypersensitivity reactions – causes & effects – different types of hypersensitivity reactions (eg) allergy, atopy, anaphylatoxis, serum sickness . Disorders associated with complements. Transplantation and transfusion immune reactions. Graft rejection and adverse reactions of mismatched blood transfusion

Course Objectives	
Title	**PRACTICAL-III**
Course Code	MEN3C
CO-1	Student acquire about the antioxidant properties of enzymes (Superoxide dismutase, catalase)
CO-2	They gain knowledge about the complete blood count
CO-3	They acquire knowledge about the LFT, RFT
CO-4	Develop knowledge about the diabetes mellitus
CO-5	Gain knowledge about the importance of maintaining blood cholesterol level

Course Outcome	
Title	**PRACTICAL-III**
Course Code	MEN3C
CO-1	Gaining knowledge the estimation of vitamin E and C and its deficiencies
CO-2	Gaining knowledge about the CBC and its related disorders.
CO-3	Acquiring knowledge about the electrolyte imbalance disorders
CO-4	Develop knowledge about the normal levels of urea, creatinine and uric acid.
CO-5	Aspire knowledge about the GTT

Syllabus	
Title	**PRACTICAL-III**
Course Code	MEN3C
Unit 1	1. Antioxidant status: Estimation of super oxide dismutase and catalase. Estimation of vitamin E and C. 2. Haematology: RBC count, WBC count – total and differential count, ESR, PCV, MCV. Estimation of haemoglobin. 3. LPO, Nitrite, glutathione and GPX. 4. Estimation of Sodium, Potasium and Calcium 5. Estimation of ALT, AST, CPK by kit method. 6. Liver function test: Estimation of bilirubin – direct and indirect. Estimation of plasma protein, A/G ratio, Thymol turbidity test, Assay of serum glutamate oxaloacetate transaminase, alkaline phosphatase, isoenzyme separation of LDH by electrophoresis. 7. Renal function test: Qualitative tests for normal and pathological components of urine. Estimation of blood and urine urea, creatinine, creatine and uric acid. Urea Clearance test. Chemical analysis of kidney and gall stones. 8. Estimation of blood glucose by orthotoluidine and glucose oxidase method. Determination of glycosylated Hb. Glucose tolerance test. Lipid profile: Estimation of cholesterol by Zak‟s method, lipoprotein profile, estimation of ketone bodies, estimation of triglycerides, free fatty acids and phospholipids.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF COMPUTER SCIENCE(P.G.)

Program : M.Sc. (COMPUTER SCIENCE)

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	To possess advanced knowledge of Computing, Mathematical basics for contemporary Computing Specialization and Knowledge of defined problem domain (Improved Computational knowledge).
PO-2	To identify a prospective domain, review research literature and analyze the problems using mathematical methods and suggest solutions (Improved analytical skills).
PO-3	To have the Ability to use design tools,design software as per needs and specifications (Design/development of solutions).
PO-4	To apply acquired knowledge of the domain in investigating the software design, from design of experiments, analysis of data to provision of valid conclusions (Improved Decision making).
PO-5	To possess the skills to use modern software and hardware tools to analyze problems (Modern Tool Usage).

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Implement the concept of theory and technology with classical and modern techniques for solving the complex problems in Computer Science.
PSO-2	Be more curious towards learning new and emerging technologies that adapt quickly to changes.
PSO-3	Design, execute and evaluate computing projects in academia and industries using appropriate technologies.
PSO-4	Know the contextual knowledge in computing science research and communicate effectively with stakeholders with the society at large for enhancing the quality of life.
PSO-5	Be honest in upholding the ethical principles and social responsibilities along with socio-economic innovations.

Course Objectives	
Title	Design and Analysis of Algorithms
Course Code:	PSD1A
CO-1	The course introduces the basics of computational complexity analysis and Various algorithm design paradigms.
CO-2	The goal is to provide students with solid foundations to deal with a wide variety of computational problems
CO-3	To provide a thorough knowledge of the most common data structures
CO-4	To provide a kowledge of the algorithms for data structures
CO-5	To design algorithm in context of space and time complexity and apply asymptotic notation

Course Outcome	
Title	Design and Analysis of Algorithms
Course Code:	PSD1A
CO-1	To teach techniques for effective problem-solving techniques in computing.
CO-2	To use different paradigms of problem-solving techniques and to illustrate clever and efficient ways to solve a given problem.
CO-3	To design efficient algorithms using various algorithm designing strategies
CO-4	To analyze the problem and develop the algorithms related to these problems
CO-5	To classify the problem and apply the appropriate design strategy to develop algorithm

Syllabus	
Title	Design and Analysis of Algorithms
Course Code:	PSD1A
Unit 1	Introduction - Definition of Algorithm – pseudocode conventions – recursive algorithms – time and space complexity –big-“oh” notation – practical complexities – randomized algorithms – repeated element – primality testing - Divide and Conquer: General Method - Finding maximum and minimum – merge sort.
Unit 2	Divide and conquer contd. – Quicksort, Selection, Strassen's matrix multiplication – Greedy Method: General Method –knapsack problem - Tree vertex splitting - Job sequencing with dead lines – optimal storage on tapes.
Unit 3	Dynamic Programming: General Method - multistage graphs – all pairs shortest paths – single source shortest paths - String Editing – 0/1 knapsack. Search techniques for graphs – DFS-BFS-connected components – biconnected components.
Unit 4	Back Tracking: General Method – 8-queens - Sum of subsets - Graph Coloring – Hamiltonian cycles. Branch and Bound: General Method - Traveling Salesperson problem.
Unit 5	Lower Bound Theory: Comparison trees - Oracles and advisory arguments - Lower bounds through reduction - Basic Concepts of NP-Hard and NP-Complete problems

Course Objectives	
Title	Advanced Java Programming
Course Code:	PSD1B
CO-1	Develop error-free, well-documented Java programs;
CO-2	Develop and test Java network, search engine, and web framework programs.
CO-3	Learn how to write, test, and debug advanced-level Object-Oriented programs using Java.
CO-4	The course covers Graphical User Interface (GUI) networking, and database manipulation.
CO-5	Student will be able to use advanced technology in Java such as Internationalization, and Remote method Invocation.

Course Outcome	
Title	Advanced Java Programming
Course Code:	PSD1B
CO-1	To provide a sound foundation to the students on implementing J2EE Applications.
CO-2	To create knowledge on Database connection using JDBC, API Servlets, Java Server Pages.
CO-3	Use the characteristics of an object-oriented programming language JAVA in a program. CO2 Apply JAVA features to program design and implementation.
CO-4	Design and implementation programs of Java Script, Applets, Event Handling, AWT Programming, and Interface.
CO-5	To provide a sound foundation to the students on implementing J2EE Applications.

Syllabus	
Title	Advanced Java Programming
Course Code	PSD1B
Unit 1	Servlet Overview – Servlet life cycle - The Java Web Server – Simple Servlet – Servlet Packages – Using Cookies - - Session Tracking - Security Issues – using JDBC in Servlets – HTML to Servlet Communication - applet to servlet communication.
Unit 2	Java Beans: The software component assembly model- The java bean development kitdeveloping beans – notable beans – using infobus - Glasgow developments - Application Builder toolJAR files-Introspection-Bound Properties-Persistence-customizers - java beans API.
Unit 3	EJB: EJB architecture- EJB requirements – design and implementation – EJB session beans- EJB entity beans-EJB Clients – deployment tips, tricks and traps for building distributed and other systems – implementation and future directions of EJB-Variable in perl- perl control structures and operators – functions and scope
Unit 4	RMI – Overview – Developing applications with RMI: Declaring & Implementing remote interfaces-stubs & skeletons, Registering remote objects, writing RMI clients –Pushing data from RMI Servlet – RMI over Inter-ORB Protocol
Unit 5	JSP –Introduction JSP-Examining MVC and JSP -JSP scripting elements & directives-Working with variables scopes-Error Pages - using Java Beans in JSP Working with Java Mail-Understanding Protocols in Java mail-Components-Java mail API-Integrating into J2EE-Understanding Java Messaging Services-Introducing Java Transactions.

Course Objectives	
Title	System Software
Course Code:	PSD1C
CO-1	To understand the relationship between system software and machine architecture.
CO-2	To understand the processing of an HLL program for execution on a computer.
CO-3	To understand the process of scanning and parsing.
CO-4	To know the design and implementation of assemblers, macro processor, linker
CO-5	To have an understanding of loader, system software tools.

Course Outcome	
Title	System Software
Course Code:	PSD1C
CO-1	To teach some of the major tasks of the system software of a computer system.
CO-2	To focus on internal working of the hardware and software interface of a typical system.
CO-3	Be able to compare various system software related to the given system
CO-4	Be able to understand the concepts required to develop the system software
CO-5	Be able to make proper use of system software tools

Syllabus	
Title	System Software
Course Code:	PSD1C
Unit 1	Language processors – Language processing activities and fundamentals – Language specification – Development Tools – Data Structures for Language processing- Scanners and Parsers.
Unit 2	Assemblers: Elements of Assembly language programming - Overview of the Assembly process - Design of a Two-pass Assembler - A single pass Assembler for the IBM PC.
Unit 3	Macros and Macro processors – Macro definition, call and expansion – Nested macro calls – Advanced macro facilities - Design of a macro preprocessor - Compilers: Aspects of compilation.
Unit 4	Compilers and Interpreters – Memory allocation - Compilation of Expressions and Control structures - Code optimization – Interpreters.
Unit 5	Linkers: Linking and Relocation concepts – Design of a linker – Self relocating Programs – A linker for MS DOS - Linking for over-lays – loaders - Software tools: Software tools for program development - Editors - Debug monitors - Programming environments – User interfaces.

Course Objectives	
Title	Theoretical Foundations of Computer Science
Course Code:	PED1A
CO-1	To give an overview of the theoretical foundations of computer science from the perspective of formal languages
CO-2	To illustrate finite state machines to solve problems in computing
CO-3	To explain the hierarchy of problems arising in the computer sciences.
CO-4	To familiarize Regular grammars, context frees grammar.
CO-5	To use basic concepts of formal languages of finite automata techniques

Course Outcome	
Title	Theoretical Foundations of Computer Science
Course Code	PED1A
CO-1	Use the concepts and techniques of discrete mathematics for theoretical computer science
CO-2	Design Finite Automata for different Regular Expressions and Languages
CO-3	Identify and use different formal languages and their relationship.
CO-4	To solve various problems of applying normal form techniques, push down automata and Turing Machines
CO-5	Analyze various concepts of undecidability and Computable Function and Discuss analytically and intuitively for problem-solving situation

Syllabus	
Title	Theoretical Foundations of Computer Science
Course Code:	PED1A
Unit 1	: Propositions and Compound Propositions – Logical Operations – Truth Tables –Tautologies and Contradictions – Logical Equivalence –Algebra of Propositions – Conditional and Biconditional Statements –Arguments – Logical Implication – Quantifiers – Negation of Quantified Statements – Basic Counting Principles – Factorial – Binomial Coefficients – Permutations – Combinations – Pigeonhole Principle – Ordered and Unordered Partitions.
Unit 2	Order and Inequalities – Mathematical Induction – Division Algorithm – Divisibility – Euclidean Algorithm – Fundamental Theorem of Arithmetic – Congruence Relation – Congruence Equations – Semigroups – Groups – Subgroups – Normal Subgroups – Homomorphisms – Graph Theory: basic definitions-paths, reachability, connectedness matrix representation of graphs, trees.
Unit 3	Finite Automata and Regular Expressions: Finite State Systems – Basic definitions – Nondeterministic finite automata – Finite automata with -moves – Regular expressions.
Unit 4	Properties of Regular sets: Pumping lemma – Closure properties – Decision Algorithms – My hill – Nerode Theorem – Context Free Grammars – Derivation Trees.
Unit 5	Simplifying Context free grammars - Chomsky normal forms – Greibach Normal forms – Pushdown automata and context-free languages.

Course Objectives	
Title	Computer Networks
Course Code:	PSD2A
CO-1	The main emphasis of this course is on the organization and management of local area networks (LANs).
CO-2	The course objectives include learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks
CO-3	Gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.
CO-4	Students are introduced to computer communication network design and its operations.
CO-5	On completion of the course, students should be able, in part to design, implement and maintain a typical computer network (LAN).

Course Outcome	
Title	Computer Networks
Course Code:	PSD2A
CO-1	To develop an understanding of modern network architectures from a design and performance perspective.
CO-2	Design logical sub-address blocks with a given address block.
CO-3	Decide routing entries given a simple example of network topology
CO-4	Describe what classless addressing scheme is.
CO-5	Describe how routing protocols work.

Syllabus	
Title	Computer Networks
Course Code:	PSD2A
Unit 1	Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP models – Example networks: Internet, 3G Mobile phone networks, Wireless LANs –RFID and sensor networks - Physical layer – Theoretical basis for data communication - guided transmission media
Unit 2	Wireless transmission - Communication Satellites – Digital modulation and multiplexing - Telephones network structure – local loop, trunks and multiplexing, switching. Data link layer: Design issues – error detection and correction.
Unit 3	Elementary data link protocols - sliding window protocols – Example Data Link protocols – Packet over SONET, ADSL - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.
Unit 4	Network layer - design issues - Routing algorithms - Congestion control algorithms – Quality of Service – Network layer of Internet- IP protocol – IP Address – Internet Control Protocol.
Unit 5	Transport layer – transport service- Elements of transport protocol - Addressing, Establishing & Releasing a connection – Error control, flow control, multiplexing and crash recovery - Internet Transport Protocol – TCP - Network Security: Cryptography.

Course Objectives	
Title	Digital Image Processing
Course Code:	PSD2A
CO-1	To become familiar with digital image fundamentals
CO-2	To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
CO-3	To learn concepts of degradation function and restoration techniques.
CO-4	To study the image segmentation and representation techniques.
CO-5	To become familiar with image compression and recognition methods

Course Outcome	
Title	Digital Image Processing
Course Code:	PSD2B
CO-1	Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
CO-2	Operate on images using the techniques of smoothing, sharpening and enhancement.
CO-3	Perform the restoration concepts and filtering techniques.
CO-4	Demonstrate the segmentation, features extraction, compression and recognition methods for color models.
CO-5	Compress images and use tools for image recognition.

Syllabus	
Title	Digital Image Processing
Course Code:	PSD2B
Unit 1	Introduction – steps in image processing - Image acquisition - representation - sampling and quantization - relationship between pixels. – color models – basics of color image processing.
Unit 2	Introduction – steps in image processing - Image acquisition - representation - sampling and quantization - relationship between pixels. – color models – basics of color image processing.
Unit 3	Image enhancement in Frequency domain – Introduction to Fourier transform: 1- D, 2 –D DFT and its inverse transform - smoothing and sharpening filters.
Unit 4	Image restoration: Model of degradation and restoration process – noise models – restoration in the presence of noise- periodic noise reduction. - Image segmentation: Thresholding and region based segmentation.
Unit 5	Image compression: Fundamentals – models – information theory – error free compression – Lossy compression: predictive and transform coding - JPEG standard.

Course Objectives	
Title	Object Oriented Analysis and Design
Course Code:	PED2A
CO-1	To Introduce various designing techniques and methods for object oriented
CO-2	Performance analysis with real time system
CO-3	Demonstrate a familiarity with object oriented data and system. To give clear idea on implementing design with UML diagram like state diagram , activity diagram , use case diagram etc.
CO-4	To Introduce various designing techniques and methods for object oriented
CO-5	A variety of systems development strategies

Course Outcome	
Title	Object Oriented Analysis and Design
Course Code:	PED2A
CO-1	To understand the fundamental aspects of object-oriented analysis and design.
CO-2	To develop a software project using OOAD.
CO-3	Understand Object Oriented concepts, terms and principles.
CO-4	Understand the basic concepts to identify state & behavior of real world objects.
CO-5	Able to learn various object oriented methodologies and choose the appropriate one for solving the problem with the help of various case studies.

Syllabus	
Title	Object Oriented Analysis and Design
Course Code:	PED2A
Unit 1	System Development - Object Basics - Development Life Cycle - Methodologies - Patterns - Frameworks - Unified Approach - UML.
Unit 2	Use-Case Models - Object Analysis - Object relations - Attributes - Methods – Class and Object responsibilities - Case Studies.
Unit 3	Design Processes - Design Axioms - Class Design - Object Storage - Object Interoperability - Case Studies.
Unit 4	User Interface Design - View layer Classes - Micro-Level Processes - View Layer Interface - Case Studies.
Unit 5	Quality Assurance Tests - Testing Strategies - Object orientation on testing - Test Cases - test Plans - Continuous testing - Debugging Principles - System Usability - Measuring User Satisfaction - Case Studies.

Course Objectives	
Title	Principles of Compiler Design
Course Code:	PSD3A
CO-1	To learn the various phases of compiler.
CO-2	To learn the various parsing techniques.
CO-3	To understand intermediate code generation and run-time environment.
CO-4	To learn to implement the front-end of the compiler.
CO-5	To learn to implement code generators.

Course Outcome	
Title	Principles of Compiler Design
Course Code:	PSD3A
CO-1	Understand the different phases of the compiler.
CO-2	Design a lexical analyzer for a sample language.
CO-3	Apply different parsing algorithms to develop the parsers for a givegrammar.
CO-4	Design and implement a scanner and a parser using LEX and YACC tools
CO-5	Learn to implement code optimization techniques and a simple code generator.

Syllabus	
Title	Principles of Compiler Design
Course Code:	PSD3A
Unit 1	Introduction to Compilers - Finite Automata and lexical Analysis.
Unit 2	Syntax Analysis: Context free grammars - Derivations and parse trees – Basic parsing techniques - LR parsing.
Unit 3	Syntax - directed translation, symbol tables.
Unit 4	Code optimization - More about code optimization.
Unit 5	Code generation - Error detection and recovery.

Course Objectives	
Title	Information Security
Course Code:	PSD3B
CO-1	Learn concepts of cyber and information security
CO-2	Learn key practices and processes for managing security effectively.
CO-3	Learn Basic network fundamentals – including (but not limited to) topologies, protocols, address conservation
CO-4	Learn services, and the security issues that affect networks.
CO-5	Learn Security vulnerabilities

Course Outcome	
Title	Information Security
Course Code:	PSD3B
CO-1	To have understanding of Basic cryptology and why it is fundamental to computer and information security.
CO-2	To have understanding of Software program deficiencies and the vulnerabilities associated with them
CO-3	To be able to differentiate Access controls and authentication.
CO-4	Understand the use of risk management to plan, implement, and administer security programs and processes.
CO-5	To be able to understand the key elements of incident management; detection, remediation, and recovery.

Syllabus	
Title	Information Security
Course Code:	PSD3B
Unit 1	Introduction: Security- Attacks- Computer criminals- Method of defense Program Security: Secure programs- Non-malicious program errors- Viruses and other malicious code- Targeted malicious code- Controls against program threats
Unit 2	Operating System Security: Protected objects and methods of protection- Memory address protection- Control of access to general objects- File protection mechanism- Authentication: Authentication basics- Password- Challenge-response- Biometrics.
Unit 3	Database Security: Security requirements- Reliability and integrity- Sensitive data- InterfaceMultilevel database- Proposals for multilevel security
Unit 4	Security in Networks: Threats in networks- Network security control- Firewalls- Intrusion detection systems- Secure e-mail- Networks and cryptography- Example protocols: PEM- SSL- Ipsec.
Unit 5	Administrating Security: Security planning- Risk analysis- Organizational security policies Physical security - Legal- Privacy- and Ethical Issues in Computer Security - Protecting programs and data- Information and law- Rights of employees and employers- Software failures- Computer crime Privacy- Ethical issues in computer society- Case studies of ethics.

Course Objectives	
Title	Artificial Intelligence
Course Code:	PSD3C
CO-1	To impart knowledge about Artificial Intelligence.
CO-2	To give understanding of the main abstractions and reasoning for intelligent systems.
CO-3	To enable the students to understand the basic principles of Artificial Intelligence in various applications.
CO-4	To identify the scope of Artificial Intelligence in real life applications
CO-5	To enable decoding of human thinking process and find the ways of making the machine decide intelligently in lieu of number crunching

Course Outcome	
Title	Artificial Intelligence
Course Code:	PSD3C
CO-1	Solve basic AI based problems.
CO-2	Define the concept of Artificial Intelligence.
CO-3	Apply AI techniques to real-world problems to develop intelligent systems.
CO-4	Select appropriately from a range of techniques when implementing intelligent systems.
CO-5	Possess the basic knowledge of different machine learning techniques

Syllabus	
Title	Artificial Intelligence
Course Code:	PSD3C
Unit 1	Introduction - Intelligent Agents- Problem Solving - by Searching - Informed Search and Exploration - Constraint Satisfaction Problems - Adversarial Search
Unit 2	Knowledge and Reasoning - Logical Agents - First-Order Logic - Inference in First-Order Logic - Knowledge Representation
Unit 3	Planning – Planning and Acting in the Real World - Uncertain knowledge and reasoning - Uncertainty - Probabilistic Reasoning - Probabilistic Reasoning Over Time - Making Simple Decisions - Making Complex Decisions
Unit 4	Learning - Learning from Observations - Knowledge in Learning - Statistical Learning Methods - Reinforcement Learning
Unit 5	Communicating, Perceiving, and Acting - Communication - Probabilistic Language Processing - Perception – Robotics.

Course Objectives	
Title	Big Data Analytics
Course Code:	PSDED
CO-1	To gives an overview of Big Data, i.e. storage, retrieval and processing of big data.
CO-2	To focus on the “technologies”, i.e., the tools/algorithms that are available for storage, processing of Big Data.
CO-3	To help a student to perform a variety of “analytics” on different data sets and to arrive at positive conclusions.
CO-4	To introduce the tools required to manage and analyze big data like Hadoop,NoSql MapReduce
CO-5	To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability

Course Outcome	
Title	Big Data Analytics
Course Code:	PSDED
CO-1	Understand Big Data and its analytics in the real world
CO-2	Analyze the Big Data framework like Hadoop and NOSQL to efficiently store and process Big Data to generate analytics
CO-3	Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm
CO-4	Design and Implementation of Big Data Analytics using pig and spark to solve data intensive problems and to generate analytics
CO-5	To have skills that will help them to solve complex real-world problems in for decision support.

Syllabus	
Title	Big Data Analytics
Course Code:	PSDED
Unit 1	Basic nomenclature - Analytics process model - Analytics model requirements - Types of data sources – Sampling - types of data elements - Visual Data Exploration and Exploratory Statistical Analysis - Missing Values - Outlier Detection and Treatment - Standardizing Data – Categorization - weights of evidence coding - Variable selection -Segmentation.
Unit 2	Predictive Analytics: Target Definition - Linear Regression - Logistic Regression - Decision Trees - Neural Networks - Support Vector machines - Ensemble Methods - Multiclass Classification Techniques - Evaluating Predictive Models.
Unit 3	Descriptive Analytics: Association Rules - Sequence Rules - Segmentation. Survival Analysis: Survival Analysis Measurements - Parametric Survival Analysis.
Unit 4	Social Network Analytics: Social Network Definitions - Social Network Metrics - Social Network Learning -Relational Neighbor Classifier - Probabilistic Relational Neighbor Classifier - Relational logistic Regression - Collective Inference.
Unit 5	Benchmarking - Data Quality - Software – Privacy - Model Design and Documentation - Corporate Governance. Example applications: Credit Risk Modeling - Fraud Detection - Recommender Systems - Web Analytics.

Course Objectives	
Title	Distributed Database Systems
Course Code:	PSDEF
CO-1	To introduction students to Distributed DBMS and associated problems.
CO-2	To make students understand various algorithms and techniques for managing distributed database.
CO-3	To understand theoretical and practical aspects of distributed database systems.
CO-4	To study and identify various issues related to the development of distributed database system.
CO-5	To make students understand Transaction Management & Compare various approaches to concurrency control in Distributed database

Course Outcome	
Title	Distributed Database Systems
Course Code:	PSDEF
CO-1	Apply various fragmentation techniques given a problem
CO-2	Analyse and calculate the cost of enforcing semantic integrity control
CO-3	Use the steps of query processing
CO-4	Apply optimization techniques are applies to Distributed Database
CO-5	Apply effectively Query Optimization Algorithms

Syllabus	
Title	Distributed Database Systems
Course Code:	PSDEF
Unit 1	Features of Distributed versus Centralized Databases – Why Distributed Databases – Distributed Database Management Systems (DDBMSs)- Review of Databases – Review of Computer Networks Levels of Distribution Transparency- Reference Architecture for Distributed Databases – Types of Data Fragmentation – Distribution Transparency for read-only Applications – Distribution transparency for Update Applications – Distributed Database Access Primitives – Integrity Constraints in Distributed Databases - A Framework for Distributed Database Design – The Design of Database Fragmentation – The Allocation of Fragments.
Unit 2	Equivalence Transformations for Queries – Transforming Global Queries into Fragment Queries – Distributed Grouping and Aggregate Function Evaluation – Parametric Queries -Optimization of Access Strategies - A Framework for Query Optimization – Join Queries – General Queries. A Framework for Transaction Management – Supporting Atomicity of Distributed Transactions – Concurrency Control for Distributed Transactions – Architectural Aspects of Distributed Transactions.
Unit 3	Foundations of Distributed Concurrency Control – Distributed Deadlocks – Concurrency Control Based on Timestamps – Optimistic Methods for Distributed Concurrency Control - Reliability – Basic Concepts Nonblocking Commitment Protocols – Reliability and Concurrency Control – Determining a Consistent View of the Network – Detection and Resolution of Inconsistency – Checkpoints and Cold Restart - Distributed Database Administration – Catalog Management in Distributed Databases – Authorization and Protection.
Unit 4	Distributed object database management systems – Fundamental object concepts and Models – Object – Abstract Data Types –

	Composition (Aggregation) – Class – Collection – Subtyping and Inheritance. – Object Distribution Design – Horizontal Class Partitioning – Vertical Class Partitioning – Path Partitioning – Class Partitioning Algorithms – Allocation – Replication – Alternative Client / Server Architectures – Cache Consistency – Object Identifier Management – Pointer Switching Object Migration – Distributed Object Storage – Object Query Processor Architectures – Query Processing Issues – Query Execution – Correctness Criteria – Transaction Models and Object Structures – Transactions Management in Object DBMSs – Transactions as Objects – Conclusion – Bibliographic Notes – Exercises.
Unit 5	Parallel Database Systems – Database Server Approach – Database Servers and Distributed Databases – Parallel System Architectures – Objectives – Functional Aspects – Parallel Data Processing – Parallel Query Optimization – Data Placement – Query Parallelism – Parallel Execution Problems – Initialization – Interferences and Convoy Effect – Load Balancing – Parallel Execution for Hierarchical Architecture – Problem Formulation – Basic Concepts – Load Balancing Strategy – Performance Evaluation – Conclusion – Bibliographic Notes – Exercises.

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF ENGLISH(P.G.)

Program : **M A ENGLISH**

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	To introduce students to English poetry from the Middle Ages to the Seventeenth Century, with a concentration on the development of poetic genres such the Sonnet, Ballad, Lyric, Satire, and Epic
PO-2	To familiarise the students with the beginning of drama in Britain and the stages of its evolution in the context of theatre and culture.
PO-3	The purpose of this programme is to acquaint students with the history and evolution of the British novel up to the 18th century.
PO-4	The purpose of this essay's content is to clarify a number of novel-related ideas and theories.
PO-5	To emphasis on the influence of classical Indian tradition and the impact of the West on it, through translation in modern times.

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	Developed a deep understanding of the discipline and the capacity to work across disciplines
PSO-2	The students will master the use of research intelligence in experiments and innovations.
PSO-3	Possessing knowledge of ethical principles and a dedication to professional ethics.
PSO-4	Attain incorporated lifelong learning and self-directed learning
PSO-5	Developed flexibility in a variety of situations with a global perspective

Course Objectives	
Title	From Chaucer to 17th Century
Course Code	HBB1A
CO-1	To familiarise students with English Poetry.
CO-2	To enrich the students with the specific poetry of Medieval England to 17th century.
CO-3	To focus the attention of the students on the evolution of Poetic forms – Sonnets, Ballad, Lyric, Satire, Epic etc.
CO-4	To understand and appreciate poetry as a literary art form.
CO-5	To develop their own creativity and enhance their writing skills in poetry.

Course Outcome	
Title	From Chaucer to 17th Century
Course Code	HBB1A
CO-1	Students get to know the growth of poetry from Chaucer to Medieval England.
CO-2	Students learn to apply the features of Lyric, Ballad and Sonnet while writing poetry.
CO-3	Students appreciate the poetry forms of Metaphysical poetry.
CO-4	The student learns to create awareness of social issue and disparities using this poetic device such as satire.
CO-5	Students understand the characteristics features of Epic and try to use in their literary work.

Syllabus	
Title	From Chaucer to 17th Century
Course Code	HBB1A
Unit 1	**Chaucer and Medieval England** Geoffrey Chaucer (From "The Prologue" to The Canterbury Tales)- The Knight The Prioress The Wife of Bath The Monk The Doctor of Physic
Unit 2	**Poetic Forms During 16th Century** Lyric, Ballad, Sonnet Ballad of Sir Patrick Spens Spenser,s Prothalamion Wyatt and Surrey's sonnets – 2 Sonnets
Unit 3	**Poetic Forms during 17th Century** **Metaphysical Poetry** John Donne The Canonisation Ecstasy
Unit 4	**Satire** John Dryden Absalom and Achitophel
Unit 5	**Epic** John Milton Paradise Lost Book IX

Course Objectives	
Title	Elizabethan and Jacobean Drama
Course Code	**HBBIB**
CO-1	To acquaint the students with the origin of Elizabethan and Jacobean Drama.
CO-2	To analyse the stage of its evolution in the context of theatre and culture.
CO-3	To develop sufficient ability for reading and understanding Elizabethan English.
CO-4	To comprehend a range of theatrical skills and apply them to create performance.
CO-5	To enhance the study skills of students through the representative texts from the Elizabethan and Jacobean periods.

Course Outcome	
Title	Elizabethan and Jacobean Drama
Course Code	**HBBIB**
CO-1	Students come to know about moral lessons from Jacobean drama.
CO-2	The students learn about elements senacan tragedy and apply the same in the society.
CO-3	Students get to know about the various aspects of Elizabethan theatre and applies in their stage performance.
CO-4	Students understands that tragedy and comedy play a vital role in everybody's life.
CO-5	Students develop their study skills and theatrical skills through Jacobean drama.

Syllabus	
Title	Elizabethan and Jacobean Drama
Course Code	**HBBIB**
Unit 1	Miracle and Morality Plays
Unit 2	Thomas Kyd The Spanish Tragedy
Unit 3	**Elizabethan Theatre** Theatres, Theatre groups, audience, actors and conventions
Unit 4	**Tragedy and Comedy** Christoper Marlowe Doctor Faustus Ben Jonson Volpone
Unit 5	**Jacobean Drama** John Webster Duchess of Malfi

Course Objectives	
Title	**FICTION-I ORIGINS AND DEVELOPMENTS UPTO 18TH CEN**
Course Code	**: HBB1C**
CO-1	To familiarise the students with the origin and development of the British Novel up to the 18th century.
CO-2	To draw attention of the students on various concepts of the novel.
CO-3	To sensitise the students to certain theories of the novel.
CO-4	To enable the students identity strengths and weakness as a writer of fiction.
CO-5	To demonstrate a general awareness of fiction writing.

Course Outcome	
Title	**FICTION-I ORIGINS AND DEVELOPMENTS UPTO 18TH CEN**
Course Code	**HBB1C**
CO-1	Students come to know about the various concepts of the novel.
CO-2	The student learns to express large complex ideas in an approachable manner using this poetic device – viz allegorical novel and satire.
CO-3	Students learn to discuss fiction using basic vocabulary.
CO-4	The students get to know about the features of picaresque novels and its influence on European fictions.
CO-5	Students learn the background of the novel of manners and apply its concepts in the real life.

Syllabus	
Title	**FICTION-I ORIGINS AND DEVELOPMENTS UPTO 18TH CEN**
Course Code	**: HBB1C**
Unit 1	Novel as a Form, Concepts and Theories about the Novel; Poetics of the Novel – definition, types, narrative modes: omniscient narration.
Unit 2	**Allegorical Novel and Satire** John Bunyan The Pilgrim's Progress Jonathan Swift Gulliver's Travels
Unit 3	UNIT 3 **The New Wor** **d Nove**
Unit 4	UNIT 4 **Picaresque Novel** Laurence Stern Tristam Shandy
Unit 5	UNIT 4 **Picaresque Novel** Laurence Stern Tristam Shandy

Course Objectives	
Title	**INDIAN WRITING IN ENGLISH AND IN TRANSLATION**
Course Code	HBB1D
CO-1	To enable the students to understand the evolution of Indian Writing in English.
CO-2	To identify the impact of the west on Indian Writing through representative texts.
CO-3	To create awareness towards the problems of interpreting Indian culture via English language.
CO-4	To familiarise with the work og significant Indian writers of poetry, prose, fiction, and drama.
CO-5	To develop the skill of self expression through creative writing.

Course Outcome	
Title	**INDIAN WRITING IN ENGLISH AND IN TRANSLATION**
Course Code	HBB1D
CO-1	The student understands the evolution of Indian writing in English.
CO-2	Students learn the evolution of poetic forms and also appreciate their beauty of language and thought.
CO-3	The students get to know about the satire on Indian society like gender discrimination etc. through drama.
CO-4	Students learn new words and employ them in the day today conversation and in prose and fiction writing.
CO-5	The students understand the rich diversity of culture and literature in the regional languages through translation.

Syllabus	
Title	**INDIAN WRITING IN ENGLISH AND IN TRANSLATION**
Course Code	HBB1D
Unit 1	Indian Classical literary Tradition; impact of English Studies on India; Colonialism; Nationalism; Nativism and Expatriates; Socio-Cultural issues such as gender, caste and region
Unit 2	**Poetry** Rabindranath Tagore **Gitanjali**: 12,36,63,12) The Time my journey takes is long 36) This is my prayer to Thee 63) Thou hast made me known to friends Nissim Ezekiel "Background Casually" (**Indian Writing in English** ed. MakarandParanjape, Macmillan 1993, p.112) K.K Daruwalla "Hawk" *from***The Anthology Of Twelve Modern Indian Poets** Ed. A.K. Mehrotra (OUP, 1992) ArunKolatkar *From***Jejuri** The Bus A Scratch Kamala Das Introduction, Eunuchs
Unit 3	**Drama** Vijay Tendulkar **Silence! The Court is in Session**

Unit 4	**Prose and Fiction** **Prose** Sri Aurobindo B.R. Ambedkar **Fiction** R.K. Narayan ShashiDeshpande	The Renaissance in India Extracts 4, 5 and 6 *from* **Annihilation of Caste** ed. Mulk Raj Anand (Delhi: Arnold Publishers, 1990, pp. 47-54) **The Painter of Signs** **Dark Holds No Terror**
Unit 5	UNIT 5 **Indian Literature in Translation** **Poetry** The following Selections *from* A.K. Ramanujan's "Love and War" (**TheOxford Indian Ramanujan**, ed., Molly Daniels, OUP, 2004). **Short Story** The following selections from **Routes:** Representations of the West in Short Fiction from South India in Translation eds. VanamalaViswanatha, V.C. Harris, C. Vijayashree and C.T. Indra (Macmillan 2000). **Kannada** MastiVenkatesaIyengar **Malayalam** P. Surendran **Tamil** PudumaiPithan	Kapilar, Akananooru pg. 82 Purananooru pg. 356 The Sorley Episode Synonyms of the Ocean Teaching

Course Objectives	
Title	**CLASSICS IN TRANSLATION**
Course Code	**HBB1E**
CO-1	To familiarise the students with the ancient Indian theatre and classical Greek theatre.
CO-2	To draw the attention of the students to the social , economic, cultural factors reflected in Indian, European and Russian literature.
CO-3	To understand the parallel growth of the European and Indian literature from ancient to modern periods.
CO-4	To get to know the connections and connectivity between Religion and Literature.
CO-5	To imbibe the concepts of Marxism, Naturalism, and Realism in fiction

Course Outcome	
Title	**CLASSICS IN TRANSLATION**
Course Code	**HBB1E**
CO-1	Analyse literary texts in English or English translation in terms of their main stylistic and thematic features.
CO-2	Discuss the literary, historical, social and cultural backgrounds of these texts.
CO-3	Identify some of the main theoretical and methodological issues involved in reading World Literature.
CO-4	Communicate findings clearly and engagingly.
CO-5	Engage in close reading and Use literary terminology relevant to the texts.

Syllabus	
Title	**CLASSICS IN TRANSLATION**
Course Code	**HBB1E**
Unit 1	1 **Concepts** Religion and literature- Religion as a source of literature- The human sciences- Philosophy and Literature – concepts of Marxism, Naturalism and Realism in fiction- superstition and belief reflected in literature – World literature as one.
Unit 2	**Poetry** ThiruvalluvarThirukkural. (Penguin selections translated by Rajaji.
Unit 3	**Prose** Plato Portrait of Socrates.
Unit 4	**Prose Fiction** Kalki's Parthiban Kanavu Camus The Outsider. Thakazhi Sivasankaram Pillai Chemmeen.
Unit 5	**Drama** Sophocles Oedipus Rex Ibsen A Doll's House.

Course Objectives	
Title	**AMERICAN LITERATURE**
Course Code	**HBB2A**
CO-1	To familiarise the students with the origin and development of American literature.
CO-2	To understand the transitions of time of the settlers and colonies to the post-modern and multicultural literature.
CO-3	To make the students aware of the concepts and movements of American literature.
CO-4	To give an over all outlook on Transcendentalism and Individualism.
CO-5	To be aware of the counter culture, Black culture and multiculturalism and its impact in Literature.

Course Outcome	
Title	**AMERICAN LITERATURE**
Course Code	**HBB2A**
CO-1	Students learn the concepts and movements of American Literature.
CO-2	Students understand the trends and techniques of American poetry and learn to use them in self-made poems.
CO-3	Students get knowledge of modern American theatres and its stage-craft to use in theatrical performances.
CO-4	Students learn and attempt to write fiction with imagination and creativity.
CO-5	Students get an understanding of American prosaic style in present media.

Syllabus		
Title	**AMERICAN LITERATURE**	
Course Code	**HBB2A**	
Unit 1	Concepts and Movements: Beginnings of American Literature; Transcendentalism; Individualism; The American South; The Frontier; Counter – Culture; Harlem Renaissance; Rise of Black Culture and Literature; Multiculturalism.	
Unit 2	UNIT 2 **Poetry** Walt Whitman Emily Dickinson Robert Frost Wallace Stevens E.E. Cummings Gwendolyn Brooks	 Passage to India Success is Counted Sweetes The Soul Selects her own society Because I could not stop for death Home Burial Anecdote of the Jar Any one lived in a pretty how town Kitchenette Building
Unit 3	UNIT 3 **Drama** Eugene O'Neill Marsha Norman	 Long Day's Journey into the Night 'Night Mother
Unit 4	**Fiction** Mark Twain Alice Walker	 Adventures of Huckleberry Finn The Color Purple
Unit 5	**Prose** R.W. Emerson **American** **Century**. ed. Henry David Thoreau	 Self – Reliance(A**n Anthology:** **Literature of the Nineteenth** Fisher, Samuelson &Reninger, Vaid **Walden** (Chapter titled "Pond"

Course Objectives		
Title	**II**	**Eighteenth to Nineteenth Century**
Course Code	**HBB2B**	
CO-1	To familiarise the students with English poetry of Augustan period.	
CO-2	To get to know the Literature of Romantic period.	
CO-3	To sensitise the students to the poetic qualities of these two periods.	
CO-4	To learn to define and differentiate the classicism and Augustan ideals.	
CO-5	To get to know the place of Diction, Heroic couplet, verse satire and wit in poetry.	

Course Outcome		
Title	**II**	**Eighteenth to Nineteenth Century**
Course Code	**HBB2B**	
CO-1	Get a knowledge of classicism and Augustan ideals and its relevancy to present day situation.	
CO-2	Students learn to write a mock epic to satirical situation of today.	
CO-3	The place transitionists in the development 18^{th} century literature.	
CO-4	Student's aesthetic values of Romantics.	
CO-5	The role of Victorians in the growth of travelogue poetry and its impact on modern literature/	

Syllabus		
Title	**II Eighteenth to Nineteenth Century**	
Course Code	**HBB2B**	
Unit 1	Classicism and Augustan Ideals: Wit, Taste, Decorum, Propriety, Purity of Genre and Poetic Diction; Heroic Couplet; Verse Satire and Urbanism; Romantic Revolt; Pre-Raphaelites	
Unit 2	**Augustan Satire** Alexander Pope	**The Rape of the Lock**, Canto I (The Rape of the Lock ed.GeoffreyTillotson. Methun & Co. Ltd. London. 1941).
Unit 3	**Transitionists** William Blake	*From* **Songs of Experience** The Echoing Green Night *From* **Songs of Innocence** London
	William Collins	Ode to Evening
Unit 4	**Romantics** William Wordsworth	Ode on the Intimations of Immortality
	S.T. Coleridge	Dejection: An Ode
	P.B. Shelley	Ode to Skylark
	John Keats	Ode on a Grecian Urn
Unit 5	**Victorians** Robert Browning	Fra Lippo Lippi
	Lord Alfred Tennyson	Lotus Eaters
	G.M. Hopins	The Windhover
	Matthew Arnold	Dover Beach

Course Objectives	
Title	**II RESTORATION TO 20TH CEN**
Course Code	**HBB2C**
CO-1	The students will identify the familiar of European Drama.
CO-2	Analyse the different social issues in Europe.
CO-3	Determine the complex issues in European Literature.
CO-4	Explain the regional level of understanding.
CO-5	Describe the awareness of the changes and developments in the European Drama

Course Outcome	
Title	**II RESTORATION TO 20TH CEN**
Course Code	**HBB2C**
CO-1	Students are formed into skilled, knowledgeable, and ethical interpreters of literary texts in English by nurturing their ability to understand drama.
CO-2	Students learn historical contexts, psycho-social aspects and discern the various cultural and moral values associated with the texts.
CO-3	They become well acquainted with the literary genre of Drama. The rhetorical aspect of drama help them understand how to represent their experience and ideas critically.
CO-4	They learn the structure of a full length play and one act play, the dramatic devices and analyze the effect it creates in the audience.
CO-5	They learn to raise significant questions, reach well-reasoned conclusions, weigh alternative systems of thought, and enhance their creative expression.

Syllabus	
Title	**II RESTORATION TO 20TH CEN**
Course Code	**HBB2C**
Unit 1	UNIT I The Revival of Theatre; Comedy of Manners; Decadence in Restoration Drama; Sentimental Comedy; Decline of Drama in the 19th Century; Realism and Naturalism; Irish Dramatic Movement; Epic Theatre; Comedy of Menace; Post-Absurd Theatre and Women's Theatre.
Unit 2	UNIT 2 **Restoration** John Dryden — All for Love William Congreve — The Way of the World
Unit 3	UNIT 3 **Irish Dramatic Movement** J.M Synge — The Playboy of the Western World
Unit 4	UNIT 4 **Epic Theatre** Bertolt Brecht — Mother Courage and her Children **Comedy of Menace** Harold Pinter — Birthday Party
Unit 5	UNIT 5 **Post-Modern Drama** Samuel Beckett — Waiting for Godot

Course Objectives	
Title	**FICTION-II 19TH TO 20TH CEN**
Course Code	**HBB2D**
CO-1	A study of the Romantic Movement in an age of revolutions: its literary culture, its variety of genres, its cultural milieu, and the interactions of its writers.
CO-2	A study of the young writers who defined English literary culture, especially the Romantic Movement, in Regency and late Georgian England.
CO-3	A study of the more experimental, self-conscious narratives in modernist literature with emphasis on the major formal and stylistic innovations of representative modern texts.
CO-4	This course will at different times deal with particular currents of literature and thought in the 19th century, or with individual authors.
CO-5	A study of the Romantic Movement in an age of revolutions: its literary culture, its variety of genres, its cultural milieu, and the interactions of its writers.

Course Outcome	
Title	**FICTION-II 19TH TO 20TH CEN**
Course Code	**HBB2D**
CO-1	Understand the role of society and culture in the lives and writings of the writers of the age.
CO-2	Enhance the understanding of imaginative, communicative skill of the writers.
CO-3	Be exposed to different cultures, histories and myths through fiction.
CO-4	Be exposed to different techniques, narrative styles used by the writers.
CO-5	Deepen understanding the range of human experience and growing the pleasure of reading habits.

Syllabus	
Title	**FICTION-II 19TH TO 20TH CEN**
Course Code	**HBB2D**
Unit 1	UNIT I French Revolution – Victorian Social Scene Gender– Industrial Development – Colonial Expansion – Issues – Class, Liberal Humanism and the Individual – Individual and the Environment – Man and Fate, realism, multiple narration, stream of consciousness, point of view.
Unit 2	UNIT 2 **The Victorian Socio - Political and Economic Scenario** Joseph Conrad Heart of Darkness.
Unit 3	UNIT 3 **Women's Issues** Charlotte Bronte Jane Eyre George Eliot Mill on The Floss
Unit 4	UNIT 4 **Liberal Humanism, Individual Environment and Class Issues** D.H. Lawrence The Rainbow Virginia Woolf To the Lighthouse
Unit 5	UNIT 5 **Quest** James Joyce Portrait of the Artist as a Young Man

Course Objectives	
Title	**ENGLISH FOR CAREER**
Course Code	**HBB2E**
CO-1	To equip students the competence in the field of Knowledge Management.
CO-2	To develop in students the mastery over presentation skills.
CO-3	To develop basic concepts in effective business writing and knowledge management.
CO-4	To familiarise the students with the editing techniques for Newsletter and Press releases.
CO-5	To develop writings for oral communication and online CV writing and writing for a website.

Course Outcome	
Title	**ENGLISH FOR CAREER**
Course Code	**HBB2E**
CO-1	Students gain the concepts of business writing.
CO-2	Students develop mastery over presentation skills
CO-3	Students learn the editing techniques for Newsletter and Press Releases.
CO-4	Students equip with the competence in the field of knowledge management.
CO-5	Students develop writing for oral communication and online CV writing and writing for Website.

Syllabus	
Title	**ENGLISH FOR CAREER**
Course Code	**HBB2E**
Unit 1	Basic concepts in effective business writing and Knowledge Management
Unit 2	Editing techniques for Newsletters and Press Releases
Unit 3	Writing for oral communication, Online CV writing. [FOR OTHER DEPARTMENTS ONLY]
Unit 4	Writing for a website [FOR OTHER DEPARTMENTS ONLY]

Course Objectives	
Title	**SHAKESPEARE STUDIES**
Course Code	**HBB3A**
CO-1	To understand the feature of Elizabethan theatre along with Shakespeare’s work.
CO-2	To analyze themes in Shakespearean plays appreciate Shakespearean language and literary elements.
CO-3	To enact and enjoy important scenes from Shakespeare’s plays.
CO-4	To identify the familiar of Shakespeare works and compare with other writers.
CO-5	To understand Shakespeare’s works in the historical and cultural perspective.

Course Outcome	
Title	**SHAKESPEARE STUDIES**
Course Code	**HBB3A**
CO-1	Understand verbally and in writing Shakespeare's literary development.
CO-2	Understand about sonnets and poems.
CO-3	Understand verbally and in writing Shakespeare as a product of his society.
CO-4	Understand about verbally and in writing the relationship of Shakespearean literature to society.
CO-5	Understand major literary characters in Shakespeare's work.

Syllabus		
Title	**SHAKESPEARE STUDIES**	
Course Code	**HBB3A**	
Unit 1	Shakespeare Theatre; Theatre Conventions; Sources; Problems of categorization; Trends in Shakespeare Studies up to the 19th Century; Sonnet and court politics; famous actors; theatre criticism; Shakespeare into film & play production.	
Unit 2	**Sonnets** **Comedies**	Sonnets – 12, 65, 86,130 Much Ado About Nothing Winter's Tale
Unit 3	**Tragedy**	Othello
Unit 4	**History**	Henry IV Part I
Unit 5	**Shakespeare Criticism** Modern approaches - mythical, archetypal, feminist, post-colonial, New historicist; A.C. Bradley (extract) **Shakespearean Tragedy**, Macmillan, Third Edition , 1992 Wilson Knight Metaphysic of Evil (1976, V.S. Seturaman& S. Ramaswamy**English Critical Tradition Vol. I.** Chennai, Macmillan). Stephen Greenblatt Invisible Bullets: Rennaissance Authority and its Subversion, Henry IV & Henry V, in **Shakespearean Negotiations**.	Chapter V & VI and the New Introduction by John Russell Brown in London ,

New York: Oxford University Press, 1988

Also in **Political Shakespeare: New Essays in Cultural Materialism**. Eds.Jonathan Dollimore and Alan Sinfield Manchester University Press, 1994

AniaLoomba Sexuality and Racial Difference in **Gender, Race, And Renaissance Drama**, Manchester UP, 1989.

Course Objectives	
Title	**ENGLISH LANGUAGE AND LINGUSTICS**
Course Code	**HBB3B**
CO-1	To understand the basic context of a language.
CO-2	To identify the basic term and concepts of linguistics.
CO-3	To gain integrated knowledge of linguistics and language.
CO-4	To recognize and analyze various language theories.
CO-5	To understand difference between language and linguistics

Course Outcome	
Title	**ENGLISH LANGUAGE AND LINGUSTICS**
Course Code	**HBB3B**
CO-1	Understand language structures and functioning of the language.
CO-2	Understand the application of linguistics on other related disciplines.
CO-3	Understand the internal organization of words in languages.
CO-4	Understand the characteristics of seamless morphology
CO-5	Understand the nature and basic concepts of phone

Syllabus	
Title	**ENGLISH LANGUAGE AND LINGUSTICS**
Course Code	**HBB3B**
Unit 1	**Unit I - Phonology** 1) The Sounds of Language 2) The Sound Patterns of Language 3) Transcription & Reverse Transcription
Unit 2	**Unit II - Linguistics** 1) Language and the Brain 2) Language & Regional Variation 3) Language & Social Variation 4) Language & Culture
Unit 3	**Unit III - Teaching of English as Second Language (TESL)** • English Language Teaching (ELT), English as Foreign Language (EFL), English as Second Language (ESL), English for Specific Purpose (ESP) • ELT Theories, Approaches, and Methods • Student Diversity and Classroom Management; Teacher as Facilitator or Mentor • Classroom Observation; Teacher Reflection; Teaching Journals • Peer Teaching and Group Teaching; Professional Development of Teachers
Unit 4	**Unit IV - Curriculum Development and Language Assessment**

	• Types of Syllabus; Materials Design and Development; Lesson Plans • Synchronous and Asynchronous Learning, Learning Management Systems (LMS) • Outcome Based Education (OBE), Bloom's Taxonomy, ADDIE Model • Wash-Back Effect; Formative and Summative Assessment • Test Validity, Reliability, and Practicality; Multiple Choice Questions (MCQ), Item Difficulty, Distractor Analysis • Common European Framework of Reference for Languages(CEFR)
Unit 5	**Unit V - Digital Literacy and Action Research** • Digital Language Labs - Synchronous and Asynchronous language teaching • ICT tools, Mobile Learning, Video-Conferencing, Podcasting, Digital Story-telling • Web 2.0 - Language Learning apps, Blogs, Social Networks, • Blended Learning, Flipped Classroom • Fundamental Research, Empirical Research, Evaluative Research, Action Research

Course Objectives	
Title	**LITERARY CRITICISM AND LITERARY THEORY**
Course Code	**HBB3C**
CO-1	To acquire critical temper through literary works.
CO-2	To get holistic understanding of the critics and perspectives.
CO-3	To explore the evolution of criticism.
CO-4	To remember the perspectives of criticism and critics.
CO-5	To analyze the elements of criticism.

Course Outcome	
Title	**LITERARY CRITICISM AND LITERARY THEORY**
Course Code	**HBB3C**
CO-1	Understand about the global human condition, today and over the last 350 years.
CO-2	Understand about appreciation of landmark Western and Nonwestern texts.
CO-3	Understand about similar and dissimilar values within works of varying cultures and periods.
CO-4	Understand about Realism, Modernism, Post-Colonialism, Post-Modernism.
CO-5	Understand about civilly the depictions of race, religion, class and gender in the works studied.

Syllabus	
Title	**LITERARY CRITICISM AND LITERARY THEORY**
Course Code	**HBB3C**
Unit 1	Imitation - Pleasure and Instruction - Myths and Archetypes - Poetic Structure -Diction; Text –Author-Reader - The 'Other' – Formalism – Structuralism – Deconstruction – Post-Colonialism.
Unit 2	**Classical, Neo - Classical and Romantic Criticism** Aristotle — **Poetics:** Aristotle's view of Imitation & Definition of Tragedy Chapters 1-3,6-12 and 14. Sir Philip Sidney — Apologie for Poetry William Wordsworth — Preface to Lyrical Ballads S.T. Coleridge — BiographiaLiterariaCh 14

Unit 3		
	Humanistic Criticism	
	Matthew Arnold	Study of Poetry
	T.S. Eliot	Tradition and the Individual Talent
Unit 4		
	Formalism and Structuralism	
	Cleanth Brooks	Language of Paradox
	Northrop Frye	The Archetypes of Literature
	Gerard Genette	Structuralism and Literary
	Post Structuralism	
	Roland Barthes	Death of the Author
	Edward Said	(*From* "Orientalism" Extract in **A Post-Colonial Studies Reader**)
Unit 5		
	Imitation - Pleasure and Instruction - Myths and Archetypes - Poetic Structure -Diction; Text –Author-Reader - The 'Other' – Formalism – Structuralism – Deconstruction – Post-Colonialism.	

Course Objectives	
Title	**LITERATURE, ANALYSIS, APPROACHES AND APPLICATION AND COPY EDITING**
Course Code	**HBBXB**
CO-1	**To Review grammar, spelling, punctuation, style, and readability**
CO-2	**To Research and verify facts**
CO-3	**To Spot typographical errors**
CO-4	**To Express ideas clearly and logically while adhering to editorial policy**
CO-5	**To Preserve the original writer's voice throughout the copy-revision process**

Course Outcome	
Title	**LITERATURE, ANALYSIS, APPROACHES AND APPLICATION AND COPY EDITING**
Course Code	**HBBXB**
CO-1	Demonstrate basic knowledge of the history of publishing, including print, digital, and other media.
CO-2	Assess the quality and fit of submissions in a range of genres for publication in a variety of media.
CO-3	Employ editing skills—developmental, line, and copy—to improve submissions at the levels of both form and content.
CO-4	Collaborate with teams of editors and designers to create a quality publication that aligns with a discrete aesthetic mission.
CO-5	Write, edit, and design print and online media for a range of entities in the arts industry.

Syllabus	
Title	**LITERATURE, ANALYSIS, APPROACHES AND APPLICATION AND COPY EDITING**
Course Code	**HBBXB**
Unit 1	Practical Criticism – Critique and Book Review.
Unit 2	Publishing Industry: Concept organisation function.
Unit 3	Copy Editing : Basics Functions Role and Process; Copy Editor: Role and Responsibility
Unit 4	Proof Reading, Editing and E- Publishing
Unit 5	Technical Writing- Manuals, Business Correspondence

Course Objectives	
Title	**INTRODUTION TO TRANSLATION STUDIES**
Course Code	**HBB3D**
CO-1	To understand the concepts and issues in translation.
CO-2	To create an opportunity to translate a book.
CO-3	To have a conceptual understanding of the translation theories.
CO-4	To identify and explain process of translation.
CO-5	To evaluate the skills involved in translation study.

Course Outcome	
Title	**INTRODUTION TO TRANSLATION STUDIES**
Course Code	**HBB3D**
CO-1	Understand the basic theories and approaches of translations.
CO-2	Understand about theories and approaches in the translation of various texts in English and Turkish.
CO-3	Able to identify the decisions made by the translator using theoretical terminology while analyzing translated texts in both languages.
CO-4	Improve to explain the problems encountered during translational act and criticism using specialized terminology of translation theory.
CO-5	Improve to offer solutions for the problems encountered during translational act and criticism regarding translation theory in the light of the acquired theoretical knowledge.

Syllabus	
Title	**INTRODUTION TO TRANSLATION STUDIES**
Course Code	**HBB3D**
Unit 1	**Basic concepts of Translation (10 Hrs)** 1.1Kinds of Translation 1.1.1. Interlingual 1.1.2. Intralingual 1.1.3. Intersemiotic 1.2Concepts to be derived from practice 1.2.1 Source Language and Target Language 1.2.2 Equivalence 1.2.3 Word for word, Sense for Sense

Unit 2	**Translation in the Indian context (15 Hrs.)** 1.1Introduction to Short Fiction from South India by Mini Krishnan 1.2Translating Culture Codes
Unit 3	**Literary Texts in translation (10 Hrs)** 3.1 VM Basheer - Poovan Banana 3.2 Ki. Rajanarayanan - 'The Chair' in *Tamil Story*, E Dilip Kumar 3.3 Comparing two translation of a Text
Unit 4	**Application of Translation (10 Hrs.)** 4.1Dubbing and Subtitling 4.2Advertisements 4.3Film Harry Potter and the Order of the Phoenix
Unit 5	**Practical Application Tasks (7 Hrs.)**

Course Objectives	
Title	**20TH CEN POETRY**
Course Code	**HBB4A**
CO-1	To introduce the student to British poetry and drama from the age of Chaucer to the age of pope.
CO-2	To comprehend the development of trends in British drama and poetry.
CO-3	To view British literature in its socio-cultural and political contexts.
CO-4	To understand the theme, structure and style in British poetry and drama.
CO-5	To comprehend the development of trends in British

Course Outcome	
Title	**20TH CEN POETRY**
Course Code	**HBB4A**
CO-1	Apply knowledge of the historical and cultural contexts of the literature of the Romantic, Victorian and Modernist eras to some major authors, works and genres.
CO-2	Identify key elements that are distinctive to literary achievement of writers in the Romantic, Victorian and Modernist periods of British literary history.
CO-3	Reflect and write analytically about the literary works and their contexts.
CO-4	Develop their own skills of literacy critical analysis.
CO-5	Understand and successfully deploy a range of terms and concepts integral to literary studies.

Syllabus		
Title	**20TH CEN POETRY**	
Course Code	**HBB4A**	
Unit 1	Edwardian and Georgian Poetry - Modernism – Modernity – Religion – Imagism – Symbolism – Influence of representational arts in poetry - European influences – Influence of Marx on World Wars – Welfare State – Free Verse – Montage, Postmodern Poetry and Politics.	
Unit 2	Classical Modernists W.B. Yeats T.S. Eliot	 Sailing to Byzantium The Wasteland
Unit 3	War and Modernist Poetry Wilfred Owen W.H. Auden Yeats	 Strange Meeting In Memory of W.B.
Unit 4	Anti–Modernism Movement Poets Philip Larkin Ted Hughes Thom Gunn Welsh Poets	 Whitsun Weddings Crow's Theology On the Move

	Dylan Thomas	Do Not Go Gentle Into That Good Night
	R. S. Thomas	Here
Unit 5	**Post-Modern Poetry**	
	Seamus Heaney	Digging
	Craig Raine	A Martian Sends a Post Card Home

Course Objectives	
Title	**WRITINGS BY AND ON WOMEN**
Course Code	**HBB4B**
CO-1	Interpret literary works by women at an advanced undergraduate level;
CO-2	Explain and participate in critical and theoretical debates surrounding women's writing at advanced undergraduate level;
CO-3	Explain cultural, intercultural, and transhistorical concerns relating to women's writing;
CO-4	Locate and compile selections from primary and secondary sources relevant to women authors.
CO-5	Critical and theoretical debates related to women's writing.

Course Outcome	
Title	**WRITINGS BY AND ON WOMEN**
Course Code	**HBB4B**
CO-1	Features of literary language used by women writers, including genre and form;
CO-2	Literary, cultural, and sociopolitical themes of women's writing;
CO-3	The historical and material contexts in which women wrote and shared their work;
CO-4	The status and reception of women's writing across various geographical locations and time periods;
CO-5	Features of literary language used by women writers, including genre and form;

Syllabus	
Title	**WRITINGS BY AND ON WOMEN**
Course Code	**HBB4B**
Unit 1	Varieties of Feminism – concept of gender – androgyny- Language of women – environment and women- double marginalisation.
Unit 2	**Poetry:** Anne Bradstreet — Prologue Marianne Moore — Poetry Sylvia Plath — Lady Lazarus. Maya Angelou — Still I Rise Margaret Atwood — Marsh Languages Charmaine D'Souza — When God made me a Whore(Rajani P, V. Rajagopalan, Nirmal Selvamony, eds., **Living & Feeling**, Dept. of English., M.C.C.)
Unit 3	**Prose:** John Stuart Mill — On subjection of women (V.S. Seturaman & C.T. Indraed., 1994, **Victorian Prose**,Macmillan India, Chennai. pp-318) Virginia Woolf — **A Room of One's Own** (chapters 3 & 4) (Jennifer Smith ed., 1998, **A Room of One's Own by Virginia Woolf,** Cambridge UP, New Delhi.) Vandana Shiva — "Introduction to Ecofeminism"(Vandana Shiva & Maria Mies, 1993, **Ecofeminism**, Kali for Women, New Delhi. Alice Walker — In Search of Our Mother's Garden
Unit 4	**Fiction** Arundathi Roy — **The God of Small Things** Jean Rhys — **Wide Sargosa Sea** Kate Chopin — **The Awakening**
Unit 5	**Drama** Lorraine Hansberry — **Raisin in the Sun** Jane Harrison — **Stolen**

Course Objectives	
Title	**ENGLISH LITERATURE FOR UGC NET/SET EXAMINATIONS**
Course Code	**HBB4C**
CO-1	To train the students to get through NET/SET and other competitive exams,
CO-2	To make the students to master the subject.
CO-3	To evaluate the students' knowledge of literature.
CO-4	To get to know the different British ages in literature and its impact in the growth of world English literature especially in American and Non-British literature.
CO-5	To familiarise the students with all Nobel Prize and Pulitzer Prize winners and thus motivate the students towards different awards.

Course Outcome	
Title	**ENGLISH LITERATURE FOR UGC NET/SET EXAMINATIONS**
Course Code	**HBB4C**
CO-1	Students learns in detailed the characteristics of different ages for NET /SLET Exams.
CO-2	Students learn the changes in the trends of modern and post-modern literature.
CO-3	Students learn the importance of American and Non-British Literature to compare with World Literature.
CO-4	Students learn about the Nobel Prize and Pulitzer Prize winners and their contribution to the growth of literature.
CO-5	Students learn the aspect of Rhetorical and Prosody and learn to use them in out of Classroom situation.

Syllabus	
Title	**ENGLISH LITERATURE FOR UGC NET/SET EXAMINATIONS**
Course Code	**HBB4C**
Unit 1	**The Elizabethan Age / Chaucer to Shakespeare**: Historical Perspective and Background; Origins of Drama; Elizabethan Plays, Prose and Sonnets.
Unit 2	**The Jacobean Age**: Historical Perspective and Background; the Revenge Tragedies; the Metaphysical Poets; the Cavalier Poets. John Webster, Thomas Middleton, Thomas Heywood, Francis Bacon and John Bunyan
Unit 3	**The Restoration Period**: Historical Perspective and Background; Restoration Satire; Comedy of Manners. John Dryden, John Milton, John Bunyan, William Congreve, Samuel Butler and William Wycherley.
Unit 4	**The Augustan Age**: Historical Perspective and Background; Satire and Sentimental Comedy
Unit 5	**The Romantic Age**: Precursors; Transitionists; Romantic Poets and Essayists. Robert Burns, William Blake, Thomas Gray, William Collins, William Wordsworth, S.T. Coleridge, P.B.Shelley, John Keats, Charles Lamb, Leigh Hunt, William Hazlitt, Thomas De Quincy, Ann Radcliffe and Jane Austen.

Course Objectives	
Title	**FILM STUDIES**
Course Code	**HBB4D**
CO-1	To analyse the historical and theoretical foundations of filmmaking.
CO-2	To Create film work that manifests the filmmaker's unique voice.
CO-3	To Analyze story structure and the screenwriting process for use in the critique and creation of film.
CO-4	To Apply current best practices in cinematography.
CO-5	To Apply current best practices in editing language and visual effects.

Course Outcome	
Title	**FILM STUDIES**
Course Code	**HBB4D**
CO-1	Observe with knowledge and reflect upon the articulation of a film's content
CO-2	Identify and define the formal and stylistic elements of film. Develop an understanding of film language and terminology
CO-3	Gain a basic understanding of film theory and global film history
CO-4	Demonstrate familiarity with diverse forms of the moving image
CO-5	Understand the relationship between film form and its historical and cultural contexts. Describe how a film offers a set of social

Syllabus	
Title	**FILM STUDIES**
Course Code	**HBB4D**
Unit 1	History of Cinema in India; Major landmarks in India Cinema
Unit 2	**Kinds of Films** Historical Patriotic Documentary Thrillers etc.
Unit 3	Art of Film Making: Some Important Techniques Acting/ Photography/Direction/Scriptwriting etc
Unit 4	Films and Entertainment Films and Social Responsibility
Unit 5	Review of Films

JAYA COLLEGE OF ARTS AND SCIENCE

(AFFILIATED TO UNIVERSITY OF MADRAS)

THIRUNINRAVUR – 602024

DEPARTMENT OF TAMIL

Program : B.A Tamil

Program Outcomes	
	On completion of the programme, the student will be able to
PO-1	காலந்தோறும்தமிழ்அடைந்துள்ளவளர்ச்சியும்பரந்துவிரிந்துகிடக்கும்அதன் ஆழஅகலத்தையும்ஒருபருந்துப்பார்வையில்நோக்குவதோடு, தமிழ்இலக்கியத்தையும்இவக்கணத்தையும்நுட்பமாகக்கற்றுணரும்வகையிலு ம்இளங்கலைத்தமிழ்ப்பாடப்பகுதிகட்டமைக்கப்பட்டுள்ளது.
PO-2	தமிழ்இலக்கியவரலாற்றுடன்தமிழகவரலாற்றையும்ஒருசேரமாணவர்கள்கற் றுப்பயனடையும்நல்லதோர்இலக்கைச்சிறப்புறஅடையஇப்பாடத்திட்டம்வழ ிவகுக்கும்
PO-3	தொல்லிலக்கியம்முதல்புத்திலக்கியம்வரையுள்ளபல்வகைஇலக்கியக்கூறுக ள்மிளிரும்இப்பாடத்தினைமாணவர்கள்சுற்றுப்பயனடைவர். மொழியியல்போக்கினையும்திறனாய்வுக்கலையையும்கற்கும்சூழலைஇப்பா டத்திட்டம்வழங்குகிறது
PO-4	பழைமையும்புதுமையும்கைகோக்கும்களமாகஇளங்கலைத்தமிழ்விளங்குகிற துஎன்பதற்குஏற்பத்தொல்தமிழ்நூல்களோடுகணினி - இணையத்தையும்இப்பாடத்திட்டம்வழங்குகிறது
PO-5	கற்றலும்பயன்பாடும்

Program Specific Outcomes	
	On completion of the programme, the student will be able to
PSO-1	.பல்வேறுபோட்டித்தேர்வுகளைஎதிர்கொள்ளும்வகையில்இலக்கியவரலாற் றுப்பகுதிமிகுந்தபயன்பாடுஉடையதாய்இருக்கும்
PSO-2	போட்டித்தேர்வுகளில்பங்கேற்கலாம்
PSO-3	.திரைப்படத்துறையில்பணியாற்றலாம்
PSO-4	.பத்திரிகைதுறையில்பணியாற்றலாம்
PSO-5	.கதை,கவிதை,சிறுகதை,கட்டுரை,நாவல்போன்றவற்றைஎழுதலாம்

Course Objectives	
Title	PART-1**மொழித்தாள்**-1

Course Code	LA11A
CO-1	மாணவர்கள் பொதுதமிழ்படிப்பதன் மூலம் தமிழ்பற்றியும் தமிழின் முக்கியத்துவத்தைப் பற்றியும் தெரிந்து கொள்ளமுடிகிறது
CO-2	மரபுக்கவிதை,புதுக்கவிதை எவ்வாறு இயற்றலாம் என்பது பற்றியும்அ றிந்துகொள்ள முடிகிறது
CO-3	.புதுக்கவிதை,மரபுக்கவிதை ஆசிரியர்களைபற்றியும் நன்கு அறிந்து கொள்ளமுடிகிறது
CO-4	.கவிதைகளை எவ்வாறு அவர்கள் இயற்றினார்கள்அதில் உள்ள விளக்கங்களையும் நன்கு தெளிவுபடுத்திக் கொள்ளலாம்.
CO-5	நாட்டுப்புறப்பாடல்களில் இருந்து நாட்டுப்புறமக்களின் பாரம்பரியமுறைகள் பற்றியும் அவர்கள் வாழ்ந்த வாழ்க்கை பற்றியும்நன்றாகஅறிந்து கொள்ளமுடிகிறது

Course Outcome	
Title	PART-1**மொழித்தாள்**-1
Course Code	LA11A
CO-1	நாட்டுப்புறப்பாடல்கள் எவ்வாறு இயற்றப்படுகின்றன அவை எந்தெந்தசூழல்களில் நாட்டுப்புறபாடல்கள் பாடப்படுகின்றன என்பதைபற்றியும் நன்குஅறிந்துகொள்ளமுடியும்
CO-2	நாடகம்மற்றும்சிறுகதைகளின்மூலம்மாணவர்கள்தங்களின்படைப்புத்திற னைவளர்த்துக்கொள்ளலாம்
CO-3	உரைநடையின்மூலம்சங்ககாலமன்னர்களின்வாழ்க்கைபற்றியும்அவர்கள ின்கொடைதிறமையைபற்றியும்அறிந்துகொள்ளமுடிகிறது
CO-4	.மாணவர்கள்இவற்றைபடிப்பதன்மூலம்தமிழ்மற்றும்தமிழரின்பெருமைந ன்குஅறிந்துகொள்ளமுடியும்
CO-5	கவிதைகளை எவ்வாறு அவர்கள் இயற்றினார்கள்அதில் உள்ள விளக்கங்களையும் நன்கு தெளிவுபடுத்திக் கொள்ளலாம்

Syllabus	
Title	PART-1**மொழித்தாள்**-1
Course Code	LA11A
Unit 1	**மரபுக்கவிதை** • பாரதியார்- பாரதசமுதாயம். • பாரதிதாசன் – ஒற்றுமைப்பாட்டு • கவிமணிதேசிகவிநாயகம்பிள்ளை - உடல்நலம்பேணல்

	• நாமக்கல்கவிஞர்வெ. இராமலிங்கம்பிள்ளை - தமிழன் இதயம்• கவிஞர்கண்ணதாசன் - குடும்பம்ஒருகதம்பம் • பட்டுக்கோட்டைஅ. கல்யாணசுந்தரம் - வருங்காலம்உண்டு தமிழ்ஒளி - வழிப்பயணம்**புதுக்கவிதை** •கவிஞர் ந. பிச்சமூர்த்தி - காதல், லீலை •கவிஞர் அப்துல்ரகுமான் - பித்தன் • கவிஞர்மு.மேத்தா ஒருகடிதம்அனாதையாகிவிட்டது, நிழல்கள்• கவிஞர் இன்குலாப் ஒவ்வொருபுல்லையும் பெயர் சொல்லி அழைப்பேன்• கவிஞர் தமிழன்பன் - சொல்லில்உயர்வுதமிழ்ச்சொல்லே •கவிஞர்வைரமுத்து - விதைச்சோளம் • கவிஞர்அ.சங்கரி – இன்று நான் பெரியபெண்
Unit 2	ஏற்றப்பாட்டு •தெம்மாங்கு •அம்பாபாடல்கள் •விளையாட்டுப்பாடல்கள் •நடவுப்பாடல்கள்
Unit 3	**சிறுகதைகள்** •கு.ப.ரா - கனகாம்பரம் •கு.அழகிரிசாமி - குமாரபுரம்ஸ்டேஷன் • தமிழ்ச்செல்வன் - வெயிலோடுபோய் •தோப்பில்முகமதுமீரான் - வட்டக்கண்ணாடி • அம்பை – பிளாஸ்டிக்டப்பாவில் பராசக்தி முதலியோர் **உரைநடை** • இரா.பி.சேதுப்பிள்ளை - வண்மையும் வறுமையும்
Unit 4	• நா.முத்துசாமி – நாற்காலிக்காரர்
Unit 5	தமிழிலக்கியவரலாறு • மரபுக்கவிதை – இருபதாம் நூற்றாண்டுகவிஞர்கள் புதுக்கவிதை • நாட்டுப்புறப்பாடல்கள், கதைகள், கதைப்பாடல்கள், பழமொழிகள்.விடுகதைகள் • சிறுகதை, உரைநடைவரலாறு • நாடகம் சார்ந்தபகுதிகள்

Course Objectives	
Title	PART-1**மொழித்தாள்**-II
Course Code	LA12A

CO-1	மாணவ மாணவியர்பக்தி இயக்கத்தின் விளைவாக பக்தி இலக்கியங்கள் தோன்றி வளர்ந்த வரலாற்றை அறிந்துகொள்வர்.
CO-2	2 பக்தி இலககிய வகைகளைத் தெரிந்துகொள்வர்
CO-3	3.தமிழால் சமயமும் சமயத்தால் தமிழும் வளர்ந்ததை அறிவர்
CO-4	4.மாணவர்களுக்குவாழ்வியல்நெறிகளைகடைபிடிக்கஅறிந்துகொள்ளுதல்
CO-5	5.மாணவர்கள்தங்கள்அணுகுமுறையைசரிவரசெய்தல்

Course Outcome	
Title	PART-1**மொழித்தாள்**-II
Course Code	LA12A
CO-1	விருந்தினரை எவ்வாறுஉபசரிக்க வேண்டும் என்றுவிருந்தோம்பல் பண்பைதெரிந்துகொள்ளலாம்
CO-2	.பழந்தமிழர் கொடைப் பண்பினைத் தெரிந்துகொள்ளலாம்
CO-3	.இருப்பவர்கள் இல்லாதவர்களுக்குகொடுத்து உதவவேண்டும்என்பதை அறிந்துகொள்ளலாம்
CO-4	எவ்வாறு ஒற்றுமையாகவாழவேண்டும்என்றபண்பைஅறிந்துகொள்ளலாம்.
CO-5	பலவகை கலை திறமைகளைபற்றி தெரிந்துகொள்ளலாம்.

Syllabus	
Title	PART-1**மொழித்தாள்**-II
Course Code	LA12A
Unit 1	நற்றிணை – 61,88 குறுன்தொகை -87,88,89 கலித்தொகை -11 ஆம் பாடல் -அரிதாய அரன் எய்தி

Unit 2	அகநானூறு -86 ஆம் பாடல் (உழுந்து தலைபெய்த) ஐங்குறுநூறு - கிள்ளைப்பத்து பரிபாடல் - செவ்வேள்5 (கடுவன் இளவெயினார்) 1முதல் 10வரிகள்-வெற்றிவேல்
Unit 3	புறநானூறு – 48,293 பதிற்றுப்பத்து - காக்கைப்பாடினியார், நச்செள்ளையார் பாடல்கள்
Unit 4	பத்துப்பாட்டு - முல்லைப்பாட்டு (முழுவதும்)
Unit 5	.திருக்குறள் - பொருட்பால் - 3 அதிகாரம் (காலமறிதல், சுற்றந்தழால், கண்ணோட்டம்) 2.நாலடியார் - ஈகை (முதல் 5 பாடல்கள்) // தமிழிலக்கிய வரலாறு முச்சங்க வரலாறு, பதினெண்மேற்கணக்கு நூல்கள் (எட்டுத்தொகை, பத்துப்பாட்டு) பதினெண்கீழ்க்கணக்கு நூல்கள்

Course Objectives	
Title	PART-**1மொழித்தாள்-**III
Course Code	LA13A
CO-1	மாணவ மாணவியர்பக்தி இயக்கத்தின் விளைவாக பக்தி இலக்கியங்கள் தோன்றி வளர்ந்த வரலாற்றை அறிந்துகொள்வர்.
CO-2	பக்தி இலககிய வகைகளைத் தெரிந்துகொள்வர்
CO-3	தமிழால் சமயமும் சமயத்தால் தமிழும் வளர்ந்ததை அறிவர்
CO-4	மாணவர்களுக்குவாழ்வியல்நெறிகளைகடைபிடிக்கஅறிந்துகொள்ளுதல்
CO-5	மாணவர்கள்தங்கள்அணுகுமுறையைசரிவரசெய்தல்

Course Outcome	
Title	PART-**1மொழித்தாள்-**III
Course Code	LA13A
CO-1	பக்தி இலககிய வகைகளைத் தெரிந்துகொள்வர்
CO-2	.தமிழால் சமயமும் சமயத்தால் தமிழும் வளர்ந்ததை அறிவர்
CO-3	.மாணவர்களுக்குவாழ்வியல்நெறிகளைகடைபிடிக்கஅறிந்துகொள்ளுதல்
CO-4	.மாணவர்கள்தங்கள்அணுகுமுறையைசரிவரசெய்தல் **I.இலக்கியம்**
CO-5	அதைச்சார்ந்ததமிழிலக்கியவரலாறு

Syllabus	
Title	PART-**1மொழித்தாள்-**III

Course Code	LA13A
Unit 1	**அலகு-1** காரைக்கால்அம்மையார் - அற்புதத்திருவந்தாதி ("பிறந்துமொழி" எனத்தொடங்கி 5 பாடல்கள்) தேவாரம் திருஞானசம்பந்தர் -திருத்தில்லைபதிகம் "கற்றாங்கு"எனத்தொடங்கி11பாடல்கள் 3.திருநாவுக்கரசர் - "மாசில்வீணையும்" எனத்தொடங்கி 10 பாடல்கள் சுந்தரர்-"பித்தாபிறைசூடி"எனத்தொடங்கி 10 பாடல்கள் 5.மாணிக்கவாசகர் - திருப்பள்ளியெழுச்சி 10 பாடல்கள்
Unit 2	.ஆண்டாள் - நாச்சியார்திருமொழி - ஏழாம்பத்து பொய்கையாழ்வார்,பூதத்தாழ்வார், பேயாழ்வார் –முதல்பாடல் நம்மாழ்வார் - முதல்பத்து - நான்காம் திருமொழிமுதல் 5 பாடல்கள்
Unit 3	தாயுமானவர் - பைங்கிளிகண்ணி (5 கண்ணிகள்) வள்ளலார் - திருவருட்பா - பிள்ளைச்சிறுவிண்ணப்பம் (1-5) அருணகிரிநாதர் - விநாயகர்துதி - நினதுதிருவடிஎனத்தொடங்கும் 5 ஆம்பாடல்
Unit 4	சித்தர்பாடல்கள் - திருமூலர் - திருமந்திரம் (270,271,274,275,285) குணங்குடிமஸ்தான் - பராபரக்கண்ணி (முதல்பத்துக்கண்ணிகள்) வேதநாயகம்பிள்ளை - தாய்தந்தையர்வணக்கம் 25 - 32 வரிகள் பெண்மதிமாலை
Unit 5	முத்தொள்ளாயிரம் தமிழ்விடுதூது - முதல் 16கண்ணிகள் நந்திக்கலம்பகம்(61,96,100,105,110) **தமிழிலக்கியவரலாறு**பக்தி இலக்கியம் (சைவம்,வைணவம், சித்தர்கள். இஸ்லாம்,கிறித்துவம்) சிற்றிலக்கியங்கள்

Course Objectives	
Title	PART**-1மொழித்தாள்-**IV
Course Code	LA14A
CO-1	தமிழின் ஐம்பெரும்காப்பியங்கள் ஐஞ்சிறுகாப்பியங்கள் பற்றித் தெரிந்துகொள்ளலாம்.
CO-2	சிற்றிலக்கியங்கள் பற்றிய செய்திகளைத் தெரிந்துக்கொள்ளலாம்.
CO-3	கிறிஸ்தவ இலக்கியங்கள் பற்றித் தெரிந்துக்கொள்ளலாம்.
CO-4	இஸ்லாமிய இலக்கியங்கள் பற்றித் தெரிந்துகொள்ளலாம்.
CO-5	மதுரை மாநகரின் எழில் பற்றி தெரிந்துக்கொள்ளலாம்

Course Outcome	
Title	PART**-1மொழித்தாள்-**IV

Course Code	LA14A
CO-1	கிறிஸ்தவக்கொள்கைகள் இஸ்லாமியக்கொள்கைகள் பௌத்த மதகொள்கைகள்பற்றித் தெரிந்துக் கொள்ளலாம்.
CO-2	பிள்ளையார்,மீனாட்சிஅம்மை,சிவபெருமான் போன்ற தெய்வங்களின் சிறப்புகள் பற்றித் தெரிந்துக் கொள்ளலாம்.
CO-3	குழந்தைகளின்ருவங்கள்ற்றித்ரிந்துகொள்ளலாம்
CO-4	சிற்றிலக்கியங்கள் பற்றிய செய்திகளைத் தெரிந்துக்கொள்ளலாம்.
CO-5	கிபாடப்பகிர்வு I இலக்கியம் II அதைச்சார்ந்ததமிழிலக்கியவரலாறு III மொழித்திறன் றிஸ்தவ இலக்கியங்கள் பற்றித் தெரிந்துக்கொள்ளலாம்

Syllabus	
Title	PART-1மொழித்தாள்-IV
Course Code	LA14A
Unit 1	சிலப்பதிகாரம் - ஊர்க்காண்காதை மணிமேகலை - பாத்திரமரபுகூறிய காதை
Unit 2	சீவகசிந்தாமணி - ஏமாங்கதநாட்டுவளம் 10 பாடல்கள் 2.சூளாமணி - 5 பாடல்கள் (நாட்டுச்சருக்கம், நகரச்சருக்கம், தூதுசருக்கம், கல்யாணச்சருக்கம், சுயம்வரச்சருக்கம்)
Unit 3	சீவகசிந்தாமணி - ஏமாங்கதநாட்டுவளம் 10 பாடல்கள் 2.சூளாமணி - 5 பாடல்கள் (நாட்டுச்சருக்கம், நகரச்சருக்கம், தூதுசருக்கம், கல்யாணச்சருக்கம், சுயம்வரச்சருக்கம்)

Unit 4	சீறாப்புராணம் - உடும்புபேசியபடலம் - 40 பாடல்கள் தேம்பாவணி - வளன்சனித்தபடலம் - 31 பாடல்கள்
Unit 5	மீனாட்சியம்மைபிள்ளைத்தமிழ் - வருகைப்பருவம் - 5 பா திருக்குற்றாலக்குறவஞ்சி - மலைவளம் **II இலக்கியவரலாறு** காப்பிய இலக்கியங்கள் சிற்றிலக்கியங்கள் இஸ்லாமிய இலக்கியவரலாறு கிறித்துவஇலக்கியவரலாறு **III மொழித்திறனறிதல்** i. கலைச்சொற்கள் ii. படைப்பு - சிறுகதை (அ) புதுக்கவிதை மதிப்பெண்பங்கீடு - I & II - 50 III -25

Course Objectives	
Title	CORE-I **இக்காலஇலக்கியம்**
Course Code	AT21A
CO-1	மாணவர்கள்கவிதைஎழுதகற்றுக்கொள்ளமுடியும்
CO-2	வேளாண்மைதொழில்மேன்மைபற்றிதெரிந்துகொள்ளலாம்
CO-3	மாணவர்கள்கட்டுரைஎழுதுதல்பற்றிதெரிந்துகொள்ளலாம்
CO-4	தமிழர்கள்இயற்கைவளங்களைஎவ்வாறுபாதுகாக்கவேண்டும்என்பதைபற்றி தெரிந்துகொள்ளலாம்
CO-5	பெண்கல்வியின்முக்கியத்துவத்தைதெரிந்துகொள்ளலாம்

Course Outcome	
Title	CORE-I **இக்காலஇலக்கியம்**

Course Code	AT21A
CO-1	சிறுகதையின்தன்மைகளைப்பற்றிதெரிந்துகொண்டுஎழுதலாம்
CO-2	கதைகள்எழுதுவதைப்பற்றிதெரிந்துகொள்ளலாம்
CO-3	மாணவர்கள்கவிதைஎழுதகற்றுக்கொள்ளமுடியும்
CO-4	வேளாண்மைதொழில்மேன்மைபற்றிதெரிந்துகொள்ளலாம்
CO-5	மாணவர்கள்கட்டுரைஎழுதுதல்பற்றிதெரிந்துகொள்ளலாம்

Syllabus	
Title	CORE-I **இக்காலஇலக்கியம்**
Course Code	AT21A
Unit 1	மரபுக்கவிதை பாரதியார்கண்ணன்பாட்டு (1 முதல் 5),கண்ணன்என்தோழன், தாய், தந்தை, சேவகள, அரசன், பாரதிதாசன் - சஞ்சீவிபர்வதத்தின்சாரல் புதுக்கவிதை ஈரோடுதமிழன்பன் - கதைமுடியவில்லை, பூம்புகார்பதிப்பகம்
Unit 2	புதினம் இராஜம்கிருஷ்ணன்கோடுகளும்கோலங்களும்
Unit 3	சிறுகதை பூமணிஆழம்
Unit 4	நாடகம் பம்மல்சம்பந்தமுதலியார்சபாபதி(முதற்பாகம்)

Unit 5	பயணஇலக்கியம்தனிநாயகஅடிகளார் - ஒன்றேஉலகம் (சுற்றுச்செலவுக்கலை, கம்போடியா, தாய்லாந்து, ஜப்பான்நான்குசுட்டுரைகள்மட்டும் **பார்வை நூல்கள்** பாரதியார்கண்ணன்பாட்டு பாரதிதாசன் - சஞ்சீவிபர்வதத்தின்சாரல் ஈரோடுதமிழன்பன் - கதைமுடியவில்லை, பூம்புகார்பதிப்பகம் இராஜம்கிருஷ்ணன்- கோடுகளும்கோலங்களும் .பூமணி–ஆழம் .பம்மல்சம்பந்தமுதலியார்-சபாபதி(முதற்பாகம்) பயணஇலக்கியம்தனிநாயகஅடிகளார் - ஒன்றேஉலகம்

Course Objectives	
Title	CORE-II **புறப்பொருள்வெண்பாமாலை**
Course Code	AT21B
CO-1	திணைதுறைகளைப்பற்றிஅறிந்துகொள்ளுதல்
CO-2	பழங்காலமக்களின்போர்முறைகளைப்பற்றிஅறிந்துகொள்ளுதல்
CO-3	நாகரிகத்தைபற்றிஅறிந்துகொள்ளுதல்
CO-4	பழக்கவழக்கங்களைபற்றிஅறிந்துகொள்ளுதல்
CO-5	வீரதீரசெய்திகளைபற்றிஅறிந்துகொள்ளுதல்

Course Outcome	
Title	CORE-II **புறப்பொருள்வெண்பாமாலை**
Course Code	AT21B
CO-1	கல்தோன்றாகாலத்திற்குமுன்பேதமிழ்மொழிதோன்றியதுஎனஅறிந்துகொள்ளுதல்
CO-2	அக்காலநம்பிக்கைகளைப்பற்றிஅறிந்துகொள்ளுதல்
CO-3	நாகரிகத்தைபற்றிஅறிந்துகொள்ளுதல்
CO-4	பழக்கவழக்கங்களைபற்றிஅறிந்துகொள்ளுதல்
CO-5	வீரதீரசெய்திகளைபற்றிஅறிந்துகொள்ளுதல்

Syllabus

Title	CORE-II**புறப்பொருள்வெண்பாமாலை**
Course Code	AT21B
Unit 1	வெட்சிபடலம், கரந்தைபடலம்
Unit 2	வஞ்சிப்படலம்காஞ்சிபடலம்
Unit 3	நொச்சிபடலம், உழிஞைப்படலம்
Unit 4	தும்பைப்படலம், வாகைப்படலம்
Unit 5	பாடாண்படலம் **பார்வை நூல்கள்** **புறப்பொருள்வெண்பாமாலை –ஐயனாரிதனார்**

Course Objectives	
Title	CORE-III **அறஇலக்கியம்**
Course Code	AT22A
CO-1	அறஇலக்கியம்கற்பதினால்மாணவர்கள்நேர்மையானவழியில்வாழகற்றுக்கொள்கின்றனர்.
CO-2	.பெரியோர்களுக்குஎவ்வாறுமதிப்புகொடுப்பதுஎன்பதைபற்றிதெரிந்துகொள்கின்றனர்.
CO-3	முயற்சிஉடையார்இகழ்ச்சிஅடையார்என்பதைஅறிந்துகொள்கின்றனர்.
CO-4	உருவத்தைக் கண்டுயாரையும்எடைபோடக்கூடாதுஎன்பதைபற்றியும்அறிந்துகொள்கின்றனர்.
CO-5	அறவழியில்சென்றால்வாழ்க்கையில்வெற்றிபெறமுடியும்என்பதைதெரிந்துகொள்கின்றனர்

Course Outcome	
Title	CORE-III **அறஇலக்கியம்**
Course Code	AT22A

CO-1	கல்வியின்பயன்குறித்தும்அதனால்கிடைக்கும்நன்மைகள்பற்றியும்அறிந்துக ொள்கின்றனர்
CO-2	நேர்மையானவழியில்வாழ்க்கையில்வெற்றிபெறவேண்டும் என்பதை புரிந்துகொள்கின்றனர்
CO-3	அறஇலக்கியம்கற்பதினால்மாணவர்கள்நேர்மையானவழியில்வாழகற்றுக்க ொள்கின்றனர்.
CO-4	பெரியோர்களுக்குஎவ்வாறுமதிப்புகொடுப்பதுஎன்பதைபற்றிதெரிந்துகொள் கின்றனர்.
CO-5	முயற்சிஉடையார்இகழ்ச்சிஅடையார்என்பதைஅறிந்துகொள்கின்றனர்

Syllabus	
Title	CORE-III **அறஇலக்கியம்**
Course Code	AT22A
Unit 1	திருக்குறள்அறத்துப்பால்முழுவதும் (38 அதிகாரங்கள்)
Unit 2	1. நாலடியார் (5 பாடல்கள்) பாடல்எண் 38 - உறக்கும்என்றதொடக்கம் பாடல்எண் 95 - மறுமையும்என்றதொடக்கம் பாடல்எண் 132-இம்மைஎன்றதொடக்கம் பாடல்எண் 216 - கடையாயர்என்றதொடக்கம் பாடல்எண் 256 - கற்றறிந்தஎன்றதொடக்கம் 2. நான்மணிக்கடிகை (5 பாடல்கள்) பாடல்எண் 12 - கந்திற்பிணிப்பர்என்றதொடக்கம், பாடல்எண் 17-இன்னாமைஎன்றதொடக்கம். பாடல்எண் 20 - மனைக்குஎன்றதொடக்கம்பாடல்எண் 32- திருவின்என்றதொடக்கம், பாடல்எண் 33 -புகைவித்தாஎன்றதொடக்கம் 3. பழமொழிநானூறு (5 பாடல்கள்) பாடல்எண் 131 - கொழித்துக்கொளப்பட்டஎன்றதொடக்கம். பாடல்எண் 202 -வருவாய்சிறிதெனினும்என்றதொடக்கம். பாடல்எண் 217 வழங்கலும்என்றதொடக்கம். பாடல்எண் 309 -தெள்ளிஉணரும்என்றதொடக்கம். பாடல்எண் 354 - உளையஉரைத்துஎன்றதொடக்கம்.
Unit 3	திரிகடுகம் (2 பாடல்கள்) பாடல்எண் 59 இளைஞர்க்குஎன்றதொடக்கம் . எண் 80 - முறைசெய்யான்என்றதொடக்கம்2. இன்னாநாற்பது (2 பாடல்கள்) பாடல்எண் 26 நட்டார்என்றதொடக் பாடல்எண் 38 - நறியமலர்பெரிதுஎன்

	இனியவைநாற்பது (2 பாடல்கள்) பாடல்எண் 2 பிச்சைப்புக்காயினும் பாடல்எண் 5யானைஉடையஎன்ற சிறுபஞ்சமூலம் 2 பாடல்கள்) பாடல்எண் 66 - குளம்தொட்டுஎன்ற பாடல்எண் 27 - வான்குருவிக்கூடுஎன்
Unit 4	ஏலாதி (2 பாடல்கள்) பாடல்எண் 3 தவம்எளிதுஎன்றதெ பாடல்எண் 47 பெரியார்சொல்என்ற ஆசாரக்கோவை (2 பாடல்கள்) பாடல்எண் 4 வைகறையாமம்என்ற பாடல்எண் 95 தன்னுடம்புஎன்றதொ மூதுரை (2 பாடல்கள்) பாடல்எண் 2 - நல்லார்என்றதொடக்க பாடல்எண் 12 - மடல்பெரிதுஎன்ற நன்னெறி (2 பாடல்கள்) பாடல்எண்: 8 உள்ளம்என்றதொடங்கும் பாடல்எண் 18 இன்சொலால்என்ற
Unit 5	1. ஆத்திசூடி ஊக்கமதுகைவிடேல், ஒன்னாரைத்தேறேல், ஓதுவதுஒழியேல்ஓரம்சொல்லேல். ஙப்போல்வளை, தந்தைதாய்பேண். செய்வனதிருந்தச்செய்சேரிடம்அறிந்துசேர். பூமிதிருத்திஉண். வைகறைதுயிலெழு. 2. கொன்றைவேந்தன் அன்னையும்பிதாவும்முன்னறிதெய்வம், ஏவாமக்கள்மூவாமருந்து, குற்றம்பார்க்கின்சுற்றம்இல்லை. கைப்பொருள்தன்னின்மெய்ப்பொருள்கல்வி. சீரைத்தேடின்ஏரைத்தேடு, தோழனோடும்ஏழைமைபேசேல், நீரகம்பொருந்தியஊரகத்திரு, உரவோர்என்கைஇரவாதுஇருத்தல், மூத்தோர்சொல்வார்த்தைஅமிழ்தம், நுண்ணியகருமமும்காண்ணித்துணி. 3. வெற்றிவேற்கை 1. எழுத்தறிவித்தவன்இறைவன்ஆகும் 2 கல்விக்குஅழகுகசடறமொழிதல் 3. மன்னர்க்கழகுசெங்கோல்முறைமை 4. உண்டிக்குஅழகுவிருந்தொடுஉண்டல் 5. நூறாண்டுபழகினும்மூர்க்கர்கேண்மை நீர்க்குள்பாசிபோல்வேர்க்கொள்ளாதே 6. ஒருநாள்பழகினும்பெரியோர்கேனிமை இருநிலம்பிளக்கவேர்வீழ்க்கும்மே 7. பொய்யுடைஒருவன்சொல்வன்மையினால் மெய்போலும்மேமெய்போலும்மே 8. மெய்யுடைஒருவன்சொலமாட்டாமையால் பொய்போலும்மேபொய்போலும்மே 9. அறிவுடைஒருவனைஅரசனும்விரும்பும்

10. பெருமையும்சிறுமையும்தான்தரவருமே
உலகநீதி (10 அடிகள்) முதல்இருபாடல்கள் (ஓதாமல்ஒருநாளும், நெஞ்சாரப்பொய்தன்னைச்தொடங்கும்பாடல்கள்.

பார்வை நூல்கள்

1.திருக்குறள்

2.நாலடியார்

3.திரிகடுகம்

4.நீதி இலக்கியம்

Course Objectives	
Title	CORE-IV –**நம்பி அகப்பொருள்**
Course Code	AT22B
CO-1	மாணவர்களுக்குஅகப்பொருளில்உள்ளஅகம்சார்ந்தகருத்துக்களைபுரியவைத்தல்.
CO-2	மாணவர்கள்ஐவகைநிலத்திற்குரியபண்புகளைப்புரிந்துகொள்ளுதல்.
CO-3	அகவாழ்க்கையில்நடைபெறும்களவுசெய்திகளைதெரிந்துகொள்ளுதல்.
CO-4	தலைவன்தலைவியரின்கற்புநெறியினைப்பற்றிஅறிந்துகொள்ளமுடிகின்றது.
CO-5	வரைவியில்படிப்பதன்மூலம்வாழ்க்கைக்குபொருள்தேவைஎன்பதைமாணவர்கள்அறிந்துகொள்கின்றனர்

Course Outcome	
Title	CORE-IV –**நம்பி அகப்பொருள்**
Course Code	AT22B
CO-1	போட்டிதேர்வுகளுக்குஇப்பாடம்பயன்படும்வகையில்அமைந்துள்ளது.
CO-2	பழங்காலஅகவாழ்க்கைமுறையினைமாணவன்இப்பாடத்தின்மூலம்அறியமுடிகிறது
CO-3	மாணவர்களுக்குஅகப்பொருளில்உள்ளஅகம்சார்ந்தகருத்துக்களைபுரியவைத்தல்.
CO-4	மாணவர்கள்ஐவகைநிலத்திற்குரியபண்புகளைப்புரிந்துகொள்ளுதல்.
CO-5	அகவாழ்க்கையில்நடைபெறும்களவுசெய்திகளைதெரிந்துகொள்ளுதல்

Syllabus	
Title	CORE-IV –**நம்பி அகப்பொருள்**
Course Code	AT22B
Unit 1	**அகத்திணையியல்**

Unit 2	**களவியல்**
Unit 3	**வரைவியல்**
Unit 4	**கற்பியல்**
Unit 5	**ஒழிபியல்**

Course Objectives	
Title	CORE-V **நன்னூல்எழுத்ததிகாரம்**
Course Code	AT23A
CO-1	தமிழ்எழுத்துக்கள்பற்றிமுழுமையாகஅறியஉதவுகிறது
CO-2	எழுத்துக்களைக்கொண்டுசொற்கள்உருவாக்குதல்பற்றிதெரிந்துகொள்ளஉதவுகிறது
CO-3	சொற்களைக்கொண்டுவாக்கியங்கள்உருவாக்குதல்பற்றிஅறிந்துகொள்ளமுடிகிறது
CO-4	பாவகைகள்படிப்பதால்கவிதைகள்எழுததெரிந்துகொள்ளலாம்
CO-5	இலக்கணத்தைபடிப்பதன்மூலம்இலக்கியங்களைபுரிந்துகொள்ளமுடியும்

Course Outcome	
Title	CORE-V **நன்னூல்எழுத்ததிகாரம்**
Course Code	AT23A
CO-1	பாவகைகள் படிப்பதால் கவிதைகள் எழுத தெரிந்துகொள்ளலாம்
CO-2	.இலக்கணத்தை படிப்பதன்மூலம் இலக்கியங்களை புரிந்துகொள்ளமுடியும்
CO-3	சொற்களைக் கொண்டு வாக்கியங்கள் உருவாக்குதல்பற்றிஅறிந்து கொள்ள முடிகிறது
CO-4	அனைத்துவகைஇலக்கியங்களையும்தாமேஎழுதமுடியும்
CO-5	போட்டித்தேர்வுகளில்பங்கேற்கஉதவுகிறது

Syllabus	
Title	CORE-V **நன்னூல்எழுத்ததிகாரம்**
Course Code	AT23A
Unit 1	**பாயிரம்**
Unit 2	**எழுத்தியல்**
Unit 3	**பதவியல்**
Unit 4	**உயிரீற்றுப்புணரியல்**
Unit 5	**மெய்யீற்றுப்புரியல், உருபுபுணரியல்**

Course Objectives	
Title	CORE-VI- **காப்பிய இலக்கியம்**
Course Code	AT23B
CO-1	ஐம்பெரும்காப்பியங்கள்பற்றிஅறிந்துகொள்ளுதல்
CO-2	ஐஞ்சிறுகாப்பியங்களைஅறிந்துகொள்ளுதல்
CO-3	காப்பியப்பண்புகளைஅறிந்துகொள்ளுதல்
CO-4	பெண்களின்வாழ்க்கைமுறையைஅறிந்துகொள்ளுதல்
CO-5	காப்பியவர்ணனைகளைஅறிந்துகொள்ளுதல்

Course Outcome	
Title	CORE-VI- **காப்பிய இலக்கியம்**
Course Code	AT23B
CO-1	அக்காலமன்னர்களின்வாழ்க்கைமுறைகளையும்கொடைசிறப்புகளையும்அறிந்துகொள்ளுதல்
CO-2	ஐந்திணைகளின்சிறப்புகளைபற்றிஅறிந்துகொள்ளுதல்
CO-3	ஐம்பெரும்காப்பியங்கள்பற்றிஅறிந்துகொள்ளுதல்
CO-4	ஐஞ்சிறுகாப்பியங்களைஅறிந்துகொள்ளுதல்
CO-5	காப்பியப்பண்புகளைஅறிந்துகொள்ளுதல்

Syllabus	
Title	CORE-VI- **காப்பிய இலக்கியம்**
Course Code	AT23B
Unit 1	சிலப்பதிகாரம் - மதுரைக்காண்டம் - 7 காதைகள் (11,12,13,14,15,16,20) மணிமேகலை - சிறைவிடுகாதை
Unit 2	சீவகசிந்தாமணி -நாமகள் இலம்பகம் - நாட்டுவளம் - பா.எண். 30-77 வரை
Unit 3	கம்பராமாயணம் பாலகாண்டம் · நாட்டுப்படலம் (வாங்க அரும்பதம் தான்கும் பண்கள் வாய் மிழற்றும் இன்சொல் வரை 10 பாடல்கள்) பெரியபுராணம் திருநாளைப்போவார் புராணம் முழுவதும்.
Unit 4	சீறாப்புராணம் - நபி அவதாரப்படலம்(81 - 90) - செவ்வி வீற்றிருந்து புதலத்தரசு

	தேம்பாவணி ஈரறம் பொருத்து படலம் - பொறியடக்கமும், தவ ஒழுக்கமும் (பா.எண். 477, 479, 480, 481, 483, 484.485, 486, 490, 494, 495, 498, 503, 504, 505, 506 507, 508, 509, 510).
Unit 5	இக்காலக் காப்பியங்கள் வாணிதாசன் - கொடி முல்லை கண்ணதாசன் - மாங்கனி (1. வஞ்சியில் விழா. 2. சேரன் அவையில், 3. வென்றிகொள் சேரர் தானை) **பார்வை நூல்கள்** 1.**தேவாரம்** 2.**நாலாயிர திவ்ய பிரபந்தம்** 3. வாணிதாசன் - கொடி முல்லை 4.கண்ணதாசன் - மாங்கனி

Course Objectives	
Title	**நன்னூல்சொல்**
Course Code	AT24A
CO-1	மாணவ மாணவியர் நன்னூல்வழி அக்காலத் தமிழ்மொழியின் அமைப்பினை அறிந்துகொள்வர்.
CO-2	தமிழின் நால்வகைச் சொற்களின் இலக்கணத்தையும் அவை மொழியில் முறையினையும் அறிந்துகொள்வர்
CO-3	தமிழ் சொற்களை முறையறிந்து மாணவர்கள் பயன்படுத்துவர்..
CO-4	.இலக்கணத்தை படிப்பதன்மூலம் இலக்கியங்களை புரிந்துகொள்ளமுடியும்
CO-5	சொற்களைக் கொண்டு வாக்கியங்கள் உருவாக்குதல்பற்றிஅறிந்து கொள்ள முடிகிறது

Course Outcome	
Title	**நன்னூல்சொல்**
Course Code	AT24A
CO-1	பாவகைகள் படிப்பதால் கவிதைகள் எழுத தெரிந்துகொள்ளலாம்
CO-2	அனைத்துவகைஇலக்கியங்களையும்தாமேஎழுதமுடியும்
CO-3	போட்டித்தேர்வுகளில்பங்கேற்கஉதவுகிறது
CO-4	தமிழ் எழுத்துக்கள் பற்றி முழுமையாக அறிய உதவுகிறது

CO-5	இலக்கணத்தை படிப்பதன்மூலம் இலக்கியங்களை புரிந்துகொள்ளமுடியும்

Syllabus	
Title	**நன்னூல்சொல்**
Course Code	AT24A
Unit 1	பெயரியல்
Unit 2	வினையியல்
Unit 3	பொதுவியல்
Unit 4	இடையியல்
Unit 5	உரியியல்

Course Objectives	
Title	**பக்தி இலக்கியங்கள்**
Course Code	AT24B
CO-1	மாணவ மாணவியர்பக்தி இயக்கத்தின் விளைவாக பக்தி இலக்கியங்கள் தோன்றி வளர்ந்த வரலாற்றை அறிந்துகொள்வர்
CO-2	பக்தி இலகிய வகைகளைத் தெரிந்துகொள்வர்
CO-3	தமிழால் சமயமும் சமயத்தால் தமிழும் வளர்ந்ததை அறிவர்
CO-4	மாணவர்களுக்குவாழ்வியல்நெறிகளைகடைபிடிக்கஅறிந்துகொள்ளுதல்
CO-5	மாணவர்கள்தங்கள்அணுகுமுறையைசரிவரசெய்தல்

Course Outcome	
Title	**பக்தி இலக்கியங்கள்**
Course Code	AT24B
CO-1	மாணவர்களின்மனதைஒருநிலைப்படுத்துதல்
CO-2	மதம்சார்ந்தகொள்கைகளைஅறிந்துகொள்ளுதல்
CO-3	மாணவர்கள்மனனம்செய்யும்வழக்கத்தைஏற்படுத்திக்கொள்ளுதல்
CO-4	மாணவர்கள்வரலாற்றுச்செய்திகளைஅறிந்துகொள்ளுதல்
CO-5	தமிழ்சார்ந்தஇலக்கியங்களைஅறிந்துகொள்ளுதல்

Syllabus	
Title	**பக்தி இலக்கியங்கள்**
Course Code	AT24B

Unit 1	காரைக்காலம்மையார் புராணம் திருஞானசம்பந்தர் (2-234 திருத்துருத்தி பதிகம் பா.எண்: 1759 - 1766 திருநாவுக்கரசர் - திருக்கானூர் பதிகம் 15 ஆம் திருமுறை 76 ஆம் பதிகம், பா.எண். 146 - 1954 வரை 9 பாடல்கள்) சுந்தர் - 7ஆம் திருமுறை, திருவாரூர் பதிகம், பா.எண்.945 – 954 வரை) மாணிக்கவாசகர் · திருவெம்பாலை 1-10)
Unit 2	ஆண்டாள் - திருப்பாவை முழுவதும் பொய்கை ஆழ்வார் - முதல் திருவந்துதி 3) - 3222, 3347, 3251 பூதத்தாழ்வார் -2ஆம் திருவந்தாதி (3)3285,32883293 பேயாழ்வார் 3ஆம் திருவந்தாதி (3) - 3386, 3387, 3392 நம்மாழ்வார் ஏழாம் பத்து 4 ஆம் திருவாய்மொழி (2777 2787) (10
Unit 3	தாயுமானவர்- ஆனந்தமான பரம் - 2ஆம் பாடல் (தெருளாகி, மருளாகி) பாடல்கள்) வள்ளலார் - 5 பாடல்கள் (திருவொற்றியூர் பதிகம்) அருணகிரிநாதர் - 1 பாடல் திருப்புகழ் - நாதவிந்துகளதி-ஆவிளன்குடி
Unit 4	கிறித்தவம் - இரட்சணிய யாத்ரிகம் - ஆதி பருவம், இராச துரொகப் படலம் - 16 பாடல்கள் அலகு-5 இசுலாம் - குணங்குடி மஸ்தான் சாகிபு - 15 கண்ணிகள் (கண்மனி மாலைக்கண்ணி - 2, 3, 6, 7, 9, 10, 13, 26, 35, 37, 40, 41, 46, 48, 54

Course Objectives	
Title	**CORE-IXசிற்றிலக்கியங்கள்**
Course Code	**AT25A**
CO-1	மாணவ, மாணவியர்சிற்றிலக்கியவகைகளைஅறிந்துகொள்வர்.
CO-2	சிற்றிலக்கியவகைக்குஏற்பபாடுபொருள்வேறுபடுமாற்றைஅறிந்துகொள்வர் .
CO-3	சிற்றிலக்கியஅழகியல், இசையியல்முதலியகூறுகளைஉணர்ந்துகொள்வர்.
CO-4	தமிழ்மக்களின்வாழ்க்கைமுறைபற்றிஅறிந்துகொள்ளலாம்.
CO-5	தெய்வங்களின்வழிபாடுஅவசியத்தைதெரிந்துகொள்ளலாம்

Course Outcome	
Title	**CORE-IXசிற்றிலக்கியங்கள்**

Course Code	**AT25A**
CO-1	அரசர்களைப்பற்றியசெய்திகள்போர்பற்றியசெய்தியைஅறிந்துகொள்ளலாம் .
CO-2	வள்ளல்களின்வாழ்க்கைநெறிபற்றிதெரிந்துகொள்ளலாம்
CO-3	உழவுத்தொழில்முக்கியத்துவத்தைப்பற்றிதெரிந்துகொள்ளலாம்
CO-4	குழந்தைகள்பருவங்கள்பற்றிதெரிந்துகொள்ளலாம்
CO-5	பழங்காலமக்களின்தூதுசெல்லும்முறைப்பற்றிதெரிந்துதெரிந்துகொள்ளலாம்

Syllabus	
Title	**CORE-IXசிற்றிலக்கியங்கள்**
Course Code	**AT25A**
Unit 1	குறவஞ்சி - குறத்திகுறிசொல்லும்பகுதி. இறைவனின்திருவுலா, வசந்தவல்லியின்காதல், குறவஞ்சிநாடகம்முடிய
Unit 2	பள்ளு - முக்கூடற்பள்ளு (5 பாடல்கள் - 15, 16,19, 20, 36)
Unit 3	பள்ளு - முக்கூடற்பள்ளு (5 பாடல்கள் - 15, 16,19, 20, 36)
Unit 4	பரணி - கலிங்கத்துப்பரணி (காடுபாடியது) அந்தாதி - சரசுவதிஅந்தாதி (5 பாடல்கள்)
Unit 5	தூதுஅழகர்கிள்ளைவிடுதாதுமுழுவதும்

Course Objectives	
Title	**CORE-Xயாப்பருங்கலக்காரிகை**
Course Code	**AT25B**

CO-1	மாணவ, மாணவியர்செய்யுளின்யாப்புஉறுப்புகளைஅறிந்துகொள்வர்.
CO-2	பா, பாவினவகைகளைஅறிந்துகொள்வர்.
CO-3	மரபுகவிதைஇயற்றும்ஆற்றலைப்பெறுவர்
CO-4	செய்யுளில்எழுத்துக்கள்வரும்முறைபற்றிஅறிந்துகொள்ளலாம்
CO-5	அசைசீர்தளைபோன்றசெய்திகளைக்கற்றுக்கொள்ளலாம்

Course Outcome	
Title	**CORE-Xயாப்பருங்கலக்காரிகை**
Course Code	**AT25B**
CO-1	செய்யுளுக்குஅழகுசேர்க்கும்தொடைசெய்திகளைபற்றிஅறிந்துகொள்ளலாம்
CO-2	பாவகைகளைப்பற்றிஅறிந்துகொள்ளலாம்
CO-3	செய்யுளில்இலக்கியநயம்பாராட்டுதல்பற்றிஅறிந்துகொள்ளலாம்
CO-4	எதுகைமோனையோடுகவிதைஎழுதக்கற்றுக்கொள்ளலாம்
CO-5	அகப்பாட்டுஉறுப்புகளைஅறிந்துகொள்ளலாம்

Syllabus	
Title	**CORE-Xயாப்பருங்கலக்காரிகை**
Course Code	**AT25B**
Unit 1	உறுப்பியல் (எழுத்து, அசை, சீர்)
Unit 2	உறுப்பியல் (தளை, அடி, தொடை, தூக்கு)
Unit 3	செய்யுளியல் (நாற்பா, மருட்பா)
Unit 4	செய்யுளியல் (பாவினம்
Unit 5	ஒழிபியல்

Course Objectives	
Title	CORE XI – **திராவிடமொழிகளின்ஒப்பிலக்கணம்**
Course Code	AT25C
CO-1	. மாணவ, மாணவியர்இந்தியாவிலும்இந்தியாவிற்குஅப்பாலும்பரவியுள்ளதிராவிடமொழிகள்குறித்தஅறிமுகம்பெறுவர்
CO-2	திராவிடமொழிக்குடும்பத்தின்தனிச்சிறப்பியல்புகளைஅறிந்துகொள்வர்.
CO-3	இலக்கணஅடிப்படையில்திராவிடமொழிகளிடையேயான அறிந்துகொள்வர்
CO-4	மாணவர்கள்ஒலிவகையைஅறிந்துமொழியைபேசுதல்,எழுதுதல்ஆகியவற்றுக்குஒலிஇன்றியமையாதது.
CO-5	உயிரொலிகள்மெய்யொலிகள்இதழ்குவிஉயிர்கள்உயிர்,குறில்,நெடில்குற்றியலுகரம்,குற்றியலிகரம்,அளபெடைஇவையெல்லாம்ஒருமொழிக்குஇன்றியமையாதவைஎன்றுமாணவர்கள்அறிதல்

Course Outcome	
Title	CORE XI – **திராவிடமொழிகளின்ஒப்பிலக்கணம்**
Course Code	AT25C
CO-1	தென்திராவிடமொழிகள்,நடுதிராவிடமொழிகள்,வடதிராவிடமொழிகள்ஆகியவற்றின்சிறப்புஇயல்புகளைமாணவர்கள்அறிதல்.
CO-2	ஒருமொழியின்இலக்கணஅமைப்பைஅறிவதன்மூலம்பிழையின்றிஎழுதவும்படிக்கவும்உதவுகின்றது
CO-3	ஒருபெயர்ச்சொல்லைவைத்துஒருதொடரைஎவ்வாறுஅமைக்கலாம்என்பதைபற்றிகூறுதல்.
CO-4	தன்மைமுன்னிலைபடர்க்கைபோன்றபெயர்களைஅறிதல்.
CO-5	.மொழியின்தோற்றம்,வளர்ச்சிமற்றும்ஆய்வாளர்களின்கருத்தைஅறிதல்

Syllabus	
Title	CORE XI – **திராவிடமொழிகளின்ஒப்பிலக்கணம்**
Course Code	AT25C
Unit 1	ஒலிவகை -உயிரொலிகள், மெய்யெழுத்துகள், ஒலியளவு
Unit 2	ஒலியழுத்தம், ஒலியசைமுறை, சொல்லின்திரிபு, அடிச்சொற்கள்
Unit 3	பெயர்ச்சொல், வேற்றுமை, மூவகைப்பெயர்கள்,எண்ணுப்பெயர்கள்
Unit 4	வினைச்சொல், வினைவகை, சுட்டுமுதலியன
Unit 5	சொல்லும்பொருளும் -சொற்றொடர்

Course Objectives	
Title	CORE XII – **இலக்கியத்திறனாய்வு**
Course Code	AT25D
CO-1	மாணவ, மாணவியர்இலக்கியத்தின்கூறுகளானஉணர்ச்சி, கற்பனை, கருத்து, வடிவம்ஆகியவற்றைஅறிந்துகொள்வர்.
CO-2	இலக்கியத்தைமதிப்பிடும்நெறிமுறைகளைஅறிந்துகொள்வர்

CO-3	எந்தப்படைப்பையும்திறனாய்வுகணகொண்டுபார்க்கும்திறனைவளர்த்துகொள்வர்
CO-4	இலக்கியக்கலைபற்றிஅறிஞர்கள்கூறும்கருத்துக்களைமாணவர்கள்அறிந்துகொள்ளலாம்.
CO-5	திறனாய்வுபற்றிபல்வேறுஅறிஞர்கள்கூறும்விளக்கங்களைஅறியலாம்

Course Outcome	
Title	CORE XII – **இலக்கியத்திறனாய்வு**
Course Code	AT25D
CO-1	கவிதைநம்வாழ்க்கையில்சிறப்பிடம்பெறுவதைஅறிந்துகொள்ளலாம்
CO-2	இலக்கியத்தில்மானிடஉண்மைகளைஅறியலாம்.
CO-3	சிறுகதையின்இலக்கணம்குறித்துஅறிந்துகொள்ளலாம்.
CO-4	நாடகத்தின்கூறுகள்மூலம்நாடகத்தின்சிறப்புகளைஅறியலாம்.
CO-5	திறனாய்வின்மதிப்பீடும்,வகைகளையும்அறிந்துகொள்ளலாம்

Syllabus	
Title	CORE XII – **இலக்கியத்திறனாய்வு**
Course Code	AT25D
Unit 1	இலக்கியம்ஓர்அறிமுகம் - இலக்கியம் - வரையறை -இலக்கியத்தோற்றம்- இலக்கியத்தின்இயல்புகள் - இலக்கியவகை - இலக்கியமும்மரபுகளும் - வாழும்இலக்கியம்
Unit 2	கலைகளில்சிறந்ததுஇலக்கியக்கலை - இலக்கியமும்வாழ்க்கையும் - இலக்கியத்தின்கடப்பாடுஇலக்கியத்தோற்றம்பற்றியகொள்கை - திறனாய்வாளர்யார் - திறனாய்வாளர்

Unit 3	கவிதைக்கலை -உணர்ச்சி - கற்பனை - கருத்து - வடிவம் - கவிதையும்கற்பனையும்கவிதையும்சொல்லும்சொல்லாட்சிச் சிறப்பு - ஓசைச்சிறப்பு
Unit 4	கவிதையும்பொருளும் -குண்டுசியும்குமரிமுனையும் - கவிதைஉண்மை - உவமையின்கதை - உருவகத்தின்வரலாறு - அகமும்புறமும்
Unit 5	வாழ்க்கை, இலக்கியம், இலக்கணம், கவிதைபிறந்தசுதை, கவிதையும்அனுபவமும்கவிதையும்மக்கள்பண்பும் - கலைகலைக்காகவே - நுனிகலைகளும்கவிதைகளும் - புதினம் -நாடகம் - சிறுகதை

Course Objectives	
Title	CORE- XIII – **சங்கஇலக்கியம்**
Course Code	AT26A
CO-1	மாணவ, மாணவியர்சங்கஇலக்கியத்தின்பாடுபொருள்களைஅறிந்துகொள்வர்.
CO-2	சங்கஇலக்கியங்களின்சால்புகளைத்தெரிந்துகொள்வர்.
CO-3	சங்கஇலக்கியமொழிக்கட்டமைப்பைத்தெரித்துகொள்வர்.
CO-4	சங்கஇலக்கியம்புறம்பற்றிகற்பதினால்தமிழர்களின்பண்பாடுகளைப்பற்றிதெரிந்துகொள்ளலாம்.
CO-5	தமிழர்கள்வீரத்தில்சிறந்தவர்கள்என்பதைபற்றிதெரிந்துகொள்ளலாம்

Course Outcome	
Title	CORE- XIII – **சங்கஇலக்கியம்**
Course Code	AT26A
CO-1	விருந்தினரைஎவ்வாறுஉபசரிக்கவேண்டும்என்றுவிருந்தோம்பல்பண்பைதெரிந்துகொள்ளலாம்
CO-2	பழந்தமிழர்கொடைபண்பினைதெரிந்துகொள்ளலாம்

CO-3	இருப்பவர்கள்இல்லாதவர்களுக்குகொடுத்துஉதவவேண்டும்என்பதைஅறிந்த ுகொள்ளலாம்
CO-4	எவ்வாறுஒற்றுமையாகவாழவேண்டும்என்றபண்பைஅறிந்துகொள்ளலாம்.
CO-5	பலவகைகலைதிறமைகளைபற்றிதெரிந்துகொள்ளலாம்

Syllabus	
Title	CORE- XIII – **சங்கஇலக்கியம்**
Course Code	AT26A
Unit 1	நற்றிணை (10 பாடல்கள்) 101 (முற்றாமஞ்சள்பசும்புறம்கடுப்ப) பாடல்முதல் 110 (பிரசம்கலந்தவெண்சுவைத்தீம்பால்) பாடல்வரை குறுந்தொகை (10 பாடல்கள்) 1 (செங்களம்படக்கொன்றுஅவுணர்த்தேய்த்த) பாடல்முதல் 10 (யாயாகியளேவிழவுமுதலாட்டி) பாடல்வரை
Unit 2	ஐங்குறுநூறு (நெய்தல்) - தொண்டிப்பத்து 171(திரையிமிழ்இன்னிசைஅளைஇ) பாடல்முதல் 180 (சிறுநுனிவரைந்தனை) பாடல்வரை பரிபாடல் 1 பாடல்திருமால் (65 வரிகள்) ஆயிரம்விரித்தஅணங்குடைஅருந்தலைமுதல்தொழுதேவரை
Unit 3	கலித்தொகைபாலைக்கலிகடவுள்வாழ்த்துநீங்கலாக 1 - 5 பாடல்கள் 1.தொடங்கற்கண்தோன்றியமுதியவன் ... முதல் 5 .மரையாமரல்கவரமாரிவறப்படவரை அகநானூறு 1 - 10 பாடல்கள்களிற்றியானைநிரை 1.வண்டுபடத்ததைந்தகண்ணிஒண்கழல்முதல் 10 .வான்கமழ்பரப்பில்தூவற்குஎதிரியவரை
Unit 4	புறநானூறு - பிசிராந்தையார்பாடல்கள் (67,184,191,212) 67: அன்னச்சேவல்அன்னச்சேவல் 184: காய்நெல்லறுத்துக்கவளம்கொளினே

	191: யாண்டுபலவாகநரையிலஆகுதல் 212 :நும்கோயார்எனவினவின் • பதிற்றுப்பத்து - 5 ஆம்பதிகம் 46. 48 46: இழையர்குழையர்நறுந்தண்மாலையர்
Unit 5	பத்துப்பாட்டு - பட்டினப்பாலை–முழவதும்

Course Objectives	
Title	CORE- XIV -**தண்டியலங்காரம்** (**பொருளணியியல்முழுமையும்**)
Course Code	AT26B
CO-1	மாணவ, மாணவியர் இலக்கியத்தில்அணிகள்பெறும்இடத்தினைஅறிந்துகொள்வர்
CO-2	அணிவகைகளைஅறிந்துகொள்வர்.
CO-3	அணிநயம்படப் 'பாபுனையும்ஆற்றலைப்பெறுவர்.
CO-4	அணிஎன்பதுஅழகுஎன்பதுபொருள்
CO-5	5.ஒருசெய்யுளின்கருத்தைஅணிகள்அழகுபடுத்துகின்றன.இதுசொல்லாலும்பொருளாலும்அழகுபடஎடுத்துரைக்கின்றன.இதனால்மாணவர்கள்ஓசைநயம்பொருள்நயம்மோனைஎதுகைசீர்அந்தாதிபோன்றசொற்களோடுமாணவர்களுக்குகவிதைஇயற்றும்ஆற்றல்கிடைக்கும்

Course Outcome	
Title	CORE- XIV -**தண்டியலங்காரம்** (**பொருளணியியல்முழுமையும்**)
Course Code	AT26B
CO-1	.எழுத்துசொல்பொருள்யாப்புஆகியநான்குஇலக்கணங்களும்மொழிக்குமொழிவேறுபடும்ஆனால்அணியிலக்கணம்மட்டும்எல்லாமொழிகளுக்கும்பொதுவாகஅமையும்.இதனால்மாணவர்கள்பிறமொழிகளில்உள்ளஅணிஇலக்கணத்தையும்அறியமுடியும்
CO-2	எழுத்துசொல்பொருள்யாப்புஆகியநான்குஇலக்கணங்களும்மொழிக்குமொழிவேறுபடும்ஆனால்அணியிலக்கணம்மட்டும்எல்லாமொழிகளுக்கும்பொத

	ுவாகஅமையும்.இதனால்மாணவர்கள்பிறமொழிகளில்உள்ளஅணிஇலக்கணத்தையும்அறியமுடியும் மாறுபாடுபுகழ்நிலையணிமுதல்பாவிகவணிவரை
CO-3	3.மாணவர்கள்அணிஇலக்கணத்தைஅறிந்துகொள்வதினால்காப்பியம்ஏற்றுவதற்கானவரையறையும்பழையஇலக்கியங்களில்சிறப்பையும்உணர்ந்துகொண்டுபுதியகாப்பியங்களைஇயற்றவும்இயலும்
CO-4	அணிஇலக்கணத்தைமாணவர்கள்படிப்பதினால்அரசுத்தேர்வுகளுக்குஇதிலிருந்துவினாக்கள்இடம்பெறுகின்றனஅதனால்அணிஇலக்கணம்பயன்படுகின்றது
CO-5	. தண்டியலங்காரத்தில்உள்ள35அணிகளையும்மாணவர்கள்படிப்பதினால்கவிதைஇயற்றும்ஆற்றலும்புதியகாப்பியம்இயற்றும்ஆற்றலும்மாணவர்களுக்குஇயலும்

Syllabus	
Title	CORE- XIV -**தண்டியலங்காரம்** (**பொருளணியியல்முழுமையும்**)
Course Code	AT26B
Unit 1	தன்மையணிமுதல்தீவகஅணிவரை
Unit 2	பின்வருநிலையணிமுதல்ஒட்டணிவரை
Unit 3	அதிசயஅணிமுதல்தன்மேம்பாட்டுரையணிவரை
Unit 4	பரியாயஅணிமுதல்விரோதஅணிவரை
Unit 5	மாறுபாடுபுகழ்நிலையணிமுதல்பாவிகவணிவரை.

Course Objectives	
Title	CORE- XV – **படைப்பிலக்கியமும் மொழிபெயர்ப்பும்**
Course Code	AT26C
CO-1	மாணவ, மாணவியர்.படைப்பிலக்கியக்கூறுகளைஅறிந்துகொள்வர்.
CO-2	மொழிபெயர்ப்புஅடிப்படைகளைஅறிந்துகொள்வர்,
CO-3	இலக்கியம்படைக்கவும்மொழிபெயாக்கவும்தேவையானதிறம் பெற்றுபணிவாய்ப்புப்பெறுவர்.
CO-4	தலைப்பிற்கு ஏற்றவாறு சிறுகதையை மாணவர்கள் எழுதுதல்
CO-5	நாவல் அமையும் முறையினை அறிந்து மாணவர்கள் ஒருநாவலை படைத்தல்

Course Outcome	
Title	CORE- XV – **படைப்பிலக்கியமும் மொழிபெயர்ப்பும்**
Course Code	AT26C
CO-1	தலைப்பிற்கு ஏற்றவாறு கதைமாந்தர்களை உருவாக்கி நாடகத்தை நடித்தல் எழுதுதல்
CO-2	மொழிபெயர்ப்புஅடிப்படைகளைஅறிந்துகொள்வர்,
CO-3	, இலக்கியம்படைக்கவும்மொழிபெயாக்கவும்தேவையானதிறம்பெற்றுபணிவாய்ப்புப்பெறுவர்.
CO-4	தலைப்பிற்கு ஏற்றவாறு சிறுகதையை மாணவர்கள் எழுதுதல
CO-5	மரபுத்தொடரில்உள்ளசொற்களைசரியானமுறையில்எழுதுதல்

Syllabus	
Title	CORE- XV – **படைப்பிலக்கியமும் மொழிபெயர்ப்பும்**
Course Code	AT26C
Unit 1	படைப்பிலக்கியம் -படைப்பு -புதுக்கவிதை - 24 வரிகள் - 20 மதிப்பெண்
Unit 2	சிறுகதை - 3 முதல் 4 பக்கங்கள் 20 மதிப்பெண்
Unit 3	மொழிபெயர்ப்பு - ஆங்கிலம்-தமிழ் 15 மதிப்பெண்
Unit 4	தமிழ் - ஆங்கிலம் 20 மதிப்பெண்
Unit 5	மொழிபெயர்ப்பு - அலுவலகக்கடிதம், இலக்கியப்பகுதி, செய்தித்தாள்சார்பு - ஒருபக்க அளவில்.

Course Objectives	
Title	ALLI – I **தமிழக வரலாறும் பண்பாடும்**
Course Code	**AT31A**
CO-1	மாணவ, மாணவியர் காலந்தோறும் தமிழ்நாட்டில் நிலவிய ஆட்சிமுறைகளை அறிந்துகொள்வர்.
CO-2	காலந்தோறும் தமிழ்நாட்டில் சமூகத்தில் ஏற்பட்ட மாற்றங்களை அறிந்துகொள்வர்,
CO-3	பண்டைய தமிழர்கள் அயல்நாட்டுடன்கொண்ட தொடர்பை எடுத்துக்கூறுதல்.
CO-4	தமிழகவரலாற்றுக்கானஅடிப்படைஆதாரங்களைமாணவர்களுக்குகூறுதல்
CO-5	தமிழகத்தின் நான்காம் நூற்றாண்டு முதல் ஒன்பதாம் நூற்றாண்டு வரையில் மக்களின் சமூகநிலைகளை எடுத்துக் கூறுதல்

Course Outcome	
Title	ALLI – I **தமிழக வரலாறும் பண்பாடும்**

Course Code	**AT31A**
CO-1	.வரலாற்றுக் காலத்துக்கு முந்திய வாழ்ந்தமக்களின் வாழ்க்கை நெறிமுறைகளை எடுத்துக்கூறுதல்.
CO-2	காலந்தோறும் தமிழ்நாட்டில் சமூகத்தில் ஏற்பட்ட மாற்றங்களை அறிந்துகொள்வர்,
CO-3	பண்டைய தமிழர்கள் அயல்நாட்டுடன்கொண்ட தொடர்பை எடுத்துக்கூறுதல்.
CO-4	.தமிழர் வளர்த்த சங்கம் பண்டையத் தமிழரின் வாழ்க்கை முறைகள் வாணிகம் விளையாட்டு கலைகள் போன்றவற்றை மாணவர்களுக்கு கூறுதல்.
CO-5	. தமிழகத்தின் நான்காம் நூற்றாண்டு முதல் ஒன்பதாம் நூற்றாண்டு வரையில் மக்களின் சமூகநிலைகளை எடுத்துக் கூறுதல்

Syllabus	
Title	ALLI – I **தமிழக வரலாறும் பண்பாடும்**
Course Code	**AT31A**
Unit 1	மூன்றாம் நூற்றாண்டு வரை வரலாற்றுக் காலத்துக்கு முந்திய நீலை - சங்ககாலம் - களப்பிரர் காலம் - பல்லவர் காலம்.
Unit 2	நான்காம் நூற்றாண்டு முதல் ஒன்பதாம் நூற்றாண்டு வரை - பக்தி இயக்கம் - சமயச் செல்வாக்கு
Unit 3	சோழர் - பாண்டியர் - நாயக்கர் காலம்
Unit 4	பதிமூன்றாம் நூற்றாண்டு முதல் பதினெட்டாம் நூற்றாண்டு வரை
Unit 5	ஐரோப்பியர வருகை -19. 20ஆம் நூற்றாண்டுகள்

Course Objectives	
Title	ALLI – II **தமிழ் இலக்கிய வரலாறு**

Course Code	**AT32A**
CO-1	மாணவர்கள் போட்டித்தேர்வில் வெற்றிஅடையலாம்.
CO-2	தமிழ்வளர்த்த சங்கங்கள்பற்றி அறிந்துகொள்ளலாம்.
CO-3	சங்கஇலக்கியம் உணர்த்தும் வாழ்வியல்கருத்துக்களை தெரிந்துகொள்ளலாம்.
CO-4	காப்பியங்கள்காட்டும் நீதிகளைப் பின்பற்றலாம்.
CO-5	சைவ வைணவ சமயங்கள் குறித்து அறிந்து இறைவழிபாட்டில் கலந்துக்கொள்ளலாம்

Course Outcome	
Title	ALLI – II **தமிழ் இலக்கிய வரலாறு**
Course Code	**AT32A**
CO-1	மாணவர்கள் போட்டித்தேர்வில் வெற்றிஅடையலாம்.
CO-2	நீதிநூல்கள்உணர்த்தும்அறகருத்துக்களைஅறிந்துகொள்ளலாம்
CO-3	விடுகதைகளைப்ப் பற்றி அறிந்துகொள்ளுதல்
CO-4	நாட்டுப்புறப்பாடல்கள் பற்றி அறிந்துகொள்ளுதல்
CO-5	விடுகதைகளைப்ப் பற்றி அறிந்துகொள்ளுதல்

Syllabus	
Title	ALLI – II **தமிழ் இலக்கிய வரலாறு**
Course Code	**AT32A**
Unit 1	தமிழ்வளர்த்த சங்கங்கள்
Unit 2	சங்கஇலக்கியம்
Unit 3	காப்பியங்கள்காட்டும் நீதி
Unit 4	சைவ வைணவ சமயங்கள்
Unit 5	நாட்டுப்புறப்பாடல்கள்

Course Objectives	
Title	ALLI – III- **நாட்டுப்புறவியல்**

Course Code	**AT33A**
CO-1	மாணவ, மாணவியர் காலங்காலமாகத் தமிழ் மண்ணில் வாய்மொழியாகத் தோன்றி பரவி வழங்கும் நாட்டுப்புற இலக்கியங்களின் வகைகளை அறிந்துகொள்வர்.
CO-2	நாட்டுப்புற இலக்கியச் சிறப்புகளைத் தெரிந்துகொள்வர்.
CO-3	நாட்டுப்புறவியல் ஆய்வில் பின்பற்றபட வேண்டிய பல்வேறு துறைசாரா அணுகுமுறைகளை அறிந்துகொள்வர்.
CO-4	நாட்டுப்புறமக்களின்பழக்கவழக்கங்கள்பண்பாடுகள்பற்றிமாணவர்களுக்குக ◌ூறுதல்
CO-5	நாட்டுப்புறமக்களின்நம்பிக்கைகள்பற்றிஅறிதல்.

Course Outcome	
Title	ALLI – III- **நாட்டுப்புறவியல்**
Course Code	**AT33A**
CO-1	திருவிழா பற்றிய செய்திகளை அறிந்துகொள்ளுதல்
CO-2	பழமொழிகளைப் பற்றி அறிந்துகொள்ளுதல்
CO-3	பழமொழிகளைப் பற்றி அறிந்துகொள்ளுதல்
CO-4	விடுகதைகளைப்ப் பற்றி அறிந்துகொள்ளுதல்
CO-5	நாட்டுப்புறப்பாடல்கள் பற்றி அறிந்துகொள்ளுதல்

Syllabus	
Title	ALLI – III- **நாட்டுப்புறவியல்**
Course Code	**AT33A**
Unit 1	நாட்டுப்புறமக்களின் பழக்கவழக்கங்கள் பண்பாடுகள்
Unit 2	நாட்டுப்புறப்பாடல்கள்
Unit 3	நாட்டுப்புறமக்களின் நம்பிக்கைகள்
Unit 4	நாட்டுப்புற இலக்கியங்களின் வகைகள்
Unit 5	நாட்டுப்புறவியல் ஆய்வு

Course Objectives	
Title	ALLI – IV **தகவல் தொடர்பியல்**
Course Code	
CO-1	மாணவ, மாணவியர் தமிழ்வழியான தகவல் தொடர்புச் சாதனங்களை அறிந்துகொள்வர்.

CO-2	வெவ்வேறு ஊடகங்களுக்கு ஏற்ப மொழியை ஆளும் திறமையைப் பெறுவர்
CO-3	படைப்பாற்றலை வளர்த்துகொள்வர்
CO-4	மாணவர்கள் தகவல் தொடர்பு சாதனங்களை பற்றி அறிந்துகொள்ளுதல்
CO-5	தகவல்தொடர்பு தோன்றிய வரலாறு பற்றி அறிந்துகொள்ளுதல்

Course Outcome	
Title	ALLI – IV **தகவல் தொடர்பியல்**
Course Code	
CO-1	அச்சுக்கூடங்கள் அச்சுத்தாள்கள் அமைக்கப்பட்ட செய்திகளை பற்றிதெரிந்துகொள்ளுதல்
CO-2	தொலைக்காட்சி வானொலி செய்தித்தாள் போன்றவற்றில் உள்ளபணிவாய்ப்பை அறிந்துகொள்ளல்
CO-3	செய்திகள் சேகரிப்புபற்றி தெரிந்துகொள்ளுதல்
CO-4	ஊடகங்களில் செய்தியாளர்கள் பத்திரிக்கைஆசிரியர் ஆசிரியர்கள் ஆகியோரின் பணிகளைப்பற்றி தெரிந்துகொள்வர்
CO-5	விளம்பரங்கள் குறித்த செய்திகளை தெரிந்துகொள்வர்

Syllabus	
Title	ALLI – IV **தகவல் தொடர்பியல்**
Course Code	
Unit 1	கொள்கைகளும் கோட்பாடுகளும்
Unit 2	தகவல் தொடர்புச் சாதனங்கள்
Unit 3	தகவல் தொடர்புச் சாதனங்கள்
Unit 4	தொலைக்காட்சி
Unit 5	விளம்பரம்

Course Objectives	
Title	**அகராதியியல்**
Course Code	
CO-1	மாணவ, மாணவியர்அகராதிக்கு அடிப்படையான சொற்பொருள் கோட்பாடுகளை அறிந்துகொள்வர்.
CO-2	நிகண்டுகளின் அமைப்பு, வளர்ச்சி, பயன்பாடு முதலியவற்றை அறிந்துகொள்வர்.

CO-3	அகராதியின் அமைப்பு, வகை, வளர்ச்சி வரலாறு முதலியவற்றை தெரித்துகொள்வர்.
CO-4	தமிழ்இலக்கியத்திற்கு அடிப்படையான சொற்பொருள் கோட்பாடுகளை தருவது அகராதி என்று மாணவனால் அறிய முடிகின்றது
CO-5	அகராதியின்வரிசைஅமைப்புமுறையைஅகராதியின்மூலம்அறியமுடிகின்றத ு

Course Outcome	
Title	**அகராதியியல்**
Course Code	
CO-1	அகராதியின்வகைகள், வளர்ச்சி மற்றும் அதன்வரலாறு ஆகியவற்றை மாணவன் அறிந்து கொள்கின்றான்
CO-2	இலக்கணத்தில்அகராதி,தொல்காப்பியத்தில் அகராதி பயின்று வரும் முறையினை தெரிந்துகொள்வர்
CO-3	தமிழில் முதல்எழுத்து அகரவரிசையில் அமைந்த தமிழின் முதல்நூல் அகராதி நிகண்டு என அறிந்து கொள்கின்றனர்
CO-4	நிகண்டுஎன்பதற்குசொற்தொகுதி,சொற்பொருள்அமைக்கும்முறைபற்றிஇத ன்மூலம்அறியமுடிகிறது
CO-5	நிகண்டுகளின் அமைப்பும் வளர்ச்சி, பயன்பாடு முதலியவற்றை அகராதியின் மூலம் மாணவன் அறிந்து கொள்கிறான்

Syllabus	
Title	**அகராதியியல்**
Course Code	
Unit 1	அகராதி அகராதியியல் விளக்கம் - சொற்பொருண்மை - ஒரு பொருட்பன்மொழிகள் - பலபொருளொரு சொல் - சிறப்புப்பொருள் (connotation) - பொருள் வழக்கு வரையறை எதிர்ச்சொற்கள் முதலியவை.

Unit 2	இலக்கணமும் அகராதியும் - தொல்காப்பியத்தில் அகராதியியல் கூறுகள் - நிகண்டுகட்கு முந்தைய குறிப்புகள்
Unit 3	நிகண்டு - விளக்கம், தமிழ் நிகண்டுகளின் வளர்ச்சி வரலாறு - நிகண்டுகளின் பொது அமைப்பு - நிகண்டுகளின் யாப்பு பொருட்பாகுபாடு,
Unit 4	தமிழ் அகராதிகளின் வளர்ச்சி வரலாறு - சதுரகராதி - சென்னைப் பல்கலைக் கழகத் தமிழ்ப் பேரகராதி (Tamil Lexicon) அமைப்பு - கரியாவின் தற்காலத் தமிழகராதி
Unit 5	அகராதி வகைகள் கலைக்களஞ்சியமும்

Course Objectives	
Title	**தமிழர்அழகுக்கலைகள்**
Course Code	**ATE6A**
CO-1	மாணவ, மாணவியர் காலந்தோறும் தோன்றி வளர்ந்த அழகுக்கலைகளை அறிந்துகொள்வர்
CO-2	காலந்தோறும் தோன்றி வளர்ந்த அழகுக்கலைகளை அறிந்துகொள்வர்.
CO-3	கலைகளின் வகைகளை அறிந்துகொள்வர்.
CO-4	கலைகளைப் போற்றும் பண்பைப் பெற்று பணிவாய்ப்புப் பெறுவர்.
CO-5	பழங்கால சிற்பங்கள் ஓவியங்கள் பற்றி அறிந்து கொள்ளலாம்

Course Outcome	
Title	**தமிழர்அழகுக்கலைகள்**
Course Code	**ATE6A**
CO-1	கலைகளின் வகைகளை அறிந்துகொள்வர்.
CO-2	கலைகளைப் போற்றும் பண்பைப் பெற்று பணிவாய்ப்புப் பெறுவர்.
CO-3	பழங்கால சிற்பங்கள் ஓவியங்கள் பற்றி அறிந்து கொள்ளலாம்
CO-4	மாணவ, மாணவியர் காலந்தோறும் தோன்றி வளர்ந்த அழகுக்கலைகளை அறிந்துகொள்வர்
CO-5	காலந்தோறும் தோன்றி வளர்ந்த அழகுக்கலைகளை அறிந்துகொள்வர்.

Syllabus	
Title	**தமிழர்அழகுக்கலைகள்**
Course Code	**ATE6A**
Unit 1	அழகுக்கலை - கட்டடக்கலை - குகைக்கோவில்கள் –கற்றுளிகள்- மாகட்டடங்கள் செங்கற்கட்டடங்கள்-பாறைக்கோவில்கள் போன்றவை
Unit 2	சிற்பக்கலை - சிற்பம் அமைக்கும் பொருள்கள் - இரண்டு வகைச் சிற்பங்கள் கல்லும்உலோகமும் யவன நாட்டுச் சிற்பமும்- நமது நாட்டுச் சிற்பமும், சிற்பக் கலைஞனும்ஓவியக் கலைஞனும்
Unit 3	கூத்துக்கலை -காவியக்கலை பதினோர் ஆடல் பரதநாட்டியம் - காவியப்புலவனும் - ஓவியக்கலைஞனும்
Unit 4	நாடகக்கலை – நாடகநூல்கள் –நாடக இலக்கணம் ஒன்பது சுவை – நடிப்பு –நாடக்க் கலையின் மறுமலர்ச்சி
Unit 5	கலைபகசளைப் போற்றுதல்- .கடற்கரைக் கோயில்- பல்லவ சோழர் சோயில் வேலூர் மண்டபச் சிற்பங்கள்

Course Objectives	
Title	**கணினியும் இணையமும்**
Course Code	**ATE6B**
CO-1	மாணவ, மாணவியர் தொழில்நுட்பப் புரட்சியின் விளைவான கணினி இணையம் முதலியவற்றின் பன்முகப்பயன்பாட்டைத் தெரிந்துகொள்வர்.
CO-2	.கணினியின் செயல்பாட்டையும் அதைப் பயன்படுத்தும் மொழிகளையும் குறித்த அறிமுகம் பெறுவர்,
CO-3	.இணையத்தின் தேடல்வழியாக அறிவைப் பெருகிசக்கொள்வர்.
CO-4	மாணவர்கள்கணினியின்செயல்பாடுகளைஅறிந்துகொள்ளுதல்
CO-5	இன்றையகாலத்தில்கணினியின்தேவைகளைப்பற்றிமாணவர்கள்அறிந்துகொள்ளுதல்

Course Outcome	
Title	**கணினியும் இணையமும்**
Course Code	**ATE6B**
CO-1	கணினியின் தமிழ்செயலிகளை எவ்வாறுபார்க்கலாம் என்று அறிந்துகொள்ளுதல்
CO-2	இன்றைய நாளில் கணினி எந்தெந்ததுறைகளில் சிறந்து விளங்குகிறது என்பது தெரிந்துகொள்ளலாம்
CO-3	மாணவர்கள் கணினிஇயங்கும் முறையும் அதை எவ்வாறு பயன்படுத்திக் கொள்ளலாம் என்பதைப்பற்றியும் அறிந்துகொள்ளலாம்
CO-4	இணையம் தொடர்பான செய்திகளை அறிந்துகொள்ளுதல்
CO-5	மின்னஞ்சல் அனுப்பும் முறையில் மாணவர்கள் தெரிந்துகொள்ளலாம்

Syllabus	
Title	**கணினியும் இணையமும்**
Course Code	**ATE6B**
Unit 1	கணினி அறிமுகம் தலைமுறைகள் கணினிப்பயன்பாடு வகைகள் - கணினி தோற்றமும் வளர்ச்சியம், வரலாறும் கணினி வன்பொருள் (hardware) -மென்பொருள்(software).
Unit 2	அமைப்பு · கணினி அமைப்பு - உள்ளீடு வெளியீடு - மைய செயலகம் வெளிப்புற - உறுப்புகள் (peripheral unity) - படிக்க மட்டும் நினைவு (read only memory) தற்செயல் அணுகு நினைவு (random access memory) சேமிப்பு - இருமை முறை .
Unit 3	தொடரமைத்தல் - முறைமைப்பிரிப்பாய்வு- (system analysis) ஒரு படம ஆணைத் - {flowchart) ஆவணத் தொடர்மொழிகள் (programming languages). பேசிக் (basic), கோபல் (cobal) போர்ட்டான் (forton) பாஸ்கல் (pascal),i(c) .ஜாவா (java).

Unit 4	இணையம் - வலைபின்னல் (network), குறும்பரப்பு வலைப்பின்னல் LAN local areanetwork) பயன்பாடு -விரிபரப்பு வலைப்பின்னல் (wan wide area network),, இணையும்முறைகள் - நேரடித்தொடர்பு சேவை நிறுவனத்தின் மூலமான தொடர்பு (Indirect account through procides), பிற சேவை நிறுவன வழி மறைமுகத்தொடர்பு இணைப் இயக்க முறை இணையமுகவரி இணையத் தகவல் வகைகள் - மீ உரை (Hyper text) உலகளாவிய வலைப்பின்னல் (www.world wide web), இணையப் பயன்கள் - மின் வாணிகம் (E-Commerce)
Unit 5	மின்னஞ்சல் (E-Mail), - மின்னஞ்சல் சுருள்கள் - அனுப்பும்முறை - தொலை எழுதி (telex) தொலை நகலி(Fax) -வரலாறும் செயப்படுத்தலும் தொலை உரை(Tele texi) அமைப்பு