TELANGANA STATE
B.A. HISTORY SYLLABUS
Semester - V
(BA 504) Discipline Specific Elective - Paper – 1E-A
History of the Modern World (From 1453 CE to 1964 CE)
(With Effect from 2021-2022)

Module-I: Decline of Medieval Socio-Political, Religious, Economic conditions - Characteristic features of Renaissance - Significance of Reformation and Counter Reformation movements in Europe - Geographical Discoveries and Rise of Colonialism - Colonization of America - Mercantilism and Commercial Revolution. Emergence of Nation States in Europe - Spain - France - England - Russia - Austria - Italy and Prussia - Nature of Absolute Monarchies and Feudalism in Europe and Asia.

Module-II: Age of Revolutions - Glorious Revolution (1688) - American Revolution (1776) - French Revolution (1789) - Napoleon - Wars - Reforms- Revolutions of 1830 and 1848 - Industrial Revolution - Unification Movements in Germany and Italy.

Module-III: Rise of Capitalism - Impact on Asia and Africa - Colonization of Africa - Asia and Latin America - Entry of European Powers in China - Opium Wars - Revolution in China - Boxer Revolt - Sun-Yat-Sen - Mao's Communist Revolution - Meizi Restoration and Modernization of Japan.

Module-IV: World between 1914-1945 Rivalry among colonial powers Imperialist Hegemony - Causes and consequences of first World War - World between the Wars - League of Nations - Russian Revolution - Causes and consequences. Fascism in Italy, Nazism in Germany, Militarism in Japan.

Module-V: Causes and consequences of Second World War - UNO, Its Contribution to World Peace - Decolonization and National Liberation Movements in Asia, Latin America and Africa – Non-Alignment Movement - its Origin - Aims, Importance.

Recommended Books:

Arun Bhattacharjee, History of Modern Europe, Vol. II.
C.J.H. Hayes, Europe since 1870 A.D., Vol. II.
C.J.H. Hayes, Europe upto 1870 A.D., Vol. I.
Fischer, A History of Europe.
J.M. Roberts, History of the World, New York, 1976.
Peter Moss, Modern World History, Hampshire, 1978.
Taylor, A.J.P., The Struggle for Mastery in Europe.
Thompson, D., Europe Since Napoleon.
V.D. Mahajan, History of Modern Europe since 1789.
Telugu:
Badriraju Sheshagiri Rao and Others, Adhunika Prapancha Charitra, Telugu Academy, 2002.
Y. Vaikuntham., Prapancha Charitra, Telugu Academy.

TELANGANA STATE
B.A. HISTORY SYLLABUS
Semester - V
(BA 504) Discipline Specific Elective - Paper – 1E-B
Ancient Civilizations
(With Effect from 2021-2022)

Module-I: Mesopotamian Civilization – the Significance of Fertile Crescent – Physical and Geographical Factor – The Sumerian and Their State Systems – Its Contribution to Material Culture and Urbanisation – Society – Economy – Religion, Language and Literature – Art –Architecture – Scientific Knowledge.

Egyptian Civilization – Geographical and Physical Factors –The Age of Pyramids – The Imperial Age –Noted Kings and Their Contribution – Economic System – Agriculture – Irrigation, Trade and Commerce – Religion –Growth of Script –Literature – Art –Architecture – Advances in Scientific Knowledge.

Module-II: Greek Civilization – Geographical Factors and Historical Background – Characteristic Features of Greek Society – Polity, Slavery – City States – Athenian Democracy – Greco- Persian Wars – Administration – Greek Language – Literature – Architecture – Philosophers – Science and Technology – Significance and Decline

Module-III: Roman Civilization – Rise of Roman Power – Great Roman Kings and Their Conquests – Society – Political organization – Administrative Structure Cultural Contribution – Language and Literature – Art and Architecture Monuments – Fall of Roman Empire.

Module-IV: Chinese Civilization – Geographical and Physical Features – Polity, Administration – Social System – Economy – Religion and Philosophy – Taoism – Confucianism and Buddhism – Science and Technology.
Japan Civilization – Geographical and Physical Features – Polity - Administration – Social System – Economy – Religion and Philosophy – Shintoism and Buddhism – Science and Technology

Module-V: Persian Civilization – Geographical and Physical Features – Polity - Administration – Social System – Economy – Religion and Philosophy – Science and Technology and Decline
Arabic Civilization - Polity - Administration – Social System – Economy – Religion and Philosophy – Science and Technology

REFERENCE BOOKS:

1. Blackman: History of Human Society, Volumes 9-10
2. Breasted J.H: Ancient Times, A History of the Early World (Ginn, 1916) Vol.2-5,10
3. Rostovzeff .M.I: A History of the Ancient World Vol. 1-11, Oxford 1926.
4. Thomdick .L: History of Civilizations Vol. 4-8.
5. Secheneider .H: The History of World Civilizations from Prehistoric times to the middle Ages.
6. Moret .A: The Nile and Egyptians Civilizations,
7. Durant .W: The History of Civilizations & Our Oriental Heritage.

KAKATIYA UNIVERSITY
FACULTY OF SCIENCE
B.A./B.Sc. Life Science (Computer Applications)
SEMESTER – V
Programming in Java

Theory	**4 Hours/Week**	**4 Credit**	Internal marks = 20
Practical	**3 Hours/Week**	**1 Credit**	External Marks = 80

Unit - I

Introduction: Java Essentials, JVM, Java Features, Creation and Execution of Programs, Data Types, Structure of Java Program, Type Casting, Conditional Statements, Loops, Classes, Objects, Class Declaration, Creating Objects.

Unit - II

Method Declaration and Invocation, Method Overloading, Constructors – Parameterized Constructors, Constructor Overloading, Cleaning-up unused Objects. Class Variables &Method-static Keyword, this Keyword, One-Dimensional Arrays, Two-Dimensional Arrays, Command-Line Arguments, Inner Class.

Inheritance: Introduction, Types of Inheritance, extends Keyword, Examples, Method Overriding, super, final Keyword, Abstract classes, Interfaces, Abstract Classes Verses Interfaces.

Packages: Creating and Using Packages, Access Protection, Wrapper Classes, String Class, StringBuffer Class.

Unit - III

Exception: Introduction, Types, Exception Handling Techniques, User-Defined Exception.

Multithreading: Introduction, Main Thread and Creation of New Threads –By Inheriting the Thread Class or Implementing the Runnable Interface, Thread Lifecycle, Thread Priority and Synchronization.

Input/Output: Introduction, java.io Package, File Streams, FileInputStream Class, FileOutputStream Class, Scanner Class, BufferedInputStream Class, BufferedOutputStream Class, RandomAccessFile Class.

Unit - IV

Applets: Introduction, Example, Life Cycle, Applet Class, Common Methods Used in Displaying the Output (Graphics Class).

Event Handling: Introduction, Types of Events, Example.

AWT: Introduction, Components, Containers, Button, Label, Checkbox, Radio Buttons, Container Class, Layouts.

Swings: Introduction, Differences between Swing and AWT, JFrame, JApplet, JPanel, Components in Swings, Layout Managers, JTable.

Text Book:

1. Sachin Malhotra, Saurabh Choudhary, Programming in Java (2e)

References:

1. Bruce Eckel, Thinking in Java (4e)
2. Herbert Schildt, Java: The Complete Reference (9e)
3. Y. Daniel Liang, Introduction to Java Programming (10e)
4. Paul Deitel, Harvey Deitel, Java: How To Program (10e)
5. Cay S. Horsttnann, Core Java Volume I –Fundamentals (10e)

KAKATIYA UNIVERSITY
FACULTY OF SCIENCE
B.A./B.Sc. Life Science (Computer Applications)
SEMESTER – V
Programming in Java

Practical 3 Hours/Week 1 Credit Marks: 25

Note:

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
- Faculty must take care about UG Standard Programs.
- In the external lab examination student has to execute two programs with compilation and deployment steps are necessary.
- External Vice-Voce is compulsory.

1. Write a program to find the largest of n natural numbers.
2. Write a program to find whether a given number is prime or not.
3. Write a menu driven program for following:
   a. Display a Fibonacci series
   b. Compute Factorial of a number
4. Write a program to check whether a given number is odd or even.
5. Write a program to check whether a given string is palindrome or not.
6. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
7. Write a program to create an array of 10 integers. Accept values from the user in that Array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
8. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
9. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
10. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
11. Write a Java program for the implementation of multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
12. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
13. Write a java program to draw a line between two coordinates in a window.
14. Write a java program to display the following graphics in an applet window.
    a. Rectangles b. Circles
    c. Ellipses d. Arcs e. Polygons
15. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by NumberFormatException object. After that ex.getMessage () prints the information about the error occurring causes.
16. Write a program for the following string operations:
    a. Compare two strings b. concatenate two strings c. Compute length of a string

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

DEPARTMENT OF ENGLISH

Under Graduate Courses (Under CBCS 2021– 2022 onwards)

GENERAL ENGLISH III-YEAR, V- SEMESTER

B.A., B.COM., B.Sc., B.B.A., B.C.A.,B.A(L).

PAPER – V: ENGLISH

COMMUNICATION SKILLS

English through Human Values and Ethics

Theory: 3 Hours/Week; Credits: 3 Marks: 75 (Internal: 15; External: 60)

Unit1	PROSE	Tolerance is a Moral Virtue – Rivka T. Witenberg
	POEM	How Happy is the Little Stone – Emily Dickinson
	LANGUAGE	Paragraph Writing
Unit 2	PROSE	When Cities were Nature's Haven – Harini Nagendra
	POEM	Where the Mind is Without Fear – Rabindranath Tagore
	LANGUAGE	Note-making
Unit 3	PROSE	Why we Love Holiday Rituals and Traditions – Dimitris Xygalatas
	POEM	Sonnets are Full of Love – Christina Rossetti
	LANGUAGE	Public Speaking

PRESCRIBED TEXTBOOK: *English for Career*: A Course book for Undergraduate Learners

Eds. K. Purushotham, M. Rajeshwar and R. Meghana Rao. Published by Orient Blackswan.2021.

Approved

27-12-2021

Dr. B. Krishnaiah

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R. Meghana Rao

27/12/2021

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Board of Studies In English
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27/XII/21

27/12/2021

KAKATIYA UNIVERSITY

FACULTIES OF ARTS/SCIENCE/COMMERCE/SOCIAL SCIENCES

GENERAL ENGLISH - Semester: V Examination

B.A/B.COM/B.Sc/B.B.A/B.C.A/B.A(L).

[Internal Marks=15 and Written Marks =60 / Total Marks=75: 3 Credits for Semester]

SEMESTER V: MODEL PAPER

Time: 2 Hours] [Max. Marks: 60

Answer the following questions in the serial order.

Section A - [Marks: 3 x (10) = 30]

I. Answer any THREE of the following questions.

(A) A question on Paragraph Writing will be given based on hints / ideas. **1x(10) = 10**

e.g. Yoga is a skill in action. Build a neat paragraph in about 100 words on this topic.

(B) A question on Note Making will be given based on the passage given. **1x(10) = 10**

e.g. Make notes from the passage given below suggesting a suitable title.

(C) A question on Public Speaking will be given based on hints / ideas. **1x(10) = 10**

e.g. Prepare a Welcome Speech on the occasion of your college Freshers' Day.

(D) Reading Comprehension of an unseen passage **1x(10) = 10**

Section B - (Marks: 3X(10)=30)

Answer any THREE of the following questions. **Each question carries 10 marks.**

II. Attempt either A or B (Essay Answer Questions from Prose)

III. Attempt either A or B (Essay Answer Questions from Poetry)

IV. Attempt either A or B (Annotation Passages from Prose)

V. Attempt either A or B (Annotation Passages from Poetry)

Approved
27-12-2021

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27/12/2021

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27/12/2021

Kakatiya University, Warangal.

Faculty of Commerce & Business Management,

B.Com. V Semester - Paper GE: BUSINESS ECONOMICS

Objective: *To acquire knowledge for application of economic principles and tools in business practices.*

UNIT-I: INTRODUCTION:

Business Economics: Meaning - Nature – Characteristics - Importance and Role - Micro & Macro Economics - Scope - Objectives - Concepts used in Business Economics -Law of Diminishing marginal utility - Law of Equi-marginal utility.

UNIT- II: DEMAND ANALYSIS:

Meaning – Function - Factors influencing Demand -Types of Demand -Demand Curve - Law of Demand –Exceptions to the law of demand-Elasticity of Demand: Concept - Types of elasticity of demand-price, income and cross Elasticity of Demand –measurement of elasticity—arc and point methods—Importance of various Elasticities of Demand

UNIT-III: SUPPLY ANALYSIS:

Law of Supply - Factors influencing Supply - Market Equilibrium- Consumer Surplus - Theory of Consumer behavior - Utility and indifference curve analysis.

UNIT–IV: PRODUCTION ANALYSIS:

Concept of Production –production function-Total Production - Marginal Production - Average Production – Returns to a factor- Law of Variable Proportions - Law of Returns to Scale – Isocost – Isoquants - Economies and Dis-economies of Scale.

UNIT-V: COST AND REVENUEANALYSIS:

Theory of Cost - Concepts of Cost - Short run and Long run cost curves - Traditional and Modern Approaches -Revenue Curves–relationship between total marginal and average revenues- --Break Even Analysis—Meaning – Assumptions – Uses and Limitations.

SUGGESTED READINGS:

1. Business Economics: V. G. Mankar, Himalaya Publishing House
2. Managerial Economics: Vanith Agrawal, Pearson Education
3. Business Economics: H. L. Ahuja, S. Chand & Co. Ltd.
4. Business Economics : R. K. Lekhi, Kalyani Publishers
5. Business Economics: D. M. Mithani, Himalaya Publishing House
6. Business Economics: P. N. Chopra, Kalyani Publishers
7. Essential of Business Economics: D. N. Dwivedi, Vikas Publishers

Prof. K. Raji Reddy	Prof. P. Varalaxmi	Dr. K. Rajender
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Kakatiya University, Warangal.

Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 501 (a) : COST ACCOUNTING

Objective: *To make the students acquire the knowledge of cost accounting methods.*

UNIT-I: INTRODUCTION:

Cost Accounting: Definition – Features – Objectives – Functions – Scope – Advantages and Limitations - Essentials of a good cost accounting system- Difference between Cost Accounting and Financial Accounting – Cost concepts – Cost Classification. (Theory Only)

UNIT-II: MATERIAL:

Direct and Indirect Material cost – Inventory Control Techniques – Stock Levels – EOQ – ABC Analysis – JIT - VED - FSND - Issue of Materials to Production – Pricing methods: FIFO - LIFO with Base Stock and Simple and Weighted Average methods. (Problems)

UNIT-III: LABOUR AND OVERHEADS:

Labour: Direct and Indirect Labour Cost – Methods of Payment of Wages (only Incentive Plans): Halsey, Rowan, Taylor Piece Rate and Merrick Multiple Piece Rate Methods.

Overheads: Classification - Methods of Allocation - Apportionment and Absorption of overheads. (Problems)

UNIT-IV: UNIT AND JOB COSTING:

Unit Costing: Features - Cost Sheet – Tender and Estimated Cost Sheet.

Job Costing: Features - Objectives – Procedure - Preparation of Job Cost Sheet. (Problems)

UNIT-V: CONTRACT AND PROCESS COSTING:

Contract Costing: Features – Advantages - Procedure of Contract Costing – Guidelines to Assess profit on incomplete Contracts. Process Costing: Meaning – Features – Preparation of Process Account – Normal and Abnormal Losses. (Problems)

SUGGESTED READINGS:

1. Cost Accounting: Jain and Narang, Kalyani
2. Cost Accounting: Srihari Krishna Rao, Himalaya
3. Cost and Management Accounting: Prashanta Athma, Himalaya
4. Cost Accounting: Dr. G. Yogeshweran, PBP.
4. Cost Accounting: Jawaharlal, Tata Mcgraw Hill
5. Cost Accounting: Theory and Practice: Banerjee, PHI

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 501 (b): FINANCIAL PLANNING & PERFORMANCE

Objective: *To make students to understand the Financial Planning & Performance.*

UNIT I: STRATEGIC PLANNING:

Strategic planning: Meaning – Characteristics – Environmental Scanning – Strategic Planning Vs. Tactical Planning – Strategic Planning Process

Annual profit plan and supporting schedules: Operational budgets - Financial budgets - Capital budgets - Financial statement projections - Cash flow projections.

UNIT II: BUDGETING AND FORECASTING:

Budgeting Concepts: Operations and performance goals - Characteristics of a successful budget process - Resource allocation - Forecasting techniques: Regression analysis - Learning curve analysis - Expected value - Budgeting Methodologies: Annual business plans (master budgets) - Project budgeting - Activity-based budgeting - Zero-based budgeting - Continuous (rolling) budgets - Flexible budgeting – Meaning & Prioblems.

UNIT III: COST AND VARIANCE ANALYSIS:

Cost and Variance Analysis: Comparison of actual to planned results - Use of flexible budgets to analyze performance - Management by exception - Standard Cost System: Use of standard cost systems - Analysis of variation from standard cost expectations

UNIT IV: PERFORMANCE MEASURES:

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 - Responsibility Centers and Reporting Segments: Types of responsibility centers - Transfer pricing - Reporting of organizational segments

UNIT V: TECHNOLOGY AND ANALYTICS:

Information Systems: Accounting information systems - Enterprise resource planning systems - Enterprise performance management systems - Data Governance: Data policies and procedures - Life cycle of data - Controls against security breaches - Technology-enabled finance transformation: System Development Life Cycle - Process automation - Innovative applications

Data analytics: Business intelligence - Data mining - Analytic tools - Data visualization

SUGGESTED READINGS:

1. Wiley CMAexcel Learning System, Part 1: Planning, Performance & Analytics
2. Strategic Management and Business Policy: Globalization, Innovation and Sustainability, 15th edition; Wheelen, Thomas L., et. al.; Prentice Hall
3. Cost Management: A Strategic Emphasis, 6th edition; Blocher, Edward, J., Stout, David E., Juras, Paul E., and Cokins, Gary; McGraw Hill
4. Horngreen's Cost Accounting: A Managerial Emphasis, 16th edition; Charles T., Datar, Srikant, and Rajan, Madhav; Pearson
5. Quantitative Methods for Business, 13th Edition; Anderson, David, R., Sweeney, Dennis J., Williams, Thomas A., Camm, Jeff, and Martin, R. Kipp; Cengage Learning
6. Management Accounting: An Integrative Approach; McNair-Connolly, C.J., Merchant, Kenneth A.; IMA.

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Kakatiya University, Warangal.

Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 501 (c) : INTERNATIONAL FINANCIAL REPORTING -I

Objective: *To make students to understand the International Financial Reporting.*

UNIT I: GENERAL PURPOSE OF FINANCIAL ACCOUNTING AND REPORTING AS PER US GAAP AND IFRS:

Conceptual framework: Standard Setting Bodies & Hierarchy - Elements of F/S - Primary objectives of financial reporting - Qualitative Characteristics of F/S - Fundamental Assumptions & Principles - Accounting Cycle & Preparation of F/S - General-purpose financial statements: Balance sheet - Income statement - Statement of comprehensive income - Statement of changes in equity - Statement of changes cash flows - Public company reporting requirements: SEC Reporting Requirements - Interim Financial Reporting - Segment Reporting - Revenue recognition: 5-Step approach to Revenue Recognition - Certain Customer's Rights & Obligations - Specific Arrangements - Long Term Construction Contracts

UNIT II: CURRENT ASSETS AND CURRENT LIABILITIES (AS PER US GAAP AND IFRS):

Monetary Current Assets & Current Liabilities: Cash & Cash Equivalents - Accounts Receivable - Notes Receivable - Transfers & Servicing of Financial Assets - Accounts Payable - Employee-related Expenses Payable - Inventory: Determining Inventory & Cost of Goods Sold - Inventory Valuation - Inventory Estimation Methods

UNIT III: FINANCIAL INVESTMENTS AND FIXED ASSETS (AS PER US GAAP AND IFRS):

Financial Investments: Investments in Equity Securities - Investment in Debt Securities - Financial Instruments - Tangible Fixed Assets: Acquisition of Fixed Assets - Capitalization of Interest - Costs Incurred After Acquisition - Depreciation - Impairment - Asset Retirement Obligation - Disposal & Involuntary Conversions - Intangible Assets: Knowledge-based intangibles (R&D, software) - Legal rights based intangibles (patent, copyright, trademark, franchise, license, leasehold improvements) - Goodwill

UNIT IV: FINANCIAL LIABILITIES (AS PER US GAAP AND IFRS):

Bonds Payable: Types of Bonds - Convertible bonds vs. Bonds with detachable warrants - Bond Retirement - Fair Value Option & Fair Value Election - Debt Restructuring: Settlement - Modification of terms

UNIT V: SELECT TRANSACTIONS (AS PER US GAAP AND IFRS):

Fair value measurements: Valuation techniques - Fair value hierarchy - Fair value concepts –Accounting changes and error correction: Changes in accounting estimate - Changes in accounting principle - Changes in reporting entity - Correction of an error - Contingencies: Possibility of occurrence (remote, reasonably possible or probable) - Disclosure vs. Recognition

Derivatives and Hedge Accounting: Speculation (non-hedge) - Fair value hedge - Cash flow hedge - Non-monetary exchanges: Exchanges with commercial substance - Exchanges without commercial substance - Leases: Operating lease - Finance lease - Sale leaseback

SUGGESTED READINGS:

1. Miles CPA Review Concept Book: Financial Accounting & Reporting, Miles Education
2. Wiley CPA Excel Exam Review Course Study Guide: Financial Accounting and Reporting, Wiley
3. IFRS & US GAAP Best Practices in Accounting World: GAAP Analysis, Rajesh Dhawan
4. Transparency in Financial Reporting: A concise comparison of IFRS and US GAAP 1st Edition, Ruth Ann McEwen, Harriman House Ltd.
5. IFRS and US GAAP: A Comprehensive Comparison, Steven E. Shamrock, Wiley

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Kakatiya University, Warangal.

Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 502 (a): COMPUTERIZED ACCOUNTING

Objective: *To make the students to acquire the knowledge of computer software*

UNIT I: MAINTAINING CHART OF ACCOUNTS IN ERP:

Introduction-Getting Started with ERP - Mouse/Keyboard Conventions-Company Creation-Shut Company-Select a Company-Alter Company Details-Company Features and Configurations-F11: Company Features-F12: Configuration-Chart of Accounts-Ledger-Group-Ledger Creation-Single Ledger Creation-Multi Ledger Creation-Altering and Displaying Ledgers-Group Creation-Single Group Creation-Multiple Group Creation-Displaying Groups and Ledgers-Displaying Groups-Display of Ledgers-Deletion of Groups and Ledgers – P2P procure to page.

UNIT II: MAINTAINING STOCK KEEPING UNITS (SKU):

Introduction-Inventory Masters in ERP - Creating Inventory Masters-Creation of Stock Group-Creation of Units of Measure-Creation of Stock Item-Creation of Godown-Defining of Stock Opening Balance in ERP Stock Category-Reports.

UNIT III: RECORDING DAY-TO-DAY TRANSACTIONS IN ERP:

Introduction-Business Transactions-Source Document for Voucher-Recording Transactions in ERP - Accounting Vouchers-Receipt Voucher (F6)-Contra Voucher (F4)-Payment Voucher (F5)-Purchase Voucher (F9)-Sales Voucher (F8)-Debit Note Voucher-Credit Note (Ctrl+F8)-Journal Voucher (F7).

UNIT IV: ACCOUNTS RECEIVABLE AND PAYABLE MANAGEMENT: Introduction-Accounts Payables and Receivables-Maintaining Bill-wise Details-Activation of Maintain Bill-wise Details Feature-New Reference-Against Reference-Advance-On Account-Stock Category Report-Changing the Financial Year in ERP.

UNIT V: MIS REPORTS:

Introduction-Advantages of Management Information Systems-MIS Reports in ERP - Trial Balance - Balance Sheet-Profit and Loss Account-Cash Flow Statement-Ratio Analysis-Books and Reports - Day Book-Receipts and Payments-Purchase Register-Sales Register-Bills Receivable and Bills Payable.

SUGGESTED READINGS:

1. Computerised Accounting: Garima Agarwal, Himalaya
2. Computerised Accounting: A. Murali Krishna, Vaagdevi publications
3. Computerised Accounting: Dr. G. Yogeshweran, PBP.
4. Implementing Tally ERP 9: A.K Nadhani and K.K Nadhani, BPB Publications
5. Computerised Accounting and Business Systems: Kalyani Publications
6. Manuals of Respective Accounting Packages
7. Tally ERP 9: J.S. Arora, Kalyani Publications.

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 502 (b): FINANCIAL DECISION MAKING - I

Objective: *To make students to understand the Financial Decision Making.*

UNIT I: FINANCIAL STATEMENT ANALYSIS

Basic Financial Statement Analysis: Common size financial statements - Common base year financial statements - Financial Ratios: Liquidity - Leverage - Activity - Profitability – Market Profitability analysis: Income measurement analysis - Revenue analysis - Cost of sales analysis - Expense analysis - Variation analysis - Impact of changes in accounting treatment - Accounting and economic concepts of value and income - Earnings quality

UNIT II: FINANCIAL MANAGEMENT

Risk & Return: Calculating return - Types of risk - Relationship between risk and return Long-term Financial Management: Term structure of interest rates - Types of financial instruments - Cost of capital - Valuation of financial instruments

UNIT III: RAISING CAPITAL

Raising Capital: Sources of Long term Capital: Equity, Preference, Debt - Financial institutions - Initial and secondary public offerings - Dividend policy - Lease financing

UNIT IV: WORKING CAPITAL MANAGEMENT

Managing working capital: Cash management - Marketable securities management - Accounts receivable management - Inventory management - Short-term Credit: Types of short-term credit - Short-term credit management

UNIT V: CORPORATE RESTRUCTURING AND INTERNATIONAL FINANCE

Corporate Restructuring: Mergers and acquisitions - Bankruptcy - Other forms of restructuring International Finance: Fixed, flexible, and floating exchange rates - Managing transaction exposure - Financing international trade.

SUGGESTED READINGS:

1. Wiley CMAexcel Learning System, Part 2: Strategic Financial Management
2. Interpretation and Application of International Financial Reporting Standards; Mackenzie, Bruce, Coetsee, Danie, Njikizana, Tapiwa, Chamboko, Raymond, Colyvas, Blaise,and Hanekom, Brandon; Wiley
3. Financial Reporting & Analysis, 13th edition; Gibson, Charles H.; South-Western Cengage Learning
4. Financial Statement Analysis, 10th edition; Subramanyam, K.R., and Wild, John L.; McGraw Hill
5. Principles of Corporate Finance, 11th edition; Brealey, Richard, A., Myers, Stewart C., and Allen, Franklin; McGraw Hill

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 502 (c) : INTERNATIONAL TAX & REGULATION

Objective: *To make students to understand the International Tax & Regulation..*

UNIT I: TAXATION OF INDIVIDUALS:

Individual Income Tax Return: Filing Status - Cash basis and Accrual basis. Gross Income: Wages, Salaries, Bonus, Commission, Fees & Tips - Interest & Dividend Income Business Income - Capital Gains & Losses - Passive Income - Farming Income - Deductions: Adjustments - Deductions from AGI - Calculating Tax: Tax Credits - Alternative Minimum Taxes - Other Taxes - Estimated Tax penalty

UNIT II: PROPERTY TRANSACTIONS & DEPRECIATION:

Capital Gains & Losses - Gains & Losses from Sale of Long-term Business property - Depreciation & Amortization

UNIT III: TAXATION OF CORPORATIONS:

C-Corporations: Formation - Income Tax Return - Income - Deductions - Reconciliation of Taxable Income with books - Calculating Tax - Corporate Earnings & Distributions - Corporate Liquidation & Reorganizations - S-Corporations: Eligibility criteria - Income Tax Return - Shareholder basis - Earnings and Distribution - Termination of Election

UNIT IV: TAXATION OF OTHER ENTITIES:

Partnerships: Formation - Income Tax Return - Partner basis - Partnership Distributions - Sale of Partnership Interest by a Partner - Termination of Partnership - Estate, Trust & Gift Taxation: Estate and Trust Fiduciary Income Tax Return - Estate Tax Return - Gift Tax Return - Generation-skipping transfer Tax - Tax Exempt Organizations: Formation - Income Tax Return

UNIT V: STATUTORY REGULATIONS, ACCOUNTANT RESPONSIBILITIES, BUSINESS STRUCTURES:

Federal Security Regulations: Securities Act of 1933 - Securities Exchange Act of 1934 - Other federal security regulations - Professional & Legal Responsibilities: Accountant Common Law Liabilities - Accountant Statutory Liabilities - Accountant Liabilities for Privileged Information - Accountant Criminal Liabilities - Employment Regulations - Environmental Regulations - Antitrust Regulations - Business Structures: Sole Proprietorships - Partnerships - Corporations

SUGGESTED READINGS:

1. Miles CPA Review Concept Book: Regulation, Miles Education
2. Wiley CPA Excel Exam Review Course Study Guide: Regulation, Wiley
3. Internal Revenue Code: Income, Estate, Gift, Employment and Excise Taxes, CCH Tax Law Editors
4. Federal Income Tax: Code and Regulations--Selected Sections, Martin B. Dickinson, Wolters Kluwer
5. Federal Income Taxation by Katherine Pratt and Thomas D. Griffith, Wolters Kluwer

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503 (a) : AUDITING

Objective: *to understand meaning and elements of auditing and gain knowledge for execution of audit.*

UNIT-I: INTRODUCTION:

Auditing: Meaning – Definition – Evolution – Objectives – Importance - Types of Audit – Standards of Auditing – Procedure for issue of standards by AASB.

UNIT–II: AUDITOR AND EXECUTION OF AUDIT:

Appointment – Qualification and Disqualification – Qualities – Remuneration – Removal – Rights – Duties – Civil and Criminal Liabilities of Auditors – Commencement of Audit – Engagement Letter – Audit Program – Audit Note Book – Audit Workbook – Audit Markings.

UNIT–III: INTERNAL CONTROL, INTERNAL CHECK AND INTERNAL AUDIT: Meaning and Objectives of Internal Control – Internal Check and Internal Audit – Internal Check Vs. Internal Audit – Internal Control vs. Internal Audit.

UNIT–IV: VOUCHING:

Meaning – Objectives – Types of Vouchers – Vouching of Trading Transactions – Vouching Cash Transaction – Auditing in an EDP Environment.

UNIT–V: VERIFICATION AND VALUATION OF ASSETS:

Meaning and Definition – Distinction – Verification and Valuation of various Assets and Liabilities – Audit Committee – Role of Audit Committee – Audit Reports.

SUGGESTED READINGS:

1. Principles and Practice of Auditing: RG Saxena, Himalaya Publishing House.
2. Auditing and Assurance for CA Integrated Professional Competence: SK Basu, Pearson.
3. Auditing : Mahitha HPH
4. Auditing: Dr. Nazia Sultana, PBP.
5. Auditing: Aruna Jha, Taxmann Publications**.**
6. Auditing Principles, Practices & Problems: Jagdish Prakash, Kalyani Publishers.
7. Auditing and Assurance: Ainapure & Ainapure, PHI Learning.
8. Principles and Practice of Auditing: Dinkar Pagare, Sultan Chand & Sons.
9. Fundamentals of Auditing: Kamal Gupta and Ashok Arora, Tata McGraw-Hill
10. A Hand Book of Practical Auditing: B.N. Tandon etal., S. Chand.

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503 (b) : ADVANCED CORPORATE ACCOUNTING

Objective: *To gain knowledge of AS-19 & 21 and format accounts.*

UNIT-I: HOLDING COMPANIES (AS-21):

Nature – Legal requirements – Capital and Revenue Profit/Reserves/Losses – Minority Interest – Cost of Control or Goodwill – Capital Reserve – Inter Company Transactions – Un-realized Profit on Unsold stock - Revaluation of Assets – Interim Dividend by Subsidiary Companies - Debentures in Subsidiary Companies – Consolidated Balance Sheet.

UNIT-II: ELECTRICITY COMPANIES (DOUBLE ACCOUNTING SYSTEM):

Meaning of Double Account System – Final Accounts - Calculation of Reasonable Return and Disposal of Surplus – Replacement of an Asset.

UNIT-III: ACCOUNTING FOR PRICE LEVEL CHANGES:

Introduction – History – Limitations – Profit measurement under different systems of accounting – Methods of Accounting for Price Level Changes: Current Purchasing Power (CPP) – Current Cost Accounting (CCA).

UNIT-IV: LEASE ACCOUNTS (AS-19):

Meaning – Terminology – Advantages and Disadvantages – Types: Financial and Operating Lease – Accounting Treatment in the books of both the parties.

UNIT-V: HUMAN RESOURCE ACCOUNTING & SOCIAL RESPONSIBILITY ACCOUNTING:

Human Resource Accounting: Definition – Objectives – Assumptions – Advantages and Limitations – Approaches - Human resource accounting in India (Theory only).
Social Responsibility Accounting: Meaning – Nature – Need – Objectives – Accounting Concepts – Indicators of Social Performance (Theory only).

SUGGESTED READINGS:

1. Corporate Accounting: R.L.Gupta, M.Radha Swamy, Sultan Chand
2. Advanced Carporate Accounting: Srilatha Reddy, Himalaya
3. Advanced Carporate Accounting: Dr. Thangapandi, PBP
3. Advanced Accounting: Tulsania, TataMcGraw-hill Publishing Company
4. Corporate Accounting: Jain & Narang, Kalyani Publications
5. Advanced Accounting: S.M.Shukla, Sahitya Bhavan
6. Corporate Accounting: Prashanta Athma, Himalaya Publishers.
7. Advanced Accounting (Vol. II): Chandra Bose, PHI

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503 (c) : FINANCIAL MANAGEMENT

Objective: *To understand basics in Financial Management.*

UNIT–I: INTRODUCTION:

Financial Management: Meaning - Nature and Scope – Importance - Objectives - Profit Maximization vs Wealth Maximization – Traditional Functions of Finance Manager – Changing Role of Finance Manager – Relationship between Financial Management and Other Management Areas (Theory).

UNIT–II: FINANCIAL PLANNING:

Sources of Finance **-** Financial Planning: Meaning and Definition – Objectives – Characteristics – Process – Factors - Limitations (Theory).

UNIT–III: CAPITALIZATION:

Meaning of Capital and Capitalization – Sources of Capital - Theories of Capitalization – Over Capitalization: Meaning - Causes – Consequences - Remedies - Under Capitalization: Meaning – Causes – Consequences - Remedies - Comparison of Under and Over Capitalization – Watered Stock (Theory).

UNIT–IV: COST OF CAPITAL:

Meaning and Definition – Significance – Classification of Costs – Problems in Determination of Cost of Capital – Cost of Debt - Cost of Perpetual and Redeemable Debt - Cost of Preference Capital - Cost of Equity Capital – Cost of retained earnings - Weighted Average Cost of Capital (Simple Problems).

UNIT–V: CAPITAL STRUCTURE:

Meaning – Importance – Factors – Types – Optimal Capital Structure – Theories of Capital Structure: Net Income Approach - Net Operating Income Approach - Traditional Approach - Modigliani and Miller Approach (Simple Problems).

SUGGESTED READINGS:

1. Financial Management: I M Pandey, Vikas Publishing House Pvt Ltd.
2. Financial Management: M.Y. Khan & P.K. Jain, Tata McGraw-Hill
3. Financial Management: Shashi K. Gupta & R.K. Sharma, Kalyani Publishers,
4. Financial Management: Prasanna Chandra , McGraw Hill
5. Financial Management: Rustagi, Taxman Publications.
6. Financial Management: Tulsian, S. Chand.

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503a: MANAGEMENT INFORMATION SYSTEM

(Only for B.Com. (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits**: 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *To equip the students with finer nuances of MIS.*

UNIT–I: INTRODUCTION TO MIS:

The Technical and Business Perspective, Organization Structure, Evaluation of MIS through Information System, The Decision Making Process , System Approach to Problem Solving, The Structure of Management Information System, MIS Organization within the Company.

UNIT-II: INFORMATION SYSTEMS FOR DECISION MAKING:

Evolution of an Information System, Basic Information Systems, Decision Making and MIS, Decision Assisting Information System, Concepts of Balanced MIS Effectiveness and Efficiency Criteria.

UNIT-III: DEVELOPMENT OF MIS:

Methodology and Tools/Techniques for Systematic Identification, Evaluation and Modification of MIS. *Enterprise Resource Planning:* Introduction, Basics of ERP, Evolution of ERP, Enterprise Systems in Large Organizations, Benefits and Challenges of Enterprise Systems, *E-Enterprise System :* Introduction: Managing the E-enterprise, Organisation of Business in an E-enterprise, E-business, E-commerce, E-communication, E-collaboration.

UNIT-IV: ADVANCED MIS:

Concepts, Needs and Problems in Achieving Advanced MIS, DSS., Business intelligence + process management, systems development, and security.

UNIT-V: COLLABORATION, IMPACT & PITFALLS IN MIS:

Collaboration processes and information systems, Impact of Web 2.0 and social media on business process, Pitfalls in MIS Development: Fundamental Weakness, Soft Spots in Planning and Design Problems.

SUGGESTED READINGS:

1.Murdic, Rose and Clagett- Information Systems for Modern Management, PHI, New Delhi.
2.Process, Systems, and Information, David M. Kroenke,
3. MIS Cases Decision Making with Application Software, 4th Edition, Lisa Miller
4.Laudon-Laudon- Management Information Systems, Pearson Education, New Delhi.

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503b: E-COMMERCE

(Only for B.Com. (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits**: 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *to acquire conceptual and application knowledge of ecommerce.*

UNIT-I: INTRODUCTION:

E-Commerce: Meaning - Advantages & Limitations - E-Business: Traditional & Contemporary Model, Impact of E-Commerce on Business Models - Classification of E-Commerce: B2B - B2C - C2B - C2C - B2E - Applications of Ecommerce: E-Commerce Organization Applications - E-Marketing - E-Advertising - E-Banking - Mobile Commerce - E-Trading - E-Learning - E-Shopping.

UNIT-II:FRAMEWORK OF E-COMMERCE:

Framework of E-Commerce: Application Services - Interface Layers - Secure Messaging - Middleware Services and Network Infrastructure - Site Security - Firewalls & Network Security - TCP/IP – HTTP - Secured HTTP – SMTP - SSL.

Data Encryption: Cryptography – Encryption – Decryption - Public Key - Private Key - Digital Signatures - Digital Certificates.

UNIT-III:CONSUMER ORIENTED E-COMMERCE APPLICATIONS:

Introduction - Mercantile Process Model: Consumers Perspective and Merchant's Perspective - Electronic Payment Systems: Legal Issues & Digital Currency - E-Cash & E-Cheque - Electronic Fund Transfer (EFT) - Advantages and Risks - Digital Token-Based E-Payment System - Smart Cards.

UNIT-IV:ELECTRONIC DATA INTERCHANGE:

Introduction - EDI Standards - Types of EDI - EDI Applications in Business – Legal - Security and Privacy issues if EDI - EDI and E-Commerce - EDI Software Implementation.

UNIT-V: E-MARKETING TECHNIQUES:

Introduction - New Age of Information - Based Marketing - Influence on Marketing - Search Engines & Directory Services - Charting the On-Line Marketing Process - Chain Letters - Applications of 5P's (Product, Price, Place, Promotion, People) E-Advertisement - Virtual Reality & Consumer Experience - Role of Digital Marketing.

Lab work: *Using Microsoft Front Page Editor and HTML in Designing a Static Webpage/Website.*

SUGGESTED READINGS:

1. Frontiers of Electronic Commerce: Ravi Kalakota, Andrew B Whinston, Pearson
2. E-Commerce: Tulasi Ram Kandula, HPH.
3. Electronic Commerce, A Managers' Guide: Ravi Kalakota, Andrew B Whinston
4. E-Commerce & Computerized Accounting: Rajinder Singh, Er. KaisarRasheed, Kalyani
5. E-Commerce & Mobile Commerce Technologies: Pandey, SaurabhShukla, S. Chand

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Faculty of Commerce & Business Management,

B.Com. V Semester - Paper DSE 503C: MOBILE APPLICATIONS

(Only for B.Com. (Computer Applications)

Hours Per Week: 7 (3T+4P) **Credits**: 5

Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *To understand and apply the mobile applications.*

UNIT-I: INTRODUCTION:

What is Android, Android versions and its feature set The various Android devices on the market, The Android Market application store ,Android Development Environment - System Requirements, Android SDK, Installing Java, and ADT bundle - Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs), the Android Software Stack, The Linux Kernel, Android Runtime - Dalvik Virtual Machine, Android Runtime – Core Libraries, Dalvik VM Specific Libraries, Java Interoperability Libraries, Android Libraries, Application Framework, Creating a New Android Project ,Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon, Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Reviewing the Layout and Resource Files,

UNIT-II: MOBILE SOFTWARE:

Understanding Java SE and the Dalvik Virtual Machine, The Directory Structure of an Android Project , Common Default Resources Folders, The Values Folder, Leveraging Android XML, Screen Sizes, Launching Your Application: The AndroidManifest.xml File,

Creating Your First Android Application, Android Application Components, Android Activities: Defining the UI, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications Content Providers: Data Management, Android Intent Objects: Messaging for Components.

Android Manifest XML: Declaring Your Components, Designing for Different Android Devices, Views and View Groups, Android Layout Managers, The View Hierarchy, Designing an Android User Interface using the Graphical Layout Tool.

UNIT-III: MOBILE DISPLAY:

Displaying Text with Text View, Retrieving Data from Users, Using Buttons, Check Boxes and Radio Groups, Getting Dates and Times from Users, Using Indicators to Display Data to Users, Adjusting Progress with Seek Bar, Working with Menus using views, Gallery, Image Switcher, Grid View, and Image View views to display images, Creating Animation, Saving and Loading Files, SQLite Databases, Android Database Design, Exposing Access to a Data Source through a Content Provider, Content Provider Registration, Native Content Providers

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UNIT-IV: MOBILE APPLICATIONS:

Intent Overview, Implicit Intents, Creating the Implicit Intent Example Project, Explicit Intents, Creating the Explicit Intent Example Application, Intents with Activities, Intents with Broadcast Receivers, An Overview of Threads, The Application Main Thread, Thread Handlers, A Basic Threading Example, Creating a New Thread, Implementing a Thread Handler, Passing a Message to the Handler. Sending SMS Messages Programmatically, Getting Feedback after Sending the Message Sending SMS Messages Using Intent Receiving, sending email

Introduction to location-based service, configuring the Android Emulator for Location-Based Services, Geo coding and Map-Based Activities, Playing Audio and Video, Recording Audio and Video, Using the Camera to Take and Process Pictures

UNIT-V: MOBILE APP DEVELOPMENT & INSTALLATION:

Introduction to Windows Phone App Development, Installing the Windows Phone SDK, Creating Your First XAML for Windows Phone App. Understanding the Role of XAP Files, the Windows Phone Capabilities Model, the Threading Model for XAML-Based Graphics and Animation in Windows Phone, Understanding the Frame Rate Counter, The Windows Phone Application Analysis Tool, Reading Device Information, Applying the Model-View-View Model Pattern to a Windows Phone App, Property Change Notification, Using Commands

SUGGESTED READINGS:

1. Erik Hellman, "Android Programming – Pushing the Limits", 1st Edition, Wiley India Pvt Ltd, 2014.
2. Dawn Griffiths and David Griffiths, "Head First Android Development", 1st Edition, O'Reilly SPD Publishers, 2015
3. J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580
4. AnubhavPradhan, Anil V Deshpande, " Composing Mobile Apps" using Android, Wiley 2014, ISBN: 978-81-265-4660-2

Web Resource :

Google Developer Training, "Android Developer Fundamentals Course – Concept Reference", Google Developer Training Team, 2017.
https://www.gitbook.com/book/google-developer-training/android-developerfundamentals-course-concepts/details (Download pdf file from the above link)

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DSE-1(A)/Paper-5 (A): Applied Statistics-I

[4 HPW:: 4 Credits :: 100 Marks (External : 80, Internal : 20)]

UNIT-I

Sample Surveys: Concepts of population, sample, sampling unit, parameter, statistic, sample frame and standard error. Principal steps in sample surveys - need for sampling, census versus sample surveys, sampling and non- sampling errors, sources and treatment of non-sampling errors, advantages and limitations of sampling.

Sampling Methods: Types of sampling: Subjective, probability and mixed sampling methods. Methods of drawing random samples with and without replacement. Estimates of population mean, total, and proportion, their variances and the estimates of variances in Simple Random Sampling With and Without Replacement

UNIT-II

Estimates of population mean, population total, and population proportion, their variances and the estimates of variances in methods of: (i) Stratified Random Sampling with Proportional and Neyman allocation (ii) Systematic Sampling when N= nk, Comparison of relative efficiencies, Advantages and disadvantages of SRS, Stratified and Systematic sampling methods.

UNIT-III

Time Series: Time Series and its components with illustrations, additive, multiplicative and mixed models. Determination of trend by least squares and moving average methods. Growth curves and their fitting with reference to Modified exponential, Gompertz and Logistic curves. Determination of seasonal indices by Ratio to moving average, ratio to trend and link relative methods.

UNIT-IV

Statistical Quality Control: Importance of SQC in industry, Dimensions of quality, Statistical basis of Shewart control charts. Construction of control charts for variables: mean, range and standard deviation, Construction of control charts for attributes: p, np with fixed and varying sample sizes and their interpretation, c and u charts with fixed and varying sample sizes and their interpretation.

References:

1. V. K. Kapoor and S. C. Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. Sanjay Arora and Bansilal :New Mathematical Statistics, Satya Prakashan , New Delhi
3. Hogg and Craig : Introduction to Mathematical statistics, Prentice Hall
4. Parimal Mukhopadhyay : Mathematical Statistics, New Central Book agency.
5. Anuvartita Sankhyaka Sastram , Telugu Academy.

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Practical-5 (A) : Applied Statistics - I

[With 3 HPW, Credits 1 and 25 Marks]

Practical (using R-Software and MS- Excel)

R- Software : Overview of R, R data types and objects, reading and writing data, sub setting R Objects, Essentials of the R Language, Running R, Packages in R, Variable names and assignment, Operators, Integers, Factors, Logical operations. Operations of Scalars, Vectors, Lists, Arrays, Matrices, Data Frames. Control structures, Functions.

1. Data Visualization using R - Frequency polygons and curves, Ogives, Histogram using R.

2. Data Visualization using R - Bar diagrams (simple, compound, percentage and multiple) and Pie diagram (single and multiple) using R.

3. Computation of Descriptive Statistics using R (Measures of Central tendencies and Dispersion, Moments, Skewness and Kurtosis) using R.

4. Computation of expected frequencies for Binomial, Poisson, Normal and Exponential distributions using R.

5. Computation of Karl Pearson's coefficient of correlation and rank correlation using R.

6. Computation of partial and multiple correlations using R.

7. Time series Analysis: Computation of Secular trend by least squares and moving averages methods using R and MS-Excel.

8. Computation of Seasonal variations by Ratio to moving averages, Ratio to trend and Link Relatives methods using R and MS-Excel.

9. Construction of control charts for variables ($\bar{x}$, **R** and σ - charts) using R and MS – Excel.

10. Construction of control charts for attributes (p, np with fixed and varying sample size, C and u charts) using R and MS- Excel.

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DSE-1(B)/Paper- 5 (B): Analytical Statistics-I

[4 HPW :: 4 Credits :: 100 Marks (External : 80, Internal : 20)]

UNIT-I

Sample Surveys : Principal steps in sample surveys, census versus sample surveys, sampling and non- sampling errors, advantages and limitations of sampling.

Sampling Methods: Types of sampling : Subjective, Quota, probability and mixed sampling methods. Methods of drawing random samples with and without replacement. Estimates of population mean and total, their variances and the estimates of variances in Simple Random Sampling With and Without Replacement, Stratified Random Sampling with Proportional and Neyman optimum allocation and Systematic Sampling when N= nk.

UNIT-II

Time Series: Time series and its components with illustrations, additive, multiplicative and mixed models. Determination of trend by least squares and moving average methods. Growth curves and their fitting with reference to Modified exponential, Gompertz and Logistic curves. Determination of seasonal indices by Ratio to moving average, ratio to trend and link relative methods.

UNIT-III

Statistical Quality Control : Importance of SQC in industry. Dimensions of quality, Statistical basis of Shewart control charts. Construction of control charts for variables (mean, range and standard deviation) and attributes (p, np, c and u- charts with fixed and varying sample sizes). Interpretation of control charts.

UNIT-IV

Analysis of Variance and Design of Experiments: Concept of Gauss-Markov linear model with examples, statement of Cochran's theorem, ANOVA , one-way, two-way classifications with one observation per cell, Statistical analysis, Importance and applications of design of experiments, Principles of experimentation, Analysis of Completely randomized Design (C.R.D), Randomized Block Design (R.B.D) and Latin Square design (LSD) including one missing observation.

References:

1. S.C.Gupta and V.K.Kapoor: Fundamentals of Applied Statistics, Sultan Chand
2. B. L. Agarwal : Basic Statistics, New Age publications.
3. S. P. Gupta : Statistical Methods. Sultan Chand and Sons.
4. Parimal Mukhopadhyay : Applied Statistics, New Central Book agency.
5. Daroga Singh and Chowdhary : Theory and Analysis of Sample survey designs. Wiley Eastern.
6. M. R. Saluja : Indian Official Statistics. ISI publications.

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Practical - 5 (B): Analytical Statistics – I

[With 3 HPW, Credits 1 and 25 Marks]

Practical (using R-Software)

R- Software : Overview of R, R data types and objects, reading and writing data, sub setting R Objects, Essentials of the R Language, Running R, Packages in R, Variable names and assignment, Operators, Integers, Factors, Logical operations. Operations of Scalars, Vectors, Lists, Arrays, Matrices, Data Frames. Control structures, Functions.

1. Data Visualization using R - Frequency polygons and curves, Ogives, Histogram.

2. Data Visualization using R - Bar diagrams (simple, compound, percentage and multiple) and Pie diagram (single and multiple).

3. Computation of Descriptive Statistics using R (Measures of Central tendencies and Dispersion, Moments, Skewness and Kurtosis).

4. Computation of expected frequencies for Binomial, Poisson using R.

5. Computation of expected frequencies of Normal and Exponential distributions using R.

6. Computation of Karl Pearson's coefficient of correlation and rank correlation using R.

7. Computation of partial and multiple correlations using R.

8. Analysis of Variance for one way and two way classified data using R.

9. Analysis of Variance for CRD and RBD two way classified data using R.

10. Time series Analysis: Computation of Secular trend by least squares and moving averages methods using R.

11. Computation of Seasonal variations by Ratio to moving averages, Ratio to trend and Link Relatives methods using R.

12. Construction of control charts for variables ($\bar{x}$, **R** and σ - charts) using R.

13. Construction of control charts for attributes (p, np with fixed and varying sample size, C and u charts) using R.

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Question Papers Pattern

(A) Final Examination: KAKATIYA UNIVERSITY

B.Sc. (STATISTICS)

Theory Question Paper Pattern

Academic Years: 2019-2022

Time: 3 hours] [Max. Marks: 80

Section - A

Answer ALL questions. All questions carry equal marks. (4Qx12m=48)

Q1. (a)

[OR] From Unit-I

Q1. (b)

Q2. (a)

[OR] From Unit-II

Q2. (b)

Q3. (a)

[OR] From Unit-III

Q3. (b)

Q4. (a)

[OR] From Unit-IV

Q4. (b)

Section - B

Answer any EIGHT questions. All questions carry equal marks. (8Qx4m=32)

Q5
Q6 } From Unit-I
Q7

Q8
Q9 } From Unit-II
Q10

Q11
Q12 } From Unit-III
Q13

Q14
Q15 } From Unit-IV
Q16

***

Practical Question Paper Pattern
Academic Years: 2019-2022

Time: 2 hours] **[Max. Marks: 25**

[Practical:15, Record:5, Viva:5]

Note: Solve any THREE problems choosing at least one from each Section

Section-A (Solve Using Calculator)

Problem. 1
Problem. 2
Problem. 3
} From Part-I of Question Bank

Section - B (Solve Using Computer Programs)

Problem. 4
Problem. 5
} From Part-2 of Question Bank

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(B) Internal Examinations:

1 Two Internal exams are to be conducted and best of two internal marks is considered.
2 First internal exam is to be conducted after completion of Unit-I &II.
3 Second internal exam is to be conducted after completion of Unit-III & IV.
4 Internal Examination duration: 1 hr 30 min.
5 Internal Theory QP consists of 20 marks.
6 10 Short questions are to be given (5Q from each of 2 Completed units).
7 All TEN questions are to be answered (10QX2m=20m).

Prof A Rajendra Prasad
Chairperson, BOS in Statistics, KU

KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.SC. BIOTECHNOLOGY III YEAR

SEMESTER – V

Elective Course DSE-5

PLANT BIOTECHNOLOGY

(ELECTIVE - a)

UNIT-I

1.1. Historical perspectives of plant tissue culture, and basic requirement for tissue culture laboratory.
1.2. Culture mediums for plant tissue culture – MS medium and B5 medium.
1.3. Sterilization of media – steam, dry and filter sterilization - Explant sterilization.
1.4. Plant growth regulators and differentiation.
1.5. Method of tissue culture – formulation of medium explants collection, surface sterilization, inoculation, callus induction, subculture and regeneration of plants.
1.6.Organ culture – Leaf, Root and Stem culture.

UNIT-II

2.1. Suspension cultures – growth and subculture, types and synchronization of suspension Cultures.
2.2. Immobilization of cells and the effect of elicitors on the production of secondary Metabolites of commercial value.
2.3. Meristem culture and its uses in production of virus free plants.
2.4. Clonal propagation, Micropropagation of plants – medicinal plants and endangered Plants – methods and advantages.
2.5. Production of secondary metabolites – culture techniques.
2.6. Large scale production of commercially important compounds.

UNIT-III

3.1. Somatic embryogenesis – Principle, protocol and importance.
3.2. Artificial seed production, applications and limitations.
3.3. Embryo rescue and its importance.
3.4. Anther culture and production of androgenic haploids.
3.5. Somaclonal Variations - applications of somaclonal variations in crop improvement.
3.6. Cryopreservation of plant tissues and its applicaitonin plant tissue culture.

UNIT-IV

4.1. Protoplat – Properties of protoplast, Protoplast – Isolatoin(mechanical and enzymatic Methods).
4.2. Culturing and regeneration of protoplasts.
4.3. Somatic hybridization through protoplast fusion (Mechanical fusion, Chemo Fusion, Electro fusion.)
4.4. Selction of Somatic hybrids and Cybrids.
4.5. Introduction to *Agrobacterium tumifaciens*, features of Ti- Plasmid, molecular Mechanism of T-DNA transfer.
4.6. Physical gene transfer methods – Particle Bombrdment, Electroporation and Microinjection.

PRACTICAL PAPER –V

1. Preparation of medium for tissue culture (MS or B5)
2. Sterilization methods of explants (seed leaf, inter node and root), medium
3. Establishment of callus cultures from carrot
4. Cell suspension culture
5. Protoplast isolation and culture
6. Synthetic seed production

SPOTTERS

1. Callus
2. Somatic embryos
3. Rhizogenesis
4. Multiple shoots
5. Somatic hybrids
6. Synthetic seeds
7. Green house
8. Gene gun
9. GUS gene
10. Ti –Plasmid

REFERENCE BOOKS

1. Plant tissue culture and its biotechnological application by W. Aarz, Reinhard, M.H Zenk
2. Plant tissue culture by Akio Fujiwara
3. Frontiers of plant tissue culture by Trevor, Thorpe
4. In vitro Haploids production in Higher plants S. Mohan Jain, SK Sopory, R.E Veilleux
5. Plant tissue by culture : Theory and practice by S.S Bhojwani and A. Razdan
6. Plant cell, tissue and organ culture applied and fundamental aspects by YPS Bajaj and A. Reinhard

KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2020 – 2021 onwards)

B.SC. BIOTECHNOLOGY III YEAR

SEMESTER – V

Elective Course DSE-5

MEDICAL BIOTECHNOLOGY
(ELECTIVE-b)

UNIT-I

1.1. Scope and importance of Medical Biotechnology.
1.2. Karyotyping of human chromosomes.
1.3.Chomosome banding – G banding and R- banding technique.
1.4.Inheritance patterns in Man – Pedigree ananlysis.
1.5. Diagnosis using monoclonal antibodies – ELISA.
1.6. Genetic counselling – Calculating risk and discussing the options.

UNIT-II

2.1. Chromosomal disorders caused due to structural chromosomal abnormalities (Deletion, Duplication, Translocations).
2.2. Chromosomal disorders caused due to numerical chromosomal abnormalities (autosomal and allosomal).
2.3. Monogenic disorders (autosomal and X-linked diseases).
2.4. Mitochondrial diseases – LHON, MERRF
2.5. Types and causes of male and female infertility.
2.6. IVF – methodology.

UNIT-III

3.1. Gene therapy – *exvivo* and *invivo* gene therapy: somaticand germline gene therapy.
3.2. Strategies of gene therapy : gene augmentation – ADA deficiency; Prodrug therapy/ Suicide gene – glioma.
3.3. Stem cells – potency definitions; embryonic and adult stem cells.
3.4. Applications of stem cells - cell based therapies and regenerative medicine.
3.5. Encapsulation technology and therapeutics – Diabetes.
3.6. Human genome sequences – mapping and cloning of human disease genes.

UNIT-IV

4.1. Cancer - Types.
4.2. Oncogenes, Tumor suppressor genes, Stability of genome, control of cell cycle.
4.3. Molecular basis of colon cancer and breast cancer.
4.4. DNA/RNA based diagnosis – HBV, HIV.
4.5. Applicaitons of PCR in disease diagnosis.
4.6. Haemoglobinopathies.

PRACTICAL PAPER –V

1. Karyotyping of normal and abnormal human chromosome sets
2. Human pedigree analysis
3. Estimation of C-reactive protein
4. Dot ELISA
5. Genotyping of candidate genes for diseases by RFLP
6. Encapsulation of mammalian cells

SPOTTERS

1. Pedigree
2. Monoclonal antibodies
3. ELISA
4. Oncogenes
5. Cri du Chat syndrome
6. Trisomy
7. Diabets Mellitus
8. SCID
9. Stem cells
10. HBV

REFERENCE BOOKS

1. Medical biotechnology-Pratibha Nallari, V. Venugopal Rao- Oxford Press
2. Introduction to Human Molecular Genetics- J.J Pasternak, John Wiley Pubishers
3. Human Molecular genetics Tom strache and AP read , Bios Scxientific publishers
4. Recombinant DNA technology AEH Emery
5. Principles and Practice of Medical genetics, I, II, III volumes by AEH Edts, Emery
6. Molecular biotechnology, Glick and Pasternak

KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY III Year

SEMESTER – V

IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

UNIT – I

1.1 Basics of Immune system

1.1.1 Cells of the Immune system and the Lymphoid organs (Primary and Secondary)

1.1.2 First line of defences-physical and chemical barriers; second line of defences – inflammation and phagocytosis.

1.1.3 Types of Immunity- Inherent (Active and Passive) and Acquired Immunity (Active and Passive) Humoral and Cell mediated immunity.

1.1.4 Major Histocompatibility complex (MHC)- structure and function of class I and Class II proteins. Significance of MHC in organ transplantation; MHC restriction

UNIT – II

2.1 Antibodies and Antigens and Immune system diseases

2.1.1 Antibodies(Immunoglobulins) – Structure, functions and classification, antibody diversity, Monoclonal antibodies and applications

2.1.2 Antigens structure, antigenic determinants/epitopes, haptens, adjuvants and antigenicity.

2.1.3 Antigen-antibody reactions; Agglutination; Precipitation, Opsonization, Cytotoxicity

2.1.4 Hypersensitivity reactions.
Autoimmunity and Immunodeficiency diseases.

Unit – III

3.1 Animal Biotechnology and Genetically modified organisms

3.1.1 Concept and Scope of Animal Biotechnology

3.1.2 Recombinant DNA Technology and its applications.

3.1.3 Cloning Vectors- Plasmids, Cosmids and shuttle vectors, Cloning methods(Cell, Animal and Gene cloning); Restriction enzymes and Ligases

3.1.4 Transgenesis – Methods of Transgenesis
Production of Transgenic animals- Sheep and Fish

Unit – IV

4.1 Applications of Biotechnology

4.1.1 In vitro fertilization and embryo transfer

4.1.2 Hybridoma technology – concepts and applications

4.1.3 Stem cells- Types and their applications

4.1.4 Recombinant insulin and human growth hormone; Polymerase Chain Reaction (PCR)
Animal Bioreactors- Concepts and Applications.

HEAD
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Dr. G. SHAMITHA
Chairperson
Board of Studies
Department of Zoology & Sericulture Unit
KAKATIYA UNIVERSITY - WGL-506009 (T.S)

Suggested Readings:

1. Text Book of Immunology – Ivan Riott
2. Text Book of Immunology – C.V.Rao
3. Text Book of Immunology – Nandinin Shetty
4. Text Book of Immunology – Kubey
5. Culture of Animal Cells – R. Ian Freshney, Wiley Liss
6. Biotechnology – S. Mitra
7. Animal Cell Culture - Practical Approach – Ed. John. RW. Masters, Oxford
8. Biotechnology – B.D.Singh
9. Brown, T.A. (1998). *Molecular Biology Labfax II: Gene Cloning and DNAAnalysis*. II Edition, Academic Press, California, USA.
10. Glick, B.R. and Pasternak, J.J. (2009). *Molecular Biotechnology - Principles and Applications of Recombinant DNA*. IV Edition, ASM press, Washington, USA.

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KAKATIYA UNIVERSITY

Under Graduate Courses (Under CBCS 2019 - 2022)

B.Sc. ZOOLOGY III Year

SEMESTER – V

IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY PRACTICAL

Instruction: 3 hrs per week
No. of Credits: 1

I. Immunology

1. Identification of Blood grouping (Demonstration of Agglutination) using kit.
2. Demonstration of Precipitation (VDRL/RPR) using kit.
3. Histological study of Lymphoid organs -Spleen, Thymus, Lymph node, Bone marrow (through prepared slides).
4. Enumeration of Total RBC from a given blood sample.
5. Enumeration of Total WBC from a given blood sample.
6. Enumeration of Differential count of WBC from a given blood sample.

II. Animal Biotechnology

1. Study the following techniques through Photographs / Virtual Lab

a) Identification of Vectors
b) Identification of Transgenic animals
c) DNA sequencing (Sanger's method)
d) DNA finger printing
e) Southern blotting
f) Western blotting

2. PCR (demonstration) on site or of site demonstration.

- **Laboratory Record work shall be submitted at the time of practical examination**
- **Computer aided techniques should be adopted as per UGC guide lines.**

Suggested manuals:

1. A Hand Book of Practical Immunology – **Ivan Riott**
2. Animal Biotechnology – **P.K. Gupta.**
3. Immunology, VI Edition. W.H. Freeman and Company **Kindt, T. J., Goldsby, R.A., Osborne, B. A. and Kuby, J (2006).**
4. Immunology, VII Edition, Mosby, Elsevier Publication **David, M., Jonathan, B., David, R. B. and Ivan R. (2006).**
5. Cellular and Molecular Immunology. V Edition. Saunders Publication, **Abbas, K. Abul and Lechtman H. Andrew (2003.)**

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KAKATIYA UNIVERSITY, WARANGAL-506 009
B.Sc. Under CBCS System wef A.Y: 2021-22
Third Year : : Semester - V
GENERIC ELECTIVE (Common to all students)

WATER RESOURCES MANAGEMENT

(4 hrs/week) (Taught by ant Science Dept) (Credits:4) (Marks:100)

UNIT-I:

Introduction to water resources management, different types of water resources, water resources and its importance, Global distribution of water. Hydrological cycle, Conservation of water, recycling of water.

Unit-II:

Rain water harvesting, methods of roof top rain water harvesting in urban setting: Direct method - Storing rain water in tanks for direct use; indirect methods - Recharge pits, bore wells/dug wells, Recharge trenches. Over use of surface and ground water and control measures.

UNIT-III:

Importance of water shed and water shed management, Rain water harvesting in rural setting: Check dams, percolation tanks, gabion structure, continuous contour trenches, staggered contour trenches, farm ponds. Surface water and ground water pollution, control measures.

UNIT-IV :

Mission Bhagiratha: Telangana government water grid project for drinking water supply - aims and objectives and method of implementation.Mission Kakatiya: Telangana government project for the restoration of minor irrigation tanks, aims and objectives and method of implementation.

Text books:

1) Water Resources, Conservation and Management by Chatterjee, S.N.
2) Groundwater hydrology by Todd
3) Watershed management by J.V.S.Murthy
4) Applied Hydrogeology by Fetter.

B.Sc., III YEAR CHEMISTRY

SEMESTER-V

DSE-A: Chemistry Paper–V

(*Spectroscopy & Chromatography*)

(04 credits) **60 Hrs (04 Hrs/week)**

UNIT-I: Molecular Spectroscopy (15 Hrs)

***S5-A-E-I*:** Introduction to electromagnetic radiation, interaction of electromagnetic radiations with molecules, various types of molecular spectra.

Rotational spectroscopy (Microwave spectroscopy)

Rotational axis, moment of inertia, classification of molecules (based on moment of inertia), rotational energies, selection rules, determination of bond length of rigid diatomic molecules eg. HCl.

Infra red spectroscopy

Energy levels of simple harmonic oscillator, molecular vibration spectrum, selection rules. Determination of force constant (Problems). Qualitative relation of force constant to bond energies. Anharmonic motion of real molecules and energy levels. Modes of vibrations in polyatomic molecules. Characteristic absorption bands of various functional groups. Finger print nature of infrared spectrum

Electronic spectroscopy

Bonding and anti-bonding molecular orbitals, electronic energy levels of molecules (σ, π, n), types of electronic transitions: σ-σ^*, n-σ^*, n-π^*, π-π^* with suitable examples. Selection rules, Terminology of chromophore, auxochrome, bathochromic and hypsochromic shifts. Absorption of characteristics of chromophones: diene, enone and aromatic chromophores. Representation of UV-Visible spectra. General features of absorption-spectroscopy transmittance, absorbance, and molar absorptivity. Beer-Lambert's law and its limitations.

UNIT-II: NMR & Mass Spectroscopy (15 Hrs)

***S5-A-E-II*: Proton Magnetic Resonance Spectroscopy**

Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, factors affecting chemical shifts, NMR splitting of signals – spin-spin coupling, representation of proton NMR spectrum – Integrations. ^{1}H NMR spectrum of – ethyl bromide, acetaldehyde, 1, 1, 2- tribromo ethane, ethyl acetate and acetophenone.

Mass Spectrometry

Electron Impact Mass: Basic principles, Nitrogen rule, types of ions: Molecular ion, fragment ion and isotopic ions, representation of mass spectrum, types of peaks (molecular ion, fragment and isotopic ion peaks). Determination of molecular formula. Mass spectrum of ethyl chloride, ethyl bromide and acetophenone.

UNIT-III: Separation techniques-I (15 Hrs)

***S5-A-E-III*: Solvent Extraction-** Principle, Methods of extraction: Batch extraction, continuous extraction and counter current extraction. Application– Determination of Iron (III).

Chromatography: Classification of chromatographic methods, principles of differential migration, adsorption phenomenon, nature of adsorbents, solvent systems.

Thin layer Chromatography (TLC): Advantages, preparation of plates, solid phase and mobile phase used in TLC, eluotopic series, development of the chromatogram, Detection of the spots, factors effecting R_f values and applications of TLC.

Paper Chromatography: Principle, choice of paper and solvent systems, development of chromatogram – ascending, descending, radial and two dimensional chromatography, detection of spots, and applications of paper chromatography.

UNIT-IV: Separation techniques-II (15 Hrs)

***S5-A-E-IV*: Column Chromatography-** Principle, Types of stationary phases, Column packing – Wet packing technique, Dry packing technique. Selection criteria of mobile phase solvents for eluting polar, non-polar compounds and its applications.

Ion exchange chromatography: Principle, cation and anion exchange resins, its application in separation of ions, de-ionized water.

Gas Chromatography: Principle, theory and instrumentation (Block Diagram), Types of stationary phases and carrier gases (mobile phase), application of GC.

High performance liquid chromatography: Principle, theory and instrumentation, stationary phases and mobile phases. Applications of HPLC, analysis of Paracetamol.

Recommended Text Books and Reference Books:

1. Fundamentals of Molecular Spectroscopy, C.N. Ban well & Mc Cash.
2. Organic spectroscopy, William Kemp, Palgrave Macmillan; 2nd Revised edition.
3. Spectroscopy, B K Sharma Krishna Prakashan Media,1981.
4. Elements of Organic spectroscopy, YR Sharma.
5. Applications of Absorption spectroscopy of Organic compounds (English paper back, Dyer R.John)
6. Organic chemistry, Morrison and Boyd, Pearson Publications.
7. Introduction to Spectroscopy by Donald Pavia, Gary Lampman and George Kriz. Saunders College Division, 2001.
8. Chemistry text book for B.Sc., published by Telugu academy, Govt. of Telangana.
9. Analytical Chemistry by David Krupadanam, Universities Press (India) Limited.
10. Principles of Instrumental Analysis, D.A.Skoog, F.J.Holler & T.A. Nieman, Cengage Learning India Ed.
11. Fundamentals of Analytical Chemistry 6th Edn, D.A.Skoog, D.M. West, F.J.Holler, Saunders College Publishing, Fort worth (1992).
12. Instrumental Methods of Analysis, 7th Ed. Willard, H.H., Merritt, L.L., Dean, J. & Settle, F.A. Wordsworth Publishing Co.Ltd., Belmont, California, USA, 1988.
13. A Text Book of Quantitative Inorganic Analysis 7th Ed., Vogel, A.I. Prentice Hall.
14. Analytical Chemistry 7 th Edition by Gary D.Christian (2004)
15. Separation Methods, M.N Sastry, Himalaya Publication (2004)

B.Sc., III YEAR CHEMISTRY

SEMESTER-V

DSE-B: Chemistry Paper–V

(*Metallurgy, Dyes and Catalysis*)

(04 credits) **60 Hrs (04 Hrs/week)**

Unit I: General Principles of Metallurgy and Production of Non Ferrous Metals (15 Hrs)

***S5-E-B-I*: Pyrometallurgy:** Drying and calcination, roasting, smelting, products of smelting,
Hydrometallurgy: Leaching methods, leaching agents, leaching of metals, oxides and sulphides. Separation of liquid and solid phases and processing of aqueous solutions
Electrometallurgy: Electrolysis, Refining electrolysis, electrolysis from aqueous solutions, fused-salt electrolysis
Refining processes: Chemical and physical refining processes
Production of selected non-ferrous metals (Copper, Nickel, Zinc): Properties, raw materials, production (flow charts presentations and chemical reactions involved) and uses.

Unit II: Natural and Synthetic Dyes (15 Hrs)

***S5-E-B-II*:** Definition and Classification of dyes - Natural dyes, Synthetic dyes: based on chemical constitution of dyes; Chemical nature of dyes; Application of dyes.
Structures of Natural dyes: Indigo, Tyrian purple, Alizarine, Indigotin.
Structures of Synthetic dyes: Nitro dyes, Nitroso dyes, Azo dyes (Mono azo dye, Bis azo dyes) Diaryl methane dyes, Triaryl methane dyes, Xanthenes dyes, Phenolphthalein, Fluoroseine, Acridine dyes.
Synthesis of dyes: Mono azo dye, Bis azo dyes (Congo red), Auromine O, Malachite Green, Crystal Violet, Rhodamine B, Acridine Yellow, Indigotin. Binding of dyes to fabric. Applications of dyes.

Unit III: Catalysis-I (15 Hrs)

***S5-E-B-III*: Homogeneous and heterogeneous catalysis** - Definition of a catalyst and catalysis. Comparison of homogeneous and heterogeneous catalysis with specific examples. General characteristics of catalytic reactions.
Acid-base catalysis- Examples of acid and base catalysed reactions, hydrolysis of esters. Kinetics of acid catalysed reactions. Specific acid and general acid catalysis, Kinetics of base catalysed reactions. Specific base and general base catalysis. Examples- Aldol condensation and decomposition of nitramide, base catalysed conversion of acetone to di acetone alcohol, Mutarotation of Glucose. Effect of pH on reaction rate of acid and base catalysed reactions.
Phase transfer catalysis: Principle of phase transfer catalysis, classification of phase transfer catalysts. Factors influencing the rate of PTC reactions.

Unit IV: Catalysis-II (15 Hrs)

***S5-E-B-IV*: Enzyme catalysis-** Characteristics of enzyme catalysis, Examples: (i) Invertase in inversion of cane sugar (ii) Maltase in conversion of maltose to glucose (iii) Urease in decomposition of urea (iv) Zymase in conversion of glucose to ethanol (v) working of carbonic anhydrase and (vi) Mechanism of oxidation ethanol by alcohol dehydrogenase. Factors affecting enzyme catalysis. Effect of temperature, pH, concentration and effect of inhibitor on enzyme catalysed reactions, Catalytic efficiency.

Kinetics of enzyme catalysed reactions: Michaelis-Menton Equation. Mechanism of enzyme catalysed reactions. Significance of Michaelis constant (Km) and maximum velocity (Vmax), Lineweaver-Burk plot. Types of enzyme inhibitors.

Recommended Text Books and Reference Books:

1. Industrial Chemistry B.K.Sharma
2. Engineering Chemistry, Jain and Jain
3. Industrial Chemistry, E. Stocchi, Vol-I, Ellis Horwood Ltd. UK.
4. Handbook of Industrial Chemistry, J. A. Kent: Riegel's, CBS Publishers, New Delhi.
5. Theory of production of non-ferrous metals and alloys Study. Kateřina Skotnicová, Monika Losertová, Miroslav Kursa.
6. The Chemistry of Synthetic Dyes, Volume 4, K.Venkataraman, Elsevier.
7. Organic Chemistry Vol-I by I.L. Finar.
8. Organic Chemistry by Jennice, Gorzinski Smith.
9. Natural Dyes: Sources, Chemistry, Application and Sustainability Issues by Sujata Saxena and A. S. M. Raja.
10. Physical Chemistry by Atkins and De Paula, 8 th Edn.
11. Physical Chemistry by Puri, Sharma and Pattania, 2017.
12. Kinetics and mechanism of chemical transformations by Rajarajm and Kuriacose, Published by Macmillan India Ltd.
13. Text book of Physical Chemistry by K.L. Kapoor Macmillan, 1999.
14. Catalysis by J.C. Kuriacose, Macmillan Publishers India Limited, 1980.
15. Phase Transfer Catalysis, Fundamentals, Applications and Industrial perspectives, C.M.Stark, C.Liotta & M.Halpern, Academic Press.
16. Phase Transfer Catalysis, E.V.Dehmlow & S.S. Dehmlow, Verlag Chemie,Weinheim.

B.Sc., III YEAR CHEMISTRY

SEMESTER-V

LABORATORY COURSE

Paper –V: *Experiments in Physical Chemistry-I*

(01 Credit) **45 Hrs (03 Hrs/week)**

1. **Distribution law**
   a) Determination of molecular status and partition coefficient of benzoic acid in Toluene and water.
   b) Determination of distribution coefficient of acetic acid between n-butanol and water.
2. **Electrochemistry**
   a) Determination of cell constant of conductivity cell.
   b) Verification of Ostwald's dilution law- Determination of dissociation constant (K_a) of acetic acid by conductivity measurements.
3. **Colorimetry**
   a) Verification of Beer's - Lamberts law for $KMnO_4$
   b) Determination of the concentration of the given $KMnO_4$ solution.
4. **Adsorption**
   a) Adsorption of acetic acid on animal charcoal- Verification of Freundlich adsorption isotherm.
5. **Physical constants**
   a) Surface tension and b) Viscosity of liquids. (Demonstration Experiment)

Reference books:

1. Senior Practical Physical Chemistry, B. D Khosla, V. C. Garg , Adarsh Gulati Published by R. Chand & Co.
2. Practical Physical Chemistry, B.Vishwanathan and P.S. Raghavan. Viva Books.
3. Practicals in Physical Chemistry by P.S. Sindhu ISBN-10: 1-4039-2916-5/1403929165 ISBN-13: 978-1-4039-2916-7/9781403929167.

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – V

PAPER – V:: (A) MODERN PHYSICS

(DSE-1: ELECTIVE)

Theory:	**4 Hours/Week;**	**Credits: 4**	**Marks: 100 (Internal: 20; External: 80)**
Practical:	**3 Hours/Week**	**Credits: 1**	**Marks: 25**

UNIT - I

SPECTROSCOPY

Atomic Spectra: Introduction - Drawbacks of Bohr's atomic model – Sommerfeld's elliptical orbits -relativistic correction (no derivation). Stern & Gerlach experiment, Vector atom model and quantum numbers associated with it. L-S and j-j coupling schemes. Spectral terms, selection rules, intensity rules – spectra of alkali atoms, doublet fine structure, Zeeman Effect, Paschen-Back Effect and Stark Effect (basic idea).

Molecular Spectroscopy: Types of molecular spectra, pure rotational energies and spectrum of diatomic molecule. Determination of inter nuclear distance. Vibrational energies and spectrum of diatomic molecule. Raman effect, classical theory of Raman effect. Experimental arrangement for Raman effect and its applications.

UNIT – II

Quantum Mechanics

Inadequacy of classical Physics: Spectral radiation - Planck's law (only discussion). Photoelectric effect - Einstien's photoelectric equation. Compton's effect - experimental verification.

Matter waves & Uncertainty principle: de Broglie's hypothesis - wavelength of matter waves, properties of matter waves. Phase and group velocities. Davisson and Germer experiment. Double slit experiment. Standing de Brogile waves of electron in Bohr orbits. Heisenberg's uncertainty principle for position and momentum (x and p_x), Energy and time (E and t). Gamma ray microscope. Diffraction by a single slit. Position of electron in a Bohr orbit. Complementary principle of Bohr.

Schrodinger Wave Equation

Schrodinger time independent and time dependent wave equations. Wave function properties - Significance. Basic postulates of quantum mechanics. Operators, eigen functions and eigen values, expectation values.

UNIT - III

Nuclear Physics

Nuclear Structure: Basic properties of nucleus - size, charge, mass, spin, magnetic dipole moment and electric quadrupole moment. Binding energy of nucleus, deuteron binding energy, p-p, n-n, and n-p scattering (concepts), nuclear forces. Nuclear models - liquid drop model, shell model.

Alpha and Beta Decays: Range of alpha particles, Geiger – Nuttal law. Gammow's theory of alpha decay. Geiger – Nuttal law from Gammow's theory. Beta spectrum - neutrino hypothesis,

Particle Detectors: GM counter, proportional counter, scintillation counter.

UNIT:IV

Solid State Physics & Crystalography

Crystal Structure: Crystalline nature of matter, Crystal lattice, Unit Cell, Elements of symmetry. Crystal systems, Bravais lattices. Miller indices. Simple crystal structures (S.C., BCC, FCC, CsCl, NaCl, diamond and ZincBlende)

X-ray Diffraction: Diffraction of X -rays by crystals, Bragg's law, Experimental techniques - Laue's method and powder method.

Bonding in Crystals: Types of bonding in crystals - characteristics of crystals with different bondings. Lattice energy of ionic crystals- determination of Madelung constant for NaCl crystal, Calculation of Born Coefficient and repulsive exponent. Born-Haber cycle.

Suggested books:

1. Modern Physics by G. Aruldhas & P.Rajagopal. Eastern Economy Edition.
2. Concepts of Modern Physics by ArthurBeiser.Tata McGraw-Hill Edition.
3. Modern Physics by R. Murugeshan and Kiruthiga SivaPrasath.S. Chand & Co.
4. Nuclear Physics by D.C. Tayal, Himalaya PublishingHouse.
5. Molecular Structure and Spectroscopy by G.Aruldhas. Prentice Hall of India, New Delhi.
6. Spectroscopy -Atomic and Molecular by Gurdeep R Chatwal and Shyam Anand -Himalaya Publishing House.
7. Third Year Physics – Telugu Academy.
8. Elements of Solid State Physics by J.P. Srivastava. (for chapter on nanomaterials)-Prentice-hall of India Pvt. Ltd.

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – V

PAPER – V:: (A) MODERN PHYSICS PRACTICALS

(DSE-1: ELECTIVE)

1. Measurement of Planck's constant using black body radiation and photo-detector
2. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light
3. To determine the Planck's constant using LEDs of at least 4 different colors.
4. To determine the ionization potential of mercury.
5. To determine the absorption lines in the rotational spectrum of Iodine vapour.
6. To determine the value of e/m by (a) Magnetic focusing or (b) Bar magnet.
7. To setup the Millikan oil drop apparatus and determine the charge of an electron.
8. To show the tunneling effect in tunnel diode using I-V characteristics.
9. To determine the wavelength of laser source using diffraction of single slit.
10. To determine the wavelength of laser source using diffraction of double slits.
11. To determine (1) wavelength and (2) angular spread of He-Ne laser using plane diffraction grating
12. To determine the value of e/m for electron by long solenoid method.
13. Photo Cell – Determination of Planck's constant.
14. To verify the inverse square law of radiation using a photo-electric cell.
15. To find the value of photo electric work function of a material of the cathode using a photo-electric cell.
16. Measurement of magnetic field – Hall probe method.
17. To determine the dead time of a given G.M. tube using double source.
18. Hydrogen spectrum – Determination of Rydberg's constant
19. Energy gap of intrinsic semi-conductor
20. G. M. Counter – Absorption coefficients of a material.
21. To draw the plateau curve for a Geiger Muller counter.
22. To find the half-life period of a given radioactive substance using a G.M. Counter.

Reference Books:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, I. Prakash & Ramakrishna, 11th Edn, 2011,Kitab Mahal

Note: Minimum of eight experiments should be performed.

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – V

PAPER – V:: (B) COMPUTATIONAL PHYSICS

(DSE-1: Elective)

Theory:	**4 Hours/Week;**	**Credits: 4**	**Marks: 100 (Internal: 20; External: 80)**
Practical:	**3 Hours/Week**	**Credits: 1**	**Marks: 25**

UNIT I

Programming in C

Flow charts, algorithms, Integer and floating-point arithmetic, precision, variable types, arithmetic statements, input and output statements, control statements, executable and non-executable statements, arrays, Repetitive and logical structures, Subroutines and functions, operation with files, operating systems, Creation of executable programs.

UNIT II

Numerical methods of Analysis

Solution of algebraic and transcendental equation, Newton Ramphan method, Solution of simultaneous linear equations. Matrix inversion method, Interpolation, Newton and Lagrange formulas, Numerical differentiation. Numerical integration, Trapezoidal, Simpson and gaussian quadrature methods, Least square curve fitting, Straight line and Polynomial fits.

UNIT III

Numerical solution of ordinary differential equations

Eulars and Runge kutta methods, simulation. Generation of uniformly distributed random integers, statistical tests of randomness. Monte-Carlo evaluation of integrals and error analysis, Non-uniform probability distributions, Importance sampling, Rejection method.

UNIT IV

Computational methods

Metropolis algoritham, Molecular diffusion and Brownian motions, Random walk problems and their Montecarlo simulation. Finite element and Finite difference methods. Boundary value and initial value problems, density functional methods.

Note: Problems should be solved at the end of every chapter of all units

Suggested Books:

1.Computational methods in Physics and Engineering: Wong
2. Computer Oriented Numerical methods:Rajaraman
3. Computer Programming in Fortran 77: Rajaraman
4.Applied Numerical Analysis: Gerald
5. A Guide to Manto -Carlo simulationsi Statistical Physics: Land

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

Under Graduate Courses (Under CBCS 2021 – 2022 onwards)

B.Sc. PHYSICS III Year

SEMESTER – V

PAPER – V:: (B) COMPUTATIONAL PHYSICS PRACTICALS

(DSE-1: Elective)

1. Jacobi Method of Matrix diagonalization
2. Solution of Transcendental or Polynomial equations by the Newton Raphson metho
3. Linear curve fitting and calculation of linear correlation coefficients
4. Matrix Simulation: Subtraction and Multiplication.
5. Matrix Inversion and solution of simultaneous equations
6. Lagrange interpolation based on given input data
7. Numerical integration using the Simpsons method.
8. Numerical integration using the Gaussian quadrature method.
9. Solution of first order Differential Equation using Runge-kutta method.
10. Numerical first order differentiation of a given function.
11. Fast Fourier transform
12. Monte Carlo Integration
13. Use of a package for data generation and graph plotting.
14. Test of Randomness for random numbers generators.

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA
UNDER GRADUATE COURSES (UNDER CBCS 2021 – 2022 ONWARDS)
B.SC. BOTANY III YEAR
SEMESTER – V

PAPER – V: (A) BIODIVERSITY & CONSERVATION
(DSE-1: ELECTIVE)

Theory: 4 Hours/Week; Credits: 4 Marks: 100 (Internal: 20; External: 80)
Practical 3 Hours/Week Credits: 1 Marks: 25

UNIT – I

1. Plant diversity and its scope: Genetic diversity, Species diversity, Plant diversity at the ecosystem level, Agro biodiversity and cultivated plant taxa, wild taxa.
2. Values and uses of Biodiversity: Ethical and aesthetic values, Precautionary principle, Methodologies for valuation, Uses of plants, Uses of microbes.

UNIT-II

3. Loss of Biodiversity: Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agro biodiversity, Projected scenario for biodiversity loss.
4. Management of Plant Biodiversity: Organizations associated with biodiversity, management- Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR.
5. Biodiversity legislation and conservation, Biodiversity information management and communication.

UNIT-III:

7. Conservation of Biodiversity: Conservation of genetic diversity, species diversityand ecosystem Diversity
8. Principles of conservation :*In -situ* and *Ex-situ* conservation. Sacred groove, Botanical garden, Biosphere reserves, Sanctuaries, National parks (*In-situ*) and Tissue culture, Gene / seed / pollen banks and Cryopreservation (*Ex-situ*).

UNIT-IV:

9. Role of plants in relation to Human Welfare; Importance of forestry, their utilization and commercial aspects, Avenue trees, Ornamental plants of India.
10. Alcoholic beverages through ages. Fruits and nuts, Important fruit crops and their commercial importance. Wood and its uses.

References:

1. Krishnamurthy, K.V. (2004). An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi

2. Bharucha, E. 2005. Textbook of Environmental Studies for Undergraduate Courses. Universities Press (India) Private Limited, Hyderabad.

3. Odum, E. P. 1983. Basics of Ecology. Saunder's International Students Edition, Philadelphia.

4. Sharma, P. D. 1989. Elements of Ecology. Rastogi Publications, Meerut.

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA
UNDER GRADUATE COURSES (UNDER CBCS 2021 – 2022 ONWARDS)
B.SC. BOTANY III YEAR
SEMESTER – V

PAPER – V:: (A) BIODIVERSITY & CONSERVATION PRACTICAL
(DSE-1: ELECTIVE)

1. Study on local biodiversity: Herbs, shrubs and trees; Seasonal, Annual, biennial and perennial plants.
2. Study of morphological characteristics of plant communities: Hydrophytes (*Eichhornia, Hydrilla, Pistia, Nymphaea, Vallisneria*), Xerophytes: (*Asparagus, Opuntia, Euphorbia milii, Casuarina, Calotropis*).
3. Assessment of biodiversity
   i) Avenue trees: *Pongamiapinnata*, *Butea monosperma, Spathodea* sp., *Delonix regia*, *Jacaranda mimosifolia*, *Cassia fistula*, *Mimusopselengi*, *Acacia leucophloea*, and *Albizialebbeck.*
   ii) Ornamental Plants: Any five locally available ornamental plants.
   iii) Timber Value: *Acacianilotica*, *Tectonagrandis*and *Azardirachtaindica*
   iv) Fruits: *Mangiferaindica*(Mango), *Ziziphusmauritiana*, *Psidium guajava*(Guava), *Annona squamosa*
   v) Nuts: *Anacardiumoccidentale*(Cashew), *Terminalia catappa*(Badam)
   vi) Beverages: *Madhucaindica*, *Camellia sinensis*(Tea),*Coffea arabica*(Coffee), *Borassusflabellifer*
   (Toddy palm) and *Caryotaurens*
   vii Medicinal value: *Catharanthus roseus*, *Tinosporacordifolia*and *Phyllanthus emblica*, *Ocimumsp.*, and *Azardirachta indica*
4. Field trip: Collection of plants from the field, identification and preparation of Herbarium.

D. Calitha Ki

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA
UNDER GRADUATE COURSES (UNDER CBCS 2021 – 2022 ONWARDS)
B.SC. BOTANY III YEAR
SEMESTER – V

PAPER – V: (B) ECONOMIC BOTANY
(DSE-1: ELECTIVE)

Theory: 4 Hours/Week; Credits: 4 Marks: 100 (Internal: 20; External: 80)
Practical 3 Hours/Week; Credits: 1 Marks: 25

UNIT - I

Origin of Cultivated Plants: Major plants introduction, Crop domestication and examples of crops / varieties

1. Vegetables: Nutritional and Commercial values of root crops, leafy and fruit vegetables.
2. Millets: Nutrient significance of Sorghum, Finger millet, Pearl millet, Foxtail millet.
3. Cereals: Rice, Wheat and maize - Origin, morphology and uses.

UNIT – II

4. Legumes: General account, importance to man and ecosystem.
5. Fruits and nuts: Commercial and nutritional value of South Indian fruits. Cashew nut, Almond and Walnut.
6. Sugars & Starches: Morphology and processing of sugarcane, products and by-products of sugarcane industry. Potato – morphology, propagation & uses.
7. Spices: Listing of important spices, part used, economic importance with special reference to fennel, saffron, clove and black pepper

UNIT – III

8. Beverages: Tea, Coffee (morphology, processing & uses)
9. Edible oils & Fats: General description, extraction, uses and health implications of groundnut, sunflower, coconut, linseed, and mustard.
10. Essential Oils: General account, extraction methods, comparison with fatty oils & their uses.
11. Natural Rubber: Para-rubber - tapping, processing and uses.

UNIT – IV

12. Drug-yielding plants: Therapeutic and habit-forming drugs with special reference to *Cinchona*, *Digitalis, Papaver* and *Cannabis.*
13. Tobacco processing, uses and health hazards
14. Timber plants: General account with special reference to teak and pine
15. Fibres: Classification based on the origin of fibres, extraction methods and uses of Cotton and Jute.

B. Lalitha Ki

Suggested Readings

1. Kochhar, S.L. (2012). Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
2. Wickens, G.E. (2001). Economic Botany: Principles & Practices. Kluwer Academic Publishers, The Netherlands.
3. Chrispeels, M.J. and Sadava, D.E. (2003). Plants, Genes and Agriculture. Jones & Bartlett Publishers.
4. B.P. Pandey (2007). Economic Botany, S. Chand & Company Ltd. New Delhi. 17/e.

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA
UNDER GRADUATE COURSES (UNDER CBCS 2021 – 2022 ONWARDS)
B.SC. BOTANY III YEAR
SEMESTER – V

PAPER – V:: (B) ECONOMIC BOTANY PRACTICAL
(DSE-1: ELECTIVE)

1. Study of economically important plants: Wheat, Gram, Soybean, Black pepper, Clove Tea, Cotton, Groundnut through specimens, sections and microchemical tests.
2. Identification and study on nutrient values of locally available vegetables, millets and cereals.
3. Study on nutrient values and commercial status of Cashew nut, Almond and Walnut.
4. Uses and health implications of groundnut, sunflower, coconut, linseed, Brassica and Coconut.
5. Study of economically important plants : Wheat, Gram, Soybean, Black pepper, Clove Tea, Cotton, Groundnut through specimens, sections and microchemical tests
6. Study of products of economic importance included unit wise.
7. Collection vegetable twigs and preparation of Herbarium.
8. Identification of starch granules.
9. Estimation of iodine number of different oils.
10. Quantitative estimation and comparative study of proteins in millets and cereals.

B. Lalitakri

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA
UNDER GRADUATE COURSES (UNDER CBCS 2021 – 2022 ONWARDS)
B.SC. BOTANY III YEAR
SEMESTER – V

PAPER – V:: (C) SEED TECHNOLOGY
(DSE-1: ELECTIVE)

Theory: 4 Hours/Week; Credits: 4 Marks: 100 (Internal: 20; External: 80)
Practical 3 Hours/Week; Credits: 1 Marks: 25

UNIT- I

1. Seed: Structure and types. Seed development in cultivated plants, seed quality concept, importance of genetic purity of seed. Hybrid seed production and Heterosis.
2. Cross pollination, Emasculation, role of pollinators and their management.
3. Collection and storage of pollen for artificial pollination.

UNIT-II

4. Seed germination: Internal and external factors affecting germination.
5. Physiological processes during seed germination; seed respiration, breakdown and mobilization of stored seed reserves.
6. Seed dormancy: Types, causes and methods of breaking dormancy. Role of Phytochrome.

UNIT-III

7. Cultural practices and harvesting of Seed: Isolation, Sowing, Cultural practices, harvesting and threshing of the following crops: a) Rice b) Cotton c) Sunflower
8. Seed treatment to control seed borne disease –General account
9. Seed testing- Procedures of seed testing, seed testing laboratories and importance of seed testing.

UNIT-IV

10. Seed viability, factors affecting seed viability and genetic erosion.
11. Seed storage: Long term and short term storage. Orthodox and recalcitrant seeds. Packing of seeds – Principles, practices, bagging and labelling.
12. Seed banks- National, International and Millennium seed banks. Seed certification- History, Seed certification agency, Indian millennium, general and specific seed certification standard.

Reference:

1. Agrawal, P. K. 1993. Hand Book of Seed Technology. Dept. of Agriculture and Cooperation. National Seed Corporation Ltd., New Delhi
2. Balasubramanian, D., C. F. A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman. 2004. Biotechnology. Universities Press (India) Private Limited, Hyderabad.
3. Bedell, Y. E. Seed Science and Technology. Indian Forest Species. Allied Publishers Limited, New Delhi.
4. Channarayappa. 2007. Molecular Biotechnology – Principles and Practices. Universities Press (India) Private Limited, Hyderabad.
5. Chawala, H. S. 2002. Introduction to Plant Biotechnology. Oxford & IBH Publishing Company, New Delhi.
6. Dubey, R. C. 2001. A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi
7. Edmond, J. B., T. L. Senn, F. S. Adrews and R. J. Halfacre. 1977..
8. Hartman, H. T. and D. E. Kestler. 1976. Plant Propagation: Principles and Practices. Prentice & Hall of India, New Delhi.
9. Jha, T.B. and B. Ghosh. 2005. Plant Tissue Culture – Basic and Applied. Universities Press (India) Private Limited, Hyderabad..
10. Ramawat, K. G. 2008. Plant Biotechnology. S. Chand & Company Ltd., New Delhi.
11. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc., USA..
12. Tiwari, G. N. and R. K. Goal. Green House Technology – Fundamentals, Design, Modelling and Application. Narosa Publishing House, New Delhi.
13. Tunwar, N. S. and S. V. Singh. 1988. Indian Minimum Seed Certification Standards. The Central Seed Certification Board, Govt. of India, New Delhi.
14 Agrawal PK & Dadlani M. (Eds.). 1992. *Techniques in Seed Science and Technology*. South Asian Publ.
15. Baskin CC & Baskin JM. 1998. Seeds: Ecology, Biogeography and Evolution of Dormancy and Germination. Academic Press. Basra AS. 2006. Handbook of Seed Science and Technology. Food Product Press.
16. Bench ALR & Sanchez RA. 2004. *Handbook of Seed Physiology*. Food Product Press. Bewley JD & Black M. 1982. Physiology and Biochemistry of Seeds in Relation to Germination. Vols. I, II. Springer Verlag.
17. Bewley JD & Black M. 1985. Seed: Physiology of Seed Development and Germination. Plenum Press.
18. Copeland LO & Mc Donald MB. 1995. *Principles of Seed Science and Technology*. 3rd Ed. Chapman & Hall.
19. Khan AA. 1977. Physiology and Biochemistry of Seed Dormancy and Germination. North Holland Co.
20. Kigel J & Galili G. (Eds.). *Seed Development and Germination*. Marcel Dekker.
21. Murray DR. 1984. *Seed Physiology*. Vols. I, II. Academic Press. Sadasivam S & Manickam A. 1996. *Biochemical Methods*. 2nd Ed. New Age.

13 - Calitha Ki

KAKATIYA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Science)
SEMESTER – V
Programming in Java

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

Unit - I

Introduction: Java Essentials, JVM, Java Features, Creation and Execution of Programs, Data Types, Structure of Java Program, Type Casting, Conditional Statements, Loops, Classes, Objects, Class Declaration, Creating Objects.

Unit - II

Method Declaration and Invocation, Method Overloading, Constructors – Parameterized Constructors, Constructor Overloading, Cleaning-up unused Objects. Class Variables &Method-static Keyword, this Keyword, One-Dimensional Arrays, Two-Dimensional Arrays, Command-Line Arguments, Inner Class.

Inheritance: Introduction, Types of Inheritance, extends Keyword, Examples, Method Overriding, super, final Keyword, Abstract classes, Interfaces, Abstract Classes Verses Interfaces.

Packages: Creating and Using Packages, Access Protection, Wrapper Classes, String Class, StringBuffer Class.

Unit - III

Exception: Introduction, Types, Exception Handling Techniques, User-Defined Exception.

Multithreading: Introduction, Main Thread and Creation of New Threads –By Inheriting the Thread Class or Implementing the Runnable Interface, Thread Lifecycle, Thread Priority and Synchronization.

Input/Output: Introduction, java.io Package, File Streams, FileInputStream Class, FileOutputStream Class, Scanner Class, BufferedInputStream Class, BufferedOutputStream Class, RandomAccessFile Class.

Unit - IV

Applets: Introduction, Example, Life Cycle, Applet Class, Common Methods Used in Displaying the Output (Graphics Class).

Event Handling: Introduction, Types of Events, Example.

AWT: Introduction, Components, Containers, Button, Label, Checkbox, Radio Buttons, Container Class, Layouts.

Swings: Introduction, Differences between Swing and AWT, JFrame, JApplet, JPanel, Components in Swings, Layout Managers, JTable.

Text Book:

1. Sachin Malhotra, Saurabh Choudhary, Programming in Java (2e)

References:

1. Bruce Eckel, Thinking in Java (4e)
2. Herbert Schildt, Java: The Complete Reference (9e)
3. Y. Daniel Liang, Introduction to Java Programming (10e)
4. Paul Deitel, Harvey Deitel, Java: How To Program (10e)
5. Cay S. Horsttnann, Core Java Volume I –Fundamentals (10e)

Dr. B. RAMA
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Warangal- 506 009 (T.S.)

KAKATIYA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Science)
SEMESTER – V
Programming in Java Lab

Practical 3 Hours/Week 1 Credit Marks: 25

Note:

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
- In the external lab examination student has to execute two programs with compilation and deployment steps are necessary.
- External Vice-Voce is compulsory.

1. Write a program to find the largest of n natural numbers.
2. Write a program to find whether a given number is prime or not.
3. Write a menu driven program for following:
   a. Display a Fibonacci series
   b. Compute Factorial of a number
4. Write a program to check whether a given number is odd or even.
5. Write a program to check whether a given string is palindrome or not.
6. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
7. Write a program to create an array of 10 integers. Accept values from the user in that Array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
8. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
9. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
10. Write java program for the following matrix operations:
    a. Addition of two matrices
    b. Transpose of a matrix
11. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
12. Write a Java program for the implementation of multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
13. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
14. Write a java program to draw a line between two coordinates in a window.
15. Write a java program to display the following graphics in an applet window.
    a. Rectangles b. Circles
    c. Ellipses d. Arcs e. Polygons
16. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by NumberFormatException object. After that ex.getMessage () prints the information about the error occurring causes.
17. Write a program for the following string operations:
    a. Compare two strings b. concatenate two strings c. Compute length of a string
18. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

KAKATIYA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Science)
SEMESTER – V
Programming in Java

Theory	4 Hours/Week	4 Credit	Internal marks = 20
Practical	3 Hours/Week	1 Credit	External Marks = 80

Unit - I

Introduction: Java Essentials, JVM, Java Features, Creation and Execution of Programs, Data Types, Structure of Java Program, Type Casting, Conditional Statements, Loops, Classes, Objects, Class Declaration, Creating Objects.

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Method Declaration and Invocation, Method Overloading, Constructors – Parameterized Constructors, Constructor Overloading, Cleaning-up unused Objects. Class Variables &Method-static Keyword, this Keyword, One-Dimensional Arrays, Two-Dimensional Arrays, Command-Line Arguments, Inner Class.

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Unit - IV

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AWT: Introduction, Components, Containers, Button, Label, Checkbox, Radio Buttons, Container Class, Layouts.

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2. Herbert Schildt, Java: The Complete Reference (9e)
3. Y. Daniel Liang, Introduction to Java Programming (10e)
4. Paul Deitel, Harvey Deitel, Java: How To Program (10e)
5. Cay S. Horsttnann, Core Java Volume I –Fundamentals (10e)

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KAKATIYA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Science)
SEMESTER – V
Programming in Java Lab

Practical 3 Hours/Week 1 Credit Marks: 25

Note:

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
- In the external lab examination student has to execute two programs with compilation and deployment steps are necessary.
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1. Write a program to find the largest of n natural numbers.
2. Write a program to find whether a given number is prime or not.
3. Write a menu driven program for following:
   a. Display a Fibonacci series
   b. Compute Factorial of a number
4. Write a program to check whether a given number is odd or even.
5. Write a program to check whether a given string is palindrome or not.
6. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
7. Write a program to create an array of 10 integers. Accept values from the user in that Array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
8. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
9. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
10. Write java program for the following matrix operations:
    a. Addition of two matrices
    b. Transpose of a matrix
11. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
12. Write a Java program for the implementation of multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
13. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
14. Write a java program to draw a line between two coordinates in a window.
15. Write a java program to display the following graphics in an applet window.
    a. Rectangles b. Circles
    c. Ellipses d. Arcs e. Polygons
16. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by NumberFormatException object. After that ex.getMessage () prints the information about the error occurring causes.
17. Write a program for the following string operations:
    a. Compare two strings b. concatenate two strings c. Compute length of a string
18. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

B.Sc. Geology- III Year
Semester – V
Paper – V - (A) Stratigraphy, Indian Geology and Palaeontology
(4 hrs/week) (DSE-5 – Elective I) Credits-4 (60 hours)

Unit-1:
Definition of stratigraphy, principles of stratigraphy, lithostratigraphy, standard geological time scale. physiographic divisions of india with their stratigraphic and structural characteristics.
brief study of type area, distribution in india, lithology, age, fossil content and economic importance of the system, dharwar system, cuddapah system, vindhyan system, kurnool system and gondwana system.

Unit-II:

Brief study of type area, distribution in India, lithology, age, fossil content and economic importance of the systems triassic of spiti, jurassic of kutch, cretaceous of tiruchirapalli, deccan traps and their age, siwaliks with vertebrate fossils; geology of Telangana. stratigraphic contact boundaries between archaean and proterozoic and cretaceous and tertiary ; geology of Telangana state.

Unit-III:
Definition of palaeontology, conditions of fossilization, modes of preservation and uses of fossils. classification morphological characters and geological distribution of: phylum protozoa, phylum coeloenterata, phylum echinodermata, and phylum arthropoda. study of the following fossils with respect to their classification, morphology and geological distribution: calymene, paradoxide, corals and graptolites

Unit-IV:
Classification morphological characters and geological distribution of: phylum brachiopod, phylum mollusca (lamellibranchia, gastropoda and cephalopoda); study of the following fossils with respect to their classification, morphology and geological distribution: cidaris, micraster, holaster, hemiaster, terebratula, spirifer, rhynchonella, productus, turritella, murex, natica, voluta, pecten. gryphaea, arca, cardita, exogyra, nautilus, ammonoids, bellemnites, ,.
plant fossils - glossopteris, gangamopteris, ptylophyllum.

B.Sc. Geology- III Year
Semester – V
Paper – V - (A) Stratigraphy, Indian Geology and Palaeontology Practicals
(3 hrs/week) (DSE-5 – Elective -I) Credits-1 (45 hours)

1. Locating of different type areas and equivalents of systems or groups of India in the political map of India and study of their economic importance.
2. Preparation of stratigraphic columns.
3. Study of the classification, morphology, and geological distribution of the following invertebrate fossils with drawing - cidaris, micraster, holaster, hemiaster, terebratula, spirifer, rhynchonella, productus, turritella, murex, cypraea, natica, voluta, pecten. gryphaea, arca, cardita, exogyra, nautilus, ammonoids, bellemnites, calymene, paradoxide, corals and graptolites.
4. Study of the classification, morphology, and geological distribution of the following plant fossils with drawing drawing - glossopteris, gangamopteris, ptylophyllum.

Text books:

1. Geology of India and Burma, Krishnan, M. S. (1982) CBS Publishers, Delhi.
2. Fundamentals of historical Geology and stratigraphy of India-Ravindra Kumar.
3. Palaeontology-Invertebrate- Henry Woods

Reference books:

1. Unlocking the Stratigraphic Record. Doyle, P. & Bennett, M. R. (1996) John Wiley
2. Geology of India Volumes 1 & 2 , Ramakrishnan, M. &Vaidyanadhan, R. (2008), Geological society of India, Bangalore.
3. The making of India, Macmillan India Pvt. Ltd. Valdiya, K. S. (2010)
4. Principles of Paleontology Raup, D. M., Stanley, S. M., Freeman, W. H. (1971)
5. Invertebrate paleontology and evolution, Clarkson, E. N. K. (2012) 4th Edition by Blackwell Publishing.

Practical Model Paper

B.Sc. (CBCS) - III Year Practical Examination
GEOLOGY
Semester-V : Paper V (A)
(Stratigraphy, Indian Geology and Palaeontology)
(DSE-5 – Elective- I) **Credits : 1**

Time: 2 Hours **Max.Marks:25**

1) Locate the type area and equivalents of the Cuddapah System and add a note on the available economic important minerals in the given political map of India. (4 M)
2) Prepare the stratigraphic column of cuddapah basin. (4 M)
3) Identify the given invertebrate fossils 1-4 and write their classification morphology and age. (4x2= 8 M)
4) Identify the given plant fossils 5-6 and write their classification, morphology and age. (2x2=4 M)
5) Record &Viva (5 M)

B.Sc. Geology- III Year
Semester – V
Paper – V (B) Environmental Geology

(4 hrs/week) **(DSE-5 – Elective - II)** **Credits-4 (60 hours)**

Unit-I:
Scope of environmental geology – environmental awareness –urbanisation and its impact on environment, air, water, sound and land pollution, global warming and green house effect,

Unit – II:
Disaster management: Natural hazards - earth quakes, tsunamis, coastal erosion - protection and management, floods and landslides.
man made hazards - man as agent of mass wasting and land scarification.

Unit-III:
Geo technical constructions and its impact on environment - dams, highways, urbanisation.
mining and its impact on the environment – health hazards associated with mining –
mine waste disposal.

Unit-IV:
Waste disposal practices, recycling. role of geologist in environmental protection and planning. environment conservation and management, climate change and mitigation.

B.Sc. Geology- III Year
Semester – V
Paper – V (B) Environmental Geology practicals

(3 hrs/week) **(DSE-5 – Elective - II)** **Credits-3 (45 hours)**

1. Study of maps of seismic zones, earthquake-prone, landslide-prone and flood-prone areas in India.
2. Methods of water analyses for physical and chemical parameters.

Text Books:-
1. Strahler- Environmental Geology
2. Lundgren- Environmental Geology
3. Keller: Environmental Geology.
4. K.S. Valdiya. Environmental Geology

Reference books:

1. A Text Book of Environmental Geology- Purohit
2. Mining environment- Bharath B. Dhar
3. Impact of Mining on Environment Water Pollution – R. K. Sharam
4. Environmental Geology- Montaganery
5. Principles of Environmental Sciences- Cunningham.
6. Basic Environmental Technology –Nathanson
7. Environmental Sciences – Wright Nebel
8. Environmental Geography-Saxena
9. Environmental Impact Assessment –Bartiwal
10. A Text Book of Environmental Sciences- Subramanyan
11. Atmosphere, Weather and Climate- Sidhartha.

Practical Model Paper

B.Sc. (CBCS) - III Year Practical Examination
GEOLOGY
Semester-V : Paper V (B)
(Environmental Geology)
(DSE-5- Elective-II)

Time: 2 Hours **Credits : 1** **Max.Marks:25**

1) Identify and mark the seismic zones in the given map of India. (10 M)
2) Analyse the given water sample and estimate the chemical parameters. (10 M)
3) Record &Viva. (5 M)

KAKATIYA UNIVERSITY
B. Sc (CBCS) Microbiology – III Year
Semester-V – A (Discipline Specific Elective)
INSTRUMENTATION AND BIOTECHNIQUES

Theory syllabus

UNIT – I

1. Microscopy: Brightfield and darkfield microscopy, Fluorescence Microscopy, Phase contrast Microscopy.
2. Electron Microscopy (Scanning and Transmission Electron Microscopy).
3. Biophysical Principles: Osmosis, osmotic pressure, Donan equilibrium, diffusion potential, diffusion coefficient, endocytosis & exocytosis, gradient of chemical potential as driving force in transport, membrane potential & ionophores.

UNIT - II

1. Chromatography: Principles and applications of paper chromatography (including Descending and 2-D), Thin layer chromatography. Column packing and fraction collection.
2. Gel filtration chromatography, ion-exchange chromatography and affinity chromatography, GLC, HPLC.
3. Sedimentation and filtration.

UNIT - III

1. Electrophoresis: Principle and applications of native polyacrylamide gel electrophoresis.
2. SDS- polyacrylamide gel electrophoresis, 2D gel electrophoresis. Isoelectric focusing, Zymogram preparation and Agarose gel electrophoresis.
3. Spectrophotometry: Principle and use of study of absorption spectra of biomolecules. Analysis of biomolecules using UV and visible range. Colorimetry and turbidometry.

UNIT - IV

1. Centrifugation: Principle, working and applications of centrifuge. Preparative and analytical centrifugation, fixed angle and swinging bucket rotors.
2. RCF and sedimentation coefficient, differential centrifugation, density gradient centrifugation and ultracentrifugation.
3. Fundamental of Radioactivity: Radioactive &non radioactive isotopes, Laws of Radioactivity, Half life& Average life, types of radiation (α, β, γ radiations) application of radioactive isotopes in biology.

KAKATIYA UNIVERSITY
B. Sc (CBCS) Microbiology – III Year
Semester-V – B (Discipline Specific Elective)
INDUSTRIAL AND FOOD MICROBIOLOGY

Theory syllabus

UNIT – I

1. Introduction to Industrial microbiology: Brief history and developments in industrial microbiology.
2. Types of fermentation processes - solid state, liquid state, batch, fed-batch and continuous.
3. Types of fermenters – laboratory, pilot-scale and production fermenters. Components of a typical continuously stirred tank bioreactor.

UNIT - II

1. Isolation of industrial strains and fermentation medium: Primary and secondary screening. Preservation and maintenance of industrial strains.
2. Ingredients used in fermentation medium - molasses, corn steep liquor, whey &yeast extract.
3. Microbial fermentation processes: Downstream processing - filtration, centrifugation, cell disruption, solvent extraction.

UNIT - III

1. Microbial production of industrial products - citric acid, ethanol and penicillin.
2. Food as a substrate for microbial growth: Intrinsic and extrinsic parameters that affect microbial growth in food.
3. Microbial spoilage of food - milk, egg, bread and canned foods.

UNIT - IV

1. Principles and methods of food preservation and food sanitation: Physical methods - high temperature, low temperature, irradiation, aseptic packaging. Chemical methods - salt, sugar, benzoates, citric acid, ethylene oxide, nitrate and nitrite.
2. Dairy products, probiotics and Food-borne Diseases: Fermented dairy products yogurt, acidophilus milk, kefir, dahi and cheese.
3. Probiotics definition, examples and benefits.

KAKATIYA UNIVERSITY
B. Sc (CBCS) Microbiology – III Year
Semester-V – B (Discipline Specific Elective)
INDUSTRIAL AND FOOD MICROBIOLOGY

Practical syllabus

1. Microbial fermentation for the production and estimation of amylase.
2. Microbial fermentation for the production and estimation of citric acid.
3. Microbial fermentation for the production and estimation of ethanol.
4. Determination of the microbiological quality of milk sample by MBRT.
5. Isolation of fungi from spoilt bread/fruits/vegetables.
6. Preparation of yogurt.

References:

7. Crueger W and Crueger A. (2000). Biotechnology: A textbook of Industrial Microbiology. 2ndEdition. Panima Publishing Company, New Delhi.
8. Patel AH. (1996). Industrial Microbiology .1st Edition. MacMillan India Limited Publishing Company Ltd. New Delhi, India.
9. Tortora GJ, Funke BR, and Case CL. (2008). Microbiology: An introduction.9th Edition. Pearson Education.
10. Willey JM, Sherwood LM AND Woolverton CJ (2013), Prescott, Harley and Klein's Microbiology.9thEdition. McGraw Hill Higher education.
11. Casida LE. (1991). Industrial Microbiology. 1st edition. Wiley Eastern Limited.
12. Stanbury PF, Whitaker A and Hall SJ. (2006). Principles of Fermentation Technology. 2nd edition, Elsevier Science Ltd.
13. Adams MR and Moss MO. (1995). Food Microbiology. 4th edition, New Age International (P) Limited Publishers, New Delhi, India.
14. Banwart JM. (1987). Basic Food Microbiology. 1st edition. CBS Publishers and Distributors, Delhi, India.
15. Frazier WC and Westhoff DC. (1992). Food Microbiology. 3rd edition. Tata McGraw-Hill Publishing Company Ltd, New Delhi, India.
16. Jay JM, Loessner MJ and Golden DA. (2005). Modern Food Microbiology. 7th edition, CBS Publishers and Distributors, Delhi, India.

Linear Algebra

(w.e.f. academic year 2019-20 batch onwards)

DSC-V

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The students are exposed to various concepts like vector spaces,bases, dimension, Eigen values etc.
Outcome: After completion this course students appreciate its interdisciplinary nature.

Unit- I

Vector Spaces: Vector Spaces and Subspaces -Null Spaces, Column Spaces, and Linear Transformations -Linearly Independent Sets; Bases -Coordinate Systems -The Dimension of a Vector Space

Unit- II

Rank-Change of Basis - Eigenvalues and Eigenvectors - The Characteristic Equation

Unit- III

Diagonalization: -Eigenvectors and Linear Transformations -Complex Eigenvalues - Applications to Differential Equations.

Unit- IV

Orthogonality and Least Squares : Inner Product, Length, and Orthogonality -Orthogonal Sets -Orthogonal Projections - The Gram-Schmidt Process.

Text:

David C Lay,Linear Algebra and its Applications 4e

References:

1] S Lang, Introduction to Linear Algebra

2] Gilbert Strang , Linear Algebra and its Applications

3] Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence; Linear Algebra

4] Kuldeep Singh; Linear Algebra.

5] Sheldon Axler; Linear Algebra Done Right

KAKATIYA UNIVERSITY - WARANGAL - TELANGANA

DEPARTMENT OF ENGLISH

Under Graduate Courses (Under CBCS 2021– 2022 onwards)

GENERAL ENGLISH III-YEAR, V- SEMESTER

B.A., B.COM., B.Sc., B.B.A., B.C.A.,B.A(L).

PAPER – V: ENGLISH

COMMUNICATION SKILLS

English through Human Values and Ethics

Theory: 3 Hours/Week; Credits: 3 Marks: 75 (Internal: 15; External: 60)

Unit1	PROSE	Tolerance is a Moral Virtue – Rivka T. Witenberg
	POEM	How Happy is the Little Stone – Emily Dickinson
	LANGUAGE	Paragraph Writing
Unit 2	PROSE	When Cities were Nature's Haven – Harini Nagendra
	POEM	Where the Mind is Without Fear – Rabindranath Tagore
	LANGUAGE	Note-making
Unit 3	PROSE	Why we Love Holiday Rituals and Traditions – Dimitris Xygalatas
	POEM	Sonnets are Full of Love – Christina Rossetti
	LANGUAGE	Public Speaking

PRESCRIBED TEXTBOOK: *English for Career*: A Course book for Undergraduate Learners

Eds. K. Purushotham, M. Rajeshwar and R. Meghana Rao. Published by Orient Blackswan.2021.

Approved

27-12-2021

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27/12/2021

R. Meghana Rao

27/12/2021

Dr. R. Meghana Rao

BOS

Chairperson
Board of Studies In English
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WARANGAL-506 009.

27/XII/21

27/12/2021