



# **Bachelor of Computer Applications**

## **SEMESTER II**

1. English -II
2. Data Structures & Applications
3. Operating System
4. Discrete Mathematics
5. Accounting and Financial Management
6. Data Structures Lab

## 2BCA6: Accounting and Financial Management

### UNIT-1

#### Accounting:

1. **Introduction:** Principles, concepts and conventions, double entry system of accounting, ledger keeping.
2. Subsidiary books with special reference to simple cash book and three column cash book.
3. **Trial balance and final accounts of sole trader:** Preparation trial balance, adjusting entries, including revenue for bad debts, revenue for discount on debtors and creditors, preparation of final accounts.
4. Final accounts of joint stock companies.

### UNIT-2

#### Financial Management:

5. **Introduction:** Meaning and scope of financial management, functions of the financial manager.
6. **Ratio analysis:** Meaning of ratio, advantages, limitations, types of ratios and their usefulness, liquidity and ratios, profitability ratios, efficiency ratios, solvency ratios, problems including preparation of balance sheet.
7. **Funds flow statement:** Meaning and concepts of funds, preparation of fund flow statement.

### UNIT-3

#### Costing & Budgetary Control:

8. **Unit costing:** Preparation of cost sheet and tender price statement.
9. **Marginal costing:** Concepts, Marginal cost equations, P/V ratio, B.E.P., Margin of safety, Sales to earn a desired profit, Problems on the above.
10. **Budgetary Control:** Meaning and definition, preparation of flexible budget and cash budget.
11. **Standard costing:** Meaning of standard cost and standard costing, analysis of variances – material and labour variances only.

#### Reference Books:

1. Accountancy Vol. 1 by B.S. Raman.
2. Accountancy Vol. 2 by B.S. Raman.
3. Management Accounting by R.K. Sharma and Gupta.
4. Financial Management by I.M. Pandey.

## **2BCA3: Data Structure and Applications**

### **UNIT-1**

#### **Linear Data Structure and their sequential storage representation**

**Introduction to algorithm-** Sequential, Selection and Iteration

Algorithmic notations, Concept and terminology for non-primitive Data structures,

**Arrays-**Memory Representation of 1D and 2D, Operations on Arrays,

**Stacks-** Definitions and Concepts, Operations on stacks,

Applications of stacks- Recursion, Infix to postfix, and Evaluating postfix expressions,

**Queues-** Linear, Circular and Priority Queues

### **Unit – II**

Pointers and Linked Allocation, Linked linear lists,

Operations on Linear lists using singly linked storage structures

(Insertion, Deletion, Searching-Only on unsorted lists),

Circular linked lists- Memory Representation ,

Doubly linked linear lists- Memory Representation.

#### **Nonlinear Data Structures**

**Trees -** Definition and concepts, Operations on Binary Trees,

**Storage Representations of Binary Trees-** Sequential and Linked, Tree Traversal,

**Binary Search Tree-** Creation and Traversal

### **UNIT-III**

#### **Sorting and searching**

**Sorting-** Selection sort, Bubble Sort, Insertion Sort, Merge Sort, Quick Sort, Radix sort

**Searching-** Sequential and Binary searching

#### **Reference Books:**

1. An Introduction to Data Structures with Applications 2<sup>nd</sup> edition - J.P.Trembly and Sorenson, McGraw Hill 2001.
2. Data structures using C , Aaron M Tenenbaum, Yedidyah Langsam, Pearson
3. Data Structures And Program Design In C, Robert L Cruse, Pearson
4. Systematic Approach to Data Structures Using C by Padma Reddy

## **2BCA7: Data Structures Lab**

### **List of Experiments/Programs**

#### **PART – A**

1. Write an interactive program to search an element in the given linear array using linear and binary searching technique.
2. Write a program to arrange numbers in ascending order using insertion sort.
3. Write a program to arrange numbers in ascending order using merge sort.
4. Write a program to arrange numbers in ascending order using selection sort
5. Write a program to arrange numbers in ascending order using quick sort
6. Write an interactive program to insert an element at the given position and delete an element at the specified position in the given array.
7. Write an interactive program to implement the following operations on stack
8. Program to implement Tower of Hanoi problem.

#### **PART – B**

1. Write program to evaluate a postfix expression.
2. Write a program to convert an expression from infix to postfix.
3. Write an interactive program to perform insertion and deletion operations in Linear Queue.
4. Write an interactive program to perform insertion and deletion operations in Circular Queue.
5. Write a program to delete an item from the linked list.
6. Write an interactive program to implement stack operations using singly linked list.
7. Write an interactive program to perform insertion operation in linked list- at the beginning, at the end and in-between.
8. Program to create a binary tree and also print the preorder values, inorder values, postorder values.
9. Write a Program to add two polynomials of one variable and  $n^{\text{th}}$  degree and represent them as linked list

## 2BCA4: DISCRETE MATHEMATICS

### UNIT-1

#### Basics of Set Theory

Notation, Inclusion and Equality of Sets, The Power set, Operations on sets, Venn diagram, Set identities, Ordered pairs and Cartesian Products.

Relations and ordering – Properties of binary relations in a Set, Relation Matrix and the Graph of a Relation, Equivalence Relations, Compatibility Relations, Composition of Binary Relation.

#### Graph Theory

Basic Definitions, Paths and Connectedness, Matrix Representation of Graphs, Trees.

### UNIT-2

#### Functions

Definition and Introduction, Composition of Functions, Inverse Functions.

### UNIT-3

#### Mathematical Logic

Statements and Notation, Connectives, Negation, Conjunction, Disjunction, Statement Formulas and Truth Tables, Conditional and Bi-conditional, Tautologies, Equivalence of Formulas, Tautological Implications.

#### Reference Books:

1. Discrete Mathematical Structures with Applications to Computer Science by J.P. Tremblay, R Manohar 3<sup>rd</sup> Edition – Tata McGraw Hill.
2. Discrete mathematical structures by B. Kolman, R.C. Busby and S. Ross, 3<sup>rd</sup> edition.
3. Introduction to discrete mathematics by Liu, C.L., McGraw Hill, 2<sup>nd</sup> edition, 1985.
4. Discrete mathematics by S.A. Witala, McGraw Hill, 1987.

## **2BCA2: Technical English & Business Communication**

### **UNIT-1**

1. **Technical Report Writing:** Collection of data, planning and organization. Technical paper writing, project preparation and project report.

### **UNIT-2**

2. **Introduction to Communication:** Principles of communication, Objectives of communication, media of communication, types of communication, barriers of communication.

### **UNIT-3**

3. **Business Communication:** Kinds of business letters, Layout of business letters, Letters enquiries & replies, orders & execution credit, status inquiries, complaint and adjustment, collection letters, circular letters, sales letters, bank correspondence, application letters, E-mail, On-line marketing.

#### **Reference Books:**

1. Essentials of Business Communication by Rajendra Pal & Korla.

# 2BCA5: OPERATING SYSTEMS

## UNIT-1

### Introduction

Definition, Computer system components , User view , system view and system goals , Batch Systems, Multi programmed Systems, Time-Sharing Systems, Real-Time Systems, System Components, Operating system services, System calls and system programs.

### Process

Process Concept, process state diagram process Control block , Process Scheduling- Scheduling queues, scheduler, Cooperating process, Interprocess Communication, Threads- meaning , user threads , Kernel Threads, Multithreading Models, Threading Issues,

### CPU Scheduling

Basic concepts, Preemptive and Non-preemptive Scheduling, Scheduling Criteria, Scheduling algorithms- FCFS, Shortest job first Priority scheduling, Round Robin Scheduling.

## UNIT-II

### Process Synchronization

The Critical section problem, Solution Approach critical section problem, Bakery Algorithm, Semaphores-Meaning, Types of Semaphores, Synchronization problems- Bounded Buffer Problem, Readers-Writers problem and Dining Philosophers problem.

### Deadlocks

Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

## UNIT-III

### Memory Management

Introduction, Logical versus physical address space, Dynamic Loading, Dynamic Linking, Swapping, Contiguous Allocation, Partitioned Memory Allocation, Paging, Segmentation, Segmentation with Paging.

### Virtual Memory

Concept, Advantages of Virtual Memory, Implementation of Virtual Memory, Demand Paging, Demand segmentation, Advantages of Demand paging, Page Replacement, Page-Replacement Algorithms- FIFO Algorithm, Optimal Page Replacement Algorithm, and Least Recently used Algorithm, (LRU) Allocation of Frames, Thrashing.

### File System

File concepts, File Attributes, File Operations, File Types, File Structure, Access Methods, Directory Structure, File-System Structure, Allocation Methods- Contiguous Allocation, Linked Allocation and Indexed Allocation, Free-Space Management.

### Reference Books:

1. Operating System Concepts – 5<sup>th</sup> edition by Abraham Silberschartz and Peter Galvin, McGraw Hill, 2000
2. Modern Operating Systems – Andrew S Tanenbaum, Prentice Hall
3. Operating Systems : Internals and Design Principles, William Stallings, Prentice Hall