



# **Bachelor of Computer Applications**

## **SEMESTER I**

1. English -I
2. Basics of Digital Electronics
3. Mathematics
4. Computer Fundamentals & Problem Solving
5. C Programming
6. C Programming Lab

## 1BCA3: Basics of Digital Electronics

### Unit-I

**Number Systems** – Introduction- Decimal, Binary, Octal and Hexadecimal. Inter- Conversions, Addition, Subtraction, Multiplication and Division in Binary Number System.

1's and 2's Complement method in Binary Number System. Subtraction using 1's and 2's Compliment, Weighted Number System - Binary Coded Decimal (BCD), Addition of BCD Numbers.

**Non-Weighted Number System** – Applications, Excess-3, Gray code  
- Conversions - Gray and Binary Codes

**Fixed point and Floating point representation of numbers** - Introduction

### Unit-II

**Boolean Algebra:** Basic laws, DeMorgan's theorem, Duality theorem, Sum Of Product method and Products Of Sum method. Karnaugh map (Upto 4 Variables, Don't Care Condition).

**Fundamentals of Gates:** Basic gates, Derived gates and Universal gates (Design).

### Unit-III

**Combinational and Sequential logic circuits** - Half adder, Full adder, Half -subtractor and Full-subtractor.

**Flip-Flops** - SR, D, JK, JK Master Slave, T Flip-flops, Decoders - 3 to 8 lines, Encoders-Octal to Binary

**Multiplexer**- 4 to 1 line, Counters-3 bit Binary Ripple counter, 3 bit synchronous binary counter.

**Shift registers**- Serial-In-Parallel-Out, Parallel-In-Serial-Out, Serial-In-Serial-Out, Parallel-In-parallel-Out.

### Reference Books:

1. Digital fundamentals-Thomas.D.Floyd.
2. Malvino Leach, digital principles and application (4<sup>th</sup> edition)
3. Morris Mano, Computer System Architecture (3<sup>rd</sup> edition) PHI.
4. Digital Logic- Thomas C Bartee.

## **1BCA5: Computer Fundamentals & Problem Solving**

### **UNIT-I**

#### **Introduction to Computers**

History, Generations of Computers

Computer as multipurpose tool - Overview of the Computer system, Applications of computer, looking inside the machine, parts of the computer, information processing cycle, computer shapes and types of computer.

#### **Interacting with Computer**

The Keyboard - the mouse - other input devices - The monitor - Printers - Sound systems - Connecting I/O devices to the Computer.

#### **Storing information in a Computer**

Types of storage devices - Magnetic storage devices, Optical Storage devices, measuring device performance.

### **UNIT-II**

#### **Processing Data**

Transforming data into information - How a Computer processes data - factors affecting processing speed

#### **Computer Software**

Computer Languages, Types of Software, Operating System-Introduction, Types of Operating System. Translators

**Problem solving aspects** – Introduction, Problem definition, Problem analysis, Design of problem solution, Algorithm, Flowchart, Coding, Debugging, Program Documentation and Program maintenance, Basic programming constructs - sequence, selection and iteration.

### **UNIT-III**

#### **Information System**

What is an information System - types of information Systems — System development life cycle.

#### **Database Management systems**

Data and Information - the database - DBMS relationship-working with a database - creating tables - Editing records -querying database - generating report.

#### **Computers in Business**

Why businesses need information — Types of business Software - Evolution of business computing

#### **Security**

The Need for Computer Security, Basic Security Concepts, Threats to Users, Threats to Hardware, Threats to Data, Taking protective measures – Protecting Yourself, Protecting your privacy, Keeping your Data Secure.

#### **Reference Books:**

1. Peter Norton's 'Introduction to Computers', Second edition, TMH.
2. Dromey – How to solve it by computer –PHI
3. Computer Concepts and C Programming – P.B.KOTUR
4. Computer Fundamentals - P K Sinha, BPB



# 1BCA6: C Programming

## UNIT-1

### Overview of C

Importance of C, Sample C programs, Basic structure of C Programs, Programming style, executing a C Program.

### Constants, Variables, and Data Types

Character set, C tokens, Keywords and identifiers, Constants, Variables, Data types, Declaration of variables, Assigning values to variables, Defining symbolic constants

### Operators and Expression

Arithmetic of Operators, Relational operators, Logical operators Assignment operators, Increment and decrement operators, Conditional operator, Bit wise operators, Special operators, Arithmetic expressions, Evaluation of expressions, Precedence of arithmetic operators, Type conversions in expressions, Operator precedence and associativity, Mathematical functions.

### Managing Input and Output Operations

Reading a character, writing a character, formatted input, formatted output

## Unit-II

### Decision Making and Branching

Decision making with IF statement, Simple IF statement, The IF ELSE statement, Nesting of IF ... ELSE statements, The ELSE IF ladder, the switch statement, the ?: Operator, The GOTO statement.

### Decision Making and Looping

The WHILE statement, The DO statement, The FOR statement, Jumps in loops

### Arrays

One-dimensional arrays, Two-dimensional arrays, Initializing two-dimensional arrays.

### Handling of character strings

Declaring and initializing string variables, Reading strings from terminal, Writing strings to screen, Arithmetic operations on characters, Putting strings together Comparison of two strings, String-handling functions, Table of strings

## UNIT-III

### User-Defined Functions

Need for user-defined functions, multi-function program, The form of C functions Return values and their types, Calling a function Category of functions, Handling of non-integer functions, Nesting of functions, Recursion, Functions with arrays, The scope and lifetime of variables in functions.

### Structures and Unions

Structure definition, giving values to members, Structure initialization Comparison of structure variables, Unions, Size of structures

### Pointers and File Handling

Understanding pointers. Accessing the address of a variable, Declaring and initializing pointers, Accessing a variable through its pointer.

File Handling– Definition and need of file. Defining, Opening, and Closing a file. Input and output operations on files. Random access to files with example programs.

### Reference Books:

1. Problem Solving with C, M.T. Somashekara, PHI Learning, New Delhi, 2009
2. Programming in ANSI C 2<sup>nd</sup> Edition by E Balaguruswamy Published by Tata McGraw Hill.

## 1BCA8: C Programming Lab

### List of Experiments/Programs

#### Part A:

1. C program for given two numbers to perform arithmetic operations using switch statement.
2. C program to find biggest of three number using nested if statement.
3. C program to find sum of the  $S=1^2+2^2+3^2+\dots+n^2$  indirect method using looping statement
4. C program to find sum of the  $S=1-2+3-4+5+\dots+n$  series by indirect method using looping statement
5. C program to find sum of the  $S=1+1/x+1/x^2+\dots$  series upto 4 decimal places of accuracy.
6. C program to check whether the given number is prime or not.
7. C program to print and count prime numbers from 2 to n.
8. C program to generate Fibonacci series up to n numbers
9. C program to check whether the given number is factorial of a number or not
10. C program to convert binary number to decimal number.
11. C program to convert decimal number to binary number.
12. C program to find the roots of the quadratic equation using else if statement.
13. C program to find the reverse of the given number. Also sum & count the number of digits and check whether the given number is palindrome or not palindrome
14. C program to find largest and smallest of n numbers
15. C program to find second largest and second smallest of n numbers

#### Part B:

1. C program for sorting given set of numbers using bubble sort technique.
2. C program to search given number using linear search technique
3. C program to accept two square matrix and find sum of two matrices.
4. C program to print difference of two matrices.
5. C program to accept two matrices of order  $m*n$  and  $p*q$  to find product of two matrices using function.
6. C program to check whether given number is Fibonacci or not.
7. C program to accept  $m*n$  matrix. To find trace and norm of square matrix and to print principle diagonal elements.
8. C program to accept  $m*n$  matrix to find sum of upper diagonal and lower diagonal elements.
9. C program to find factorial of a number using recursive function
10. C program to find NCR and NPR using function.
11. C program to find LCM and GCD of two numbers.
12. C program to display transpose of given  $m*n$  matrix using function.
13. C program to swap two numbers using function and pointers.
14. C program to accept employee information and display the same using structure.
15. C program to create simple marks card assuming appropriate condition
16. C program to read and write information of an employee using a file.

## **1BCA2: General English**

### **UNIT-1**

1. **Grammar and Vocabulary:** Review of elements of grammar & usage for effective communication – Parts of speech, Phrases, Clauses, Sentences – Pattern, Complex and Compound sentences, Transformation of sentences, Direct and Indirect speech; Synonyms, Antonyms.

### **UNIT-2**

2. **Reading & Writing Skills:** Reading passages from Books, News Papers, Journals and writing them in concise forms. Exercises on Reading and Writing skills.

### **UNIT-3**

3. **Personality Development:** Exercises focusing on vocabulary and communication skills, art of public speaking, preparation of Resume, facing of interviews, group discussion.

#### **Reference Books:**

1. Current English for colleges by N. Krishnaswamy.



## 1BCA4: Mathematics

### UNIT-I

**Partial fractions:** Proper & improper fractions-all four types.

**Logarithms:** All problems, except common logarithms.

**Mathematical Induction:** Simple problems on all types.

#### Theory of equations:

- i) Solutions of cubic, bi quadratic equations when complex and irrational roots are given
- ii) Solutions of cubic, bi quadratic equations when roots are in AP, GP and HP.
- iii) Solutions of cubic, bi quadratic equations using synthetic division.
- iv) Operations on complex numbers.

#### Binomial Theorem: No proof.

- i) Expansion - problems thereon.
- ii) Finding middle terms.
- iii) Finding constant terms or terms independent of x.

#### Trigonometry:

- i) Definition of radian ( no proof for constant angle )
- ii) Problems on conversion of radians to degree and vice versa
- iii) Problems on  $s = r\theta$ ,  $s = \frac{1}{2}r^2\theta$ (no proofs)

#### Trigonometric functions and identities:

Simple problems

**Graphs of Trigonometric functions:** for sine, cos and tan functions.

Allied angles: Problems thereon

#### Complex numbers:

- i) Finding modulus and amplitude of complex numbers
- ii) Solving problems using De Moivre's Theorem.

### UNIT II

#### Analytical Geometry

- i) Problems on distance formula - Proving parallelogram, square, rhombus, equilateral triangle, Co linearity.
- ii) Problems on section formula - internal division, external division, mid point formula, centroid of a triangle.
- iii) problems on area of a triangle.

#### Straight lines:

- i) By finding slopes - show that lines are parallel and perpendicular.
- ii) Finding slopes - when two points are given
- iii) equation of straight lines - passing through given point, parallel and perpendicular to given line.
- iv) Problems on intercept form, slope form, normal form, two point form.
- v) Problems on angle between two lines.
- vi) Concurrency of three lines and point of concurrency.

#### Pair of lines

- i) Angle between two lines  $ax^2 + 2hxy + by^2 = 0$ .  $ax^2 + 2hxy + by^2 + 2gx + 2fy + C = 0$ .
- ii) Point of Intersection.
- iii) Condition for an equation to represent pair of lines.

**Circles:**

- i) Finding centre and radius.
- ii) Finding equation of a circle passing through three points, when different conditions are given, passing through x and y- axis.

**Conics : Parabola -**

Finding vertex, focus, tangent, normal, length of latus rectum, eccentricity. ( no proofs )

**UNIT III****Limits and continuity:**

- i) Simple direct problems on limits of the form  $\left( \frac{x^n - a^n}{x - a} \right), \frac{\sin \theta}{\theta}, \frac{\tan \theta}{\theta}$  (no determinate forms).
- ii) Simple problems on continuity.

**Differentiation:**

- i) Problems on sum , product, quotient, chain rule ( No parametric, logarithmic functions)

**Differential Equations:**

Solving problems by variable separable form.

**Integration:**

- i) By substitution
- ii) By parts
- iii) By partial fractions
- iv) Problems of types

$$\int \frac{dx}{a^2 + x^2}, \int \frac{dx}{a^2 - x^2}, \int \frac{dx}{x^2 - a^2}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{\sqrt{a^2 + x^2}}, \int \frac{dx}{\sqrt{x^2 - a^2}}, \int \frac{dx}{x\sqrt{x^2 - a^2}}, \int \frac{dx}{x\sqrt{x^2 + a^2}}$$

$$\int \sqrt{a^2 - x^2} dx, \int \sqrt{a^2 + x^2} dx, \int \sqrt{x^2 - a^2} dx.$$

$$\int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}$$

**Application of Integration:**

Simple problems on area

- i) Find the area of circle, ellipse, parabola & the ordinate  $x=a$  by integration
- ii) Find the area bounded by the parabola  $y^2 = 4ax$ , x - axis and  $x = 1, x = y$ .
- iii) Find the area bounded by  $y = \sin x$ , x - axis &  $x = 0, y = z$ .

**Reference Books:**

1. Theory and Problems in Mathematics – I By BOSCO Publications 2004.
2. Theory and Problems in Mathematics – II By BOSCO Publications 2005.
3. Engineering Mathematics, Volumes I–IV By S Chandrashekar.





# **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  $_n^{\circ}$  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



# **Bachelor of Computer Applications**

## **SEMESTER III**

1. English-III
2. Computer Architecture & Microprocessor
3. OOPS With C++
4. Software Engineering
5. DBMS
6. OOPS With C++ Lab

## **3BCA3 - Computer Architecture and Microprocessor**

### **UNIT-1**

Basic Structures of Computers: Computer types; Functional Units – Input unit, Memory unit, Arithmetic and logic unit, Output unit, Control Unit; Basic operational concepts; Bus structures; Multiprocessor and Multicomputer.

Storage Representation: Storage representation of characters; Memory locations and addresses – Byte addressability; Memory operation.

Addressing modes: Direct, Indirect, Immediate, Relative, Indexed.

Instruction formats: Zero address, one address, One-and-half address, Two address, Three address.

**Instruction types:** Data transfer, Arithmetic, Branching, Logical, Rotate, Stack operations, Input/Output and Machine control instructions.

Input/output Organization: Accessing Input/output devices; Interrupts; Direct Memory Access (DMA)- Block diagram of DMA Controller, cycle stealing, Burst mode.

Buses – Synchronous bus, Asynchronous bus; Interface circuits – Parallel port, Serial port.

### **Unit – 2**

Memory System: Basic concept; Random Access Memories – Static RAM, Asynchronous DRAMs, Synchronous DRAMs; Read Only Memories – PROM, EPROM, EEPROM, Flash memory; Cache Memory; Virtual memories; Secondary storage – Magnetic hard disks, Optical disks.

Introduction to Microprocessor, assembly language, 8085 Microprocessor architecture, Pin diagram, introduction to 8085 instruction set, assembly language programming.

### **Unit – 3**

Programming technology of 8085 with additional instructions, counters and time delays, stacks and subroutine, interfacing peripherals (I/Os) and applications. Interrupts, keyboard interfacing.

Introduction to 8086, advantages over 8085, additional features of 8086, modified addressing schemes.

### **Reference Books:**

1. Computer organization by Carl Hamacher, Z.Varnesic and S.Zaky 5<sup>th</sup> Edition ,Mc Graw Hill,2002.
2. Microprocessor Architecture Programming and Application with 8085 by Ramesh. S. Gaonkar – Penram International Publishing (India) .
3. M.Morris Mano –Digital Logic and Computer design,PHI Pvt.Ltd., New Delhi
4. Baary B Brey- The Intel Microprocessor Systems:The 8086/8088 family architecture, programming and designing-PHI Publication.
5. John Uffenbeck, Micro Computers and Microprocessor, PHI.



## **3BCA6: Database Management Systems**

### **UNIT I**

#### **Introduction to Database System Concepts and Architecture**

Databases and Database Users, Characteristics of the Database Approach, Actors on the Scene, Advantages of Using a DBMS

Data Models, Schemas and Instances, DBMS Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment

#### **Data Modeling Using the Entity-Relationship Model**

Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, ER Diagrams, Naming Conventions and Design Aspects

### **UNIT II**

**Transaction-** Transaction Concepts, States, ACID properties, Concurrent executions, Serializability

#### **Relational Data Model, Relational Constraints, and Relational Algebra**

Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Basic Relational Algebra Operations, Additional Relational Operations, Examples of Queries in Relational Algebra.

**Normalization-** Functional Dependencies, Transitive and Multivalued dependency, First Normal form, Second Normal Form, Third Normal Form and Boyce Codd Normal Form

### **UNIT-III**

**Advantages of RDBMS-** Codd's Rules.

#### **SQL-The Relational Database Standard**

Data Definition, SQL Data Types and Schemas, Constraints, Basic Queries in SQL, Insert, Delete, and Update Statements in SQL, Set Operations, Aggregate functions, Views (Virtual Tables) in SQL, Joins – Inner, Outer and Self, Additional Features of SQL, DCL-commit, Rollback, Save-point, Grant privileges.

#### **Reference Books:**

1. Fundamentals of Database Systems by Navathe and Elmasri –Pearson Education, Fifth Edition.
2. Database Systems Concepts, 3<sup>rd</sup> edition by Abraham Silberschatz, Henry Korth and S. Sudarshan McGraw Hill International Editions.
3. Introduction to Database systems by CJ Date, Published by Addison-Wesley.
4. Principles of database systems by Ullman, Computer Science press, 1984.
5. Introduction to database systems by Bipin C.Desai, Galgotia.

## **3BCA2: ENGLISH III**

### **UNIT –I**

**Voice (5 Marks)**

**Direct and Indirect Speech (5 Marks)**

**Verbs: Linking Verbs; Auxiliaries**

**Transitive and Intransitive Verbs**

**Negative Verbs and Infinitives (10 Marks)**

### **UNIT-II**

**Reading and Writing Skills:**

**Reading aloud passages from Books, Newspapers, Journals etc.,**

**Precise Writing (10 Marks)**

**Paraphrasing (5 Marks)**

**Expansion (5 Marks)**

### **UNIT-III**

**Facing Interviews (Including preparation necessary)**

**Interviewing skills**

**Group Discussion (4 Marks)**

**Conversation Skills in specific situations: (8x2=16)**

**Fixing an appointment**

- a) **At a Bank; Post-office**
- b) **At an Airport, Bus Stand, Railway Station**
- c) **At a Travel Agency, At the Hospital**
- d) **At the Doctor's**

## 3BCA8: Object Oriented Programming Lab

### List of Experiments/Programs

#### PART-A

1. Write a c++ program to calculate the average of three numbers.
2. Write a c++ program to find the biggest of three numbers.
3. Write a c++ program to find minimum and maximum of two numbers using functions.
4. Write a c++ program to check the given number is palindrome or not
5. Write a c++ program to sum of all even and odd numbers.
6. Write a c++ program to perform arithmetic operations using classes and objects.
7. Write a c++ program to define a student class with user name, to name, total, average for  $n$  students.
8. Write a c++ program to illustrate the use of static member function.
9. Write a c++ program to find the mean value using friend function..
10. Write a c++ program to show the use of copy constructor.
11. Write a c++ program to implement multiple inheritances.
12. Write a c++ program to illustrate pointers to objects.
13. Write a c++ program to read a string with get line function.
14. Write a c++ program to display string with write() function.
15. Write a c++ program to specify field size with using width function.

#### PART-B

16. Write a c++ program to accept two times (hh:mm:ss) to find subtraction of two times.
17. Write a c++ program to implement processing shopping list using a class with arrays as data members.
18. Write a c++ program to implement banking scheme.
19. Write a c++ program to show the use of over loaded constructor.
20. Write a c++ program to construct variables at run time using dynamic initialization.
21. Write a c++ program to find the largest value among the set of parameters using overloaded function.
22. Write a c++ program to add two complex number using operator overloading.
23. Write a c++ program to demonstrate single inheritance.
24. Write a c++ program to implement multilevel inheritance.
25. Write a c++ program to illustrate the implementation of virtual base class.
26. Write a c++ program to illustrate the use of array of pointer to objects.
27. Write a c++ program to implement reading and writing class objects using files.



## 3BCA4: Object Oriented Programming with C++

### Unit 1

#### 1. Introduction

Procedure-oriented programming, Concepts of Object-oriented programming, benefits of OOP, Applications of OOP, Structure of C++ program.

#### 2. Fundamentals

Tokens, Keywords, Identifiers and constants, Basic Data Types, User-defined data types, Derived data Types, Symbolic constants, Type compatibility, Declaration of variables, Dynamic initialization of variables, Reference variables, Operators in C++, Scope resolution operator, Member dereferencing operators, Memory management operators, Manipulators, Type cast operator, Expressions and their types, Special assignment expressions, Implicit conversions, Operator overloading, Operator precedence, Control structures.

#### 3. Functions

The main function, Function prototyping, Call by Reference, Return by Reference, Inline functions, Default arguments, const arguments, Function overloading, Friend and Virtual functions.

### Unit 2

#### 4. Classes and Objects

Specifying a Class, Defining member functions, Making an Outside function Inline, Nesting of member functions, Private member functions, Arrays within a Class, Static data members, Static member functions, Arrays of Objects, Objects as function arguments, friendly functions, Returning Objects, const member functions, Pointers to members.

#### 5. Constructors and Destructors

Constructors, Parameterized constructors, Multiple constructors in a class, Constructors with default arguments, Dynamic initialization of objects, Copy constructor, Dynamic constructor, Constructing Two-dimensional arrays, const Objects, Destructors.

#### 6. Operator Overloading and Type Conversions

Defining operator overloading, Overloading unary operators, Overloading Binary operators, Rules for overloading operators, Type conversions.

### Unit 3

#### 7. Inheritance and Polymorphism

Introduction, defining derived classes, single inheritance, making a private member inheritable, multilevel inheritance, hierarchical inheritance, hybrid inheritance, virtual base classes, abstract classes, constructors in derived classes, polymorphism – introduction, pointers, pointers to objects, this pointers, pointers to derived classes, virtual functions, pure virtual functions.

#### 8. Console I/O Operations

C++ streams, C++ stream classes, Unformatted I/O operations, Formatted I/O operations, managing output with manipulators.

#### 9. Files: Classes for file stream operations, opening and closing a file, detecting end of file, more about open(): file modes, file pointers and their manipulations, sequential input and output operations.

#### 10. Manipulating Strings

Introduction, creating objects, manipulating string objects, relational operations, string characteristics, accessing characteristics in strings, comparing and swapping.

### Reference Books:

1. Object Oriented Programming with C++ , M.T. Somashekara, D.S. Guru, H.S. Nagendraswamy, K.S. Manjunatha, PHI Learning, New Delhi, 2012
2. Object Oriented Programming with C++ by E. Balagurusamy

## 3BCA5 - SOFTWARE ENGINEERING

### UNIT - 1

1. Introduction to Software engineering , Software Products and characteristics, software engineering applications, Software engineering ethics.  
Software Process - Software engineering models: Waterfall Model, Prototyping, Spiral Model, RAD Model.
2. **Requirement Engineering:** Functional and Non-functional requirements, User requirements, System requirements, the software requirements document; Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

### UNIT – 2

3. **System Analysis Models:** Context models, Data models, Flow oriented Modeling – DFDs, Behavioral models – Use cases.
4. **Software Design:** Design process, Design characteristics, Design concepts,  
Design Models - Architectural design - Software Approach, Data Design, Architectural Styles and Patterns, Architectural design.  
Object Oriented Design - Object and Object Classes, design process, Design evaluation.  
User Interface design - Interface Analysis, Interface Design Steps, and Design evaluation.

### UNIT-3

5. **Verification and Validation:** Testing Strategies, Strategic issues, Test Strategies for conventional software - Black-box and White-box testing, Validation testing-System testing, Art of Debugging.
6. **Software Management:** Project management – Activities, Planning, Project Scheduling- Concepts and Principles,  
Risk management – Software Risk, Risk identification, Risk projection, Risk refinement.  
Software cost estimation– Estimation techniques - Decomposition Technique - software sizing,  
Empirical estimation model -COCOMO Model, Project duration and staffing.  
Quality management – Software quality Assurance and standards, ISO 9000 quality standards,  
Software measurements, Metrics for Software quality.

### Reference Books:

1. Software Engineering, Ian Sommerville, 6<sup>th</sup> Edition, 9<sup>th</sup> Edition, Pearson Education Ltd.,
2. Software Engineering – A practitioners approach, Roger. S. Pressman, Tata-McGraw Hill 6th Edition.



# **Bachelor of Computer Applications**

## **SEMESTER IV**

1. English-IV
2. Data Communication & Computer Networks
3. Computer Oriented Numerical Analysis & Statistical Methods
4. Data Warehousing & Data Mining
5. Computer Graphics
6. DBMS Lab



## 4BCA6: Computer Graphics

### UNIT-1

**Introduction** – applications of computer graphics, operations of computer graphics, graphics software packages.

**Graphical input – output devices-** graphical input devices, graphical output devices, raster scan video principles- raster scan monitors, color raster scan systems, plasma panel display, LCD panels, hard copy raster devices. Random scan devices- monitor tube displays, plotters.

**Scan conversion** – scan conversion methods, polynomial method for line, polynomial method for circle, DDA algorithm for line, circle and ellipse, Bresenham's algorithm for line drawing and circle. Midpoint methods for line and circle, problems of scan conversion.

### UNIT-1

**Scan conversion for solids-** solid areas or polygons, inside-outside test – odd even method, winding number method. Solid area filling algorithms- boundary fill algorithm, scan line fill algorithm, scan line seed fill algorithm, ordered edge list algorithm.

**2D geometrical transformations** – basic transformations- translation, rotation, scaling, homogeneous coordinate system – transformations in homogeneous notation, inverse of basic transformations, scaling about a reference point, rotation about an arbitrary point. Other transformations – reflection about any arbitrary line, shearing, combined transformation- computational efficiency, visual reality, inverse of combined transformations.

**3D geometrical transformations-** basic 3D transformation- 3D translation, 3D scaling. 3D rotation, rotation about an arbitrary axis in space, other 3D transformations- 3D reflection, reflection about any arbitrary plane, 3D shearing.

### UNIT-1

**Projection** – introduction, parallel projection- orthographic projection, axonometric projection, oblique projection, perspective projection – standard perspective projection, vanishing points. Image formation inside a camera.

**2D viewing and clipping-** windows and viewports, viewing transformation, clipping of lines in 2D- Cohen-sutherland clipping algorithm, midpoint subdivision method, polygon clipping – Sutherland – Hodgman polygon clipping.

**Curve design** – classical techniques for designing curves and object surfaces, modern curve representations.

### Reference Book:

1. Computer Graphics, Multimedia and Animation by Malay K Pakhira
2. Computer Graphics, Donald Hearn, M. Pauline Baker, Prentice-Hall
3. Computer Graphics, Roy A. Plastock, Gordon Kalley, Schaum's Outlines, McGraw Hill

## 4BCA4: Computer Oriented Numerical Analysis and Statistical Methods

### UNIT-1

**Computer Arithmetic:** Floating point representation of numbers, arithmetic operations with normalization, consequences of normalized floating point representation of numbers, Errors in numbers

**Finding the roots of an equation:** Iterative method: Introduction, Beginning an iterative method, Bisection method, Newton Raphson method, Regula Falsi method, Secant Method. Comparison of Iterative methods, Order of Convergence of Newton Raphson Method and Secant Method.

**Ordinary differential equations:** Euler's method, Taylor series method, Range Kutta II and IV order methods.

### UNIT-2

**Numerical Integration:** Simpson's 1/3 and 3/8 rule, Trapezoidal rule.

**Solving simultaneous linear equations:** Introduction, Gauss Elimination method, pivoting, illconditioned equations, Gauss Jordan method, LU Decomposition method and Gauss-Seidel iterative method. Comparison of direct and iterative methods.

**Interpolation:** Introduction, Lagrange interpolation, Difference Tables- Newton-Gregory Forward and Backward interpolation, Truncation error in interpolation.

### UNIT-3

**Statistical methods:** Introduction, definitions, classifications, frequency distribution, mean-arithmetic mean for grouped and ungrouped data, continuous frequency distribution (step deviation method), Geometric mean for grouped and ungrouped data.

Standard deviation -meaning standard deviation for actual mean method, assumed mean method and step deviation method using discrete series and continuous series.

Coefficient of variation – meaning and problems

Median – meaning, calculations of median for ungrouped, Discrete series, continuous series

Mode- meaning calculations of mode for discrete series and continuous series

Correlation – meaning, types, rank correlations and problems.

**Note:** Algorithmic approach for all statistical methods.

### Reference Books:

1. Computer Oriented Numerical Methods by Rajaraman. V.
2. Fundamentals of Mathematical Statistics by Gupta and Kapoor (Sultan Chand).
3. Probability and Statistics for engineers and scientists by Ronald E. Walpole and Raymond H Mayers.
4. Mathematical Statistics by John Freund (Prentice Hall India Pvt. Ltd.)
5. Numerical Methods by Jain M.K., S.R.K. Iyengar and R.K. Jain



# 4BCA3: DATA COMMUNICATION AND COMPUTER NETWORKS

## Unit 1:

Data Communication, Component and Basic Concepts –

- Introduction
- Characteristics – Delivery, Accuracy, Timeliness and Jitter
- Components – Message, Sender, Receiver, Transmission medium and protocol

Topology – Mesh, Star, Tree, Bus, Ring and Hybrid Topologies

Transmission modes – Simplex, Half Duplex, Full Duplex

Categories of networks – LAN, MAN, WAN

Network Components – Signal Transmission – Analog Signaling, concept of ASK, FSK, PSK, Digital Signaling, concept of Unipolar, Polar, Return-to-Zero(RZ), Biphasic, Manchester, Differential Manchester, Non-Return-to-Zero (NRZ), Bit Synchronization, Asynchronous Bit Synchronization and Synchronous Bit Synchronization, Baseband and Broadband Transmissions.

Guided Media – Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable

Unguided Media – Radio Wave Transmission Systems, Microwave Transmission Systems, Infrared Transmission Systems and Satellite Communication System.

## UNIT – II

The OSI Model – Functions of all the Seven Layers

Networking Devices – Functions and Applications of Hub, Switches, Bridges, Repeaters

Internetworking Devices – Functions and Applications of Routers and Gateways

IP Addressing – Dynamic IP Addressing, Static IP Addressing, Types of IP Addresses

Protocols –TCP, UDP, IP, IPV4, IPV6, TCP/IP Suite, SMTP, POP3, SNMP, HTTP, FTP, DNS, ICMP IGMP, ARP, RARP, OSPF, BGP, ALOHA

## UNIT – III

Packet Switching Networks – Network Services and Internal Network Operations, Packet Network Topology, Datagrams and Virtual Circuits, Connectionless Packet Switching, Virtual Circuit Packet Switching.

Routing Concepts – Routing Tables, Dijkstra's Shortest Path Routing Algorithm, Flooding, Distance Vector Routing, Congestion Control Algorithms-Leaky Bucket Algorithm.

Data Link Issues –Single bit error and Burst Error, concepts of Redundancy, Checksum, Single Bit Error correction and Hamming Code correction method.

## Reference Books:

1. Introduction to Data Communications and Networking by Behrouz Forouzan.
2. Computer Networks by Andrew S Tanenbaum.
3. Networking Essentials – Third Edition – Jeffrey S. Beasley, Piyasat Nilkaew



## **4BCA5: Data Warehousing and Data Mining**

### **UNIT-I**

**Introduction:** What is Data Warehouse? Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Implementation, Data Mining, What kinds of Data can be Mined, What kinds of patterns can be Mined, Data cleaning, Data integration: ( Entity, Identification Problem, Redundancy & Correlation Analysis), Data Reduction: (Wavelet Transforms, Attribute Subset Selection, Histogram, Clustering, Sampling, Data Cube Aggregation),

Data Transformation: Strategies Overview, Data Transformation by Normalization.

### **UNIT-II**

Mining Frequent Patterns, Associations & Correlations: Basic Concept, Frequent Itemset mining methods, pattern evaluation methods.

Classification, Decision tree Induction, Attribute Selection Measures, Tree Pruning, Bayes Classification Methods.

### **UNIT-III**

**Cluster Analysis:** What is a cluster analysis? Requirement for Cluster Analysis, Partitioning methods, Hierarchical methods.

**Data Mining Applications & Trends:** Mining Sequence Data; Time Series, Symbolic, Biological; Statistical Data Mining, Visual & Audio Data Mining, Data Mining Applications, Data Mining Trends.

### **Reference Books:**

1. Jiawei Micheline Kamber, *'Data Mining Concepts and Techniques'*, Morgan Kauf Mann Publishers.
2. George M. Marakas, *'Modern Data Warehousing, Mining and Visualization'*, Pearson Education, 2003.
3. W.H. Inmon, *'Building the Data Warehouse'*, Wiley dreamtech, 3<sup>rd</sup> Edition.
4. Mastering Data Mining – Michael J.A. Berry & Gordon S. Linoff (Wiley Pub.).
5. Data Warehousing (Pearson Ed.) – Sam Anahory & Dennis Murray.

**Activity 2: (Select clause, Arithmetic Operators)****Database: employee**

Create Following tables and insert tuples with suitable constraints

**EMPLOYEE**

EMPID	FIRSTNAME	LASTNAME	Hire_Date	ADDRESS	CITY
1001	George	Smith	11-May-06	83 first street	Paris
1002	Mary	Jones	25-Feb-08	842 Vine Ave	Losantiville
1012	Sam	Tones	12-Sep-05	33 Elm St.	Paris
1015	Peter	Thompson	19-Dec-06	11 Red Road	Paris
1016	Sarath	Sharma	22-Aug-07	440 MG Road	New Delhi
1020	Monika	Gupta	07-Jun-08	9 Bandra	Mumbai

**EMPSALARY**

EMPID	SALARY	BENEFITS	DESIGNATION
1001	10000	3000	Manager
1002	8000	1200	Salesman
1012	20000	5000	Director
1015	6500	1300	Clerk
1016	6000	1000	Clerk
1020	8000	1200	Salesman

**Write queries for the following**

1. To display FIRSTNAME, LASTNAME, ADDRESS AND CITY of all employees living in PARIS.
2. To display the content of employee table in descending order of FIRSTNAME
3. Select FIRSTNAME and SALARY of salesman
4. To display the FIRSTNAME, LASTNAME, AND TOTAL SALARY of all employees from the table EMPLOYEE and EMPSALARY. Where TOTAL SALARY is calculated as SALARY+BENEFITS
5. List the Names of employees, who are more than 1 year old in the organization
6. Count number of distinct DESIGNATION from EMPSALARY
7. List the employees whose names have exactly 6 characters
8. Add new column PHONE\_NO to EMPLOYEE and update the records
9. List employee names, who have joined before 15-Jun-08 and after 16-Jun-07
10. Generate Salary slip with Name, Salary, Benefits, HRA-50%, DA-30%, PF-12%, Calculate gross. Order the result in descending order of the gross.



### Activity 3: (Logical, Relational Operators)

#### Database: Library

Create Following tables and insert tuples with suitable constraints

#### Table: Books

Book_Id	Book_name	Author_Name	Publishers	Price	Type	Quantity
C0001	The Klone and I	Lata Kappor	EPP	355	Novel	5
F0001	The Tears	William Hopkins	First Publ	650	Fiction	20
T0001	My First C++	Brain & Brooke	ERP	350	Text	10
T0002	C++ Brainworks	A.W.Rossaine	TDH	350	Text	15
F0002	Thunderbolts	Ana Roberts	First Publ.	750	Fiction	50

#### Table : Issued

Book Id	Quantity Issued
T0001	4
C0001	5
F0001	2
T0002	5
F0002	8

#### Write queries for the following

- To show Book name, Author name and price of books of **First Publ.** publisher
- Display Book id, Book name and publisher of books having quantity more than 8 and price less than 500
- Select Book id, book name, author name of books which is published by other than ERP publishers and price between 300 to 700
- Generate a Bill with Book\_id, Book\_name, Publisher, Price, Quantity, 4% of VAT →Total”
- Display book details with book id's C0001, F0001, T0002, F0002 (Hint: use IN operator)
- Display Book list other than, type Novel and Fiction
- Display book details with author name starts with letter 'A'
- Display book details with author name starts with letter 'T' and ends with 'S'
- Select BookId, BookName, Author Name , Quantity Issued where Books.BooksId = Issued.BookId
- List the book\_name, Author\_name, Price. In ascending order of Book\_name and then on descending order of price

### Activity 4: (Date Functions)

#### Database : Lab

Create Following table and insert tuples with suitable constraints

#### Table : Equipment Details

No	ItemName	Costperitem	Quantity	Dateofpurchase	Warranty	Operational
1	Computer	30000	9	21/5/07	2	7
2	Printer	5000	3	21/5/06	4	2
3	Scanner	8000	1	29/8/08	3	1
4	Camera	7000	2	13/6/05	1	2
5	UPS	15000	5	21/5/08	1	4
6	Hub	8000	1	31/10/08	2	1
7	Plotter	25000	2	11/1/09	2	2



(Use date functions and aggregate functions)

1. To select the ItemName purchase after 31/10/07
2. Extend the warranty of each item by 6 months
3. Display Itemname , Dateof purchase and number of months between purchase date and present date
4. To list the ItemName in ascending order of the date of purchase where quantity is more than 3.
5. To count the number, average of costperitem of items purchased before 1/1/08
6. To display the minimum warranty , maximum warrenty period
7. To Display the day of the date , month , year of purchase in characters
8. To round of the warranty period to month and year format.
9. To display the next Sunday from the date '07-JUN-96'
10. To list the ItemName, which are within the warranty period till present date

#### Activity 5: ( Numeric, character functions)

##### Use Functions for the following

1. Find the mod of 165,16
2. Find Square Root of 5000
3. Truncate the value 128.3285 to 2 and -1 decimal places
4. Round the value 92.7683 to 2 and -1 decimal places
5. Convert the string '\_Department' to uppercase and lowercase
6. Display your address convert the first character of each word to uppercase and rest are in lowercase
7. Combine your first name and last name under the title Full name
8. A) Take a string length maximum of 15 display your name to the left. The remaining space should be filled with '\_'
9. Take a string length maximum of 20 display your name to the right. The remaining space should be filled with '#'
10. Find the length of the string '\_JSS College, Mysore'
11. Display substring '\_BASE' from '\_DATABASE'
12. Display the position of the first occurrence of character '\_o' in Position and Length
13. Replace string Database with Datatype
14. Display the ASCII value of ' ' (Space)
15. Display the Character equivalent of 42

#### Activity : 6 (set operators)

##### Database : subject

Create Following table and insert tuples with suitable constraints

##### Table - Physics

Regno	Name	Year	Combination
AJ00325	Ashwin	First	PCM
AJ00225	Swaroop	Second	PMCs
AJ00385	Sarika	Third	PME
AJ00388	Hamsa	First	PMCs

##### Table – Computer Science

Regno	Name	Year	Combination
AJ00225	Swaroop	Second	PMCs
AJ00296	Tajas	Second	BCA
AJ00112	Geetha	First	BCA
AJ00388	Hamsa	First	PMCs

1. Select all students from physics and Computer Science
2. Select student common in physics and Computer Science
3. Display all student details those are studying in second year

4. Display student those who are studying both physics and computer science in second year
5. Display the students studying only physics
6. Display the students studying only Computer Science
7. select all student having PMCs combination
8. select all student having BCA combination
9. select all student studying in Third year
10. Rename table Computer Science to CS

#### Activity 7: (views)

#### Database: Railway Reservation System

Create Following table and insert tuples with suitable constraints

**Table: Train Details**

Train_no	Train_name	Start_place	Destination
RJD16	Rajdhani Express	Bangalore	Mumbai
UDE04	Udhyan Express	Chennai	Hyderabad
KKE55	Karnataka Express	Bangalore	Chennai
CSE3	Shivaji Express	Coimbatore	Bangalore
JNS8	Janashatabdi	Bangalore	Salem

**Table : Availability**

Train_no	Class	Start_Place	Destination	No_of_s eats
RJD16	Sleeper Class	Banglore	Mumbai	15
UDE04	First Class	Chennai	Hyderabad	22
KKE55	First Class AC	Bangalore	Chennai	15
CSE3	Second Class	Coimbatore	Bangalore	8
JNS8	Sleeper Class	Bangalore	Salem	18

1. Create view **sleeper** to display train no, start place, destination which have sleeper class and perform the following
  - a. insert new record
  - b. update destination='Manglore' where train no='RJD16'
  - c. delete a record which have train no='KKE55'
2. Create view **details** to display train no, train name, class
3. Create view **total\_seats** to display train number, start place, use count function to no of seats , group by start place and perform the following
  - a. insert new record
  - b. update start place='Hubli' where train no='JNS8'
  - c. delete last row of the view
4. Rename view sleeper to class
5. Delete view details



**Activity 8 (group by, having clause)****Database: Bank system**

Create Following table and insert tuples with suitable constraints

**Table: Account**

Account_no	Cust_Name	Branch_ID
AE0012856	Reena	SB002
AE1185698	Akhil	SB001
AE1203996	Daniel	SB004
AE1225889	Roy	SB002
AE8532166	Sowparnika	SB003
AE8552266	Anil	SB003
AE1003996	Saathwik	SB004
AE1100996	Swarna	SB002

**Table: Branch**

Branch_ID	Branch_Name	Branch_City
SB001	Malleswaram	Bangalore
SB002	MG Road	Bangalroe
SB003	MG Road	Mysore
SB004	Jainagar	Mysore

**Table: Depositor**

Account_no	Branch_Id	Balance
AE0012856	SB002	12000
AE1203996	SB004	58900
AE8532166	SB003	40000
AE1225889	SB002	150000

**Table: Loan**

Account_no	Branch_Id	Balance
AE1185698	SB001	102000
AE8552266	SB003	40000
AE1003996	SB004	15000
AE1100996	SB002	100000

1. Display Total Number of accounts present in each branch
2. Display Total Loan amount in each branch
3. Display Total deposited amount in each branch by descending order
4. Display max , min loan amount present in each city.
5. Display average amount deposited in each branch , each city
6. Display maximum of loan amount in each branch where balance is more than 25000
7. Display Total Number of accounts present in each city
8. Display all customer details in ascending order of brachid
9. Update Balance to 26000 where accno=AE1003996
10. Display Customer Names with there branch Name



**Activity 9: (Nested Query)**

Database : Book Dealer Table : Author

Author_id	A_Name	City	Country
EE10258	Sudaker Samuel	Bangalore	India
PE96358	Natarasu	Kolkata	India
LT45879	Tenenbaum	Toranto	Canada
PW56325	Sumitabha Das	Kolkata	India
KA56983	Galvin	Loss Angles	USA

**Table : Publisher**

Publisher_ID	Name	City	Country
21	TMH	Delhi	India
22	PHI	Kolkata	India
23	PEARSON	Mumbai	India
24	EEE	Singapore	Singapore
25	LPE	Banglore	India

**Table : Category**

Category_ID	Description
31	CSE
32	ISE
33	E&E
34	E&C

**Table : Catalog**

Book_id	Title	Author_ID	Publisher_ID	Category_ID	Year	Price
41	OS	PW56325	23	31	1998	275
42	CN	LT45879	22	32	2000	475
43	EC	EE10258	23	34	2002	380
44	SE	LT45879	24	32	2002	480
45	DBMS	PW56325	21	31	1999	650
46	EC	PE96358	25	33	2004	250

**Table : Order Details**

Order_no	Book_id	Qunatity
51	41	15
52	45	50
53	42	20
54	44	10
55	43	35
56	46	25

1. List the other publications located where PEARSON publication is located
2. List the book with maximum price
3. Display book details having quantity=25

4. Display the author details those who are publishing with PHI publisher
5. Display the Books details published for '\_CSE' category
6. Display the author details those who publish in Indian publications
7. Display book details those who have orders less than 20
8. Display all the books published under '\_CSE' & '\_ISE' category
9. Delete book details of order\_no=56
10. Alter table order details add new column order\_date & update the columns

**Activity 10:**

**Database: Mobile Shoppe (Using Joins)**

Create Following table and insert tuples with suitable constraints

**Table: Mobile Handsets**

Custno	Cname	Model	Handsetno	Amount
1010	Sita	Nokia	RM560	9500
1020	Ritesh	Samsung	SR12365	3200
1030	Reena	Nokia	RM236	1200
1040	Karan	Sony Ericsson	SE12334	8200
1050	Anu	LG	LT1255	2000

**Table: Connection Details**

Custno	Cname	Connection	ActivationDate	Validity	Amount	Phoneno
1010	Seetha	Airtel	11-May-09	365	650	9985632551
1020	Ritesh	Vodafone	10-Sep-08	180	400	9923033652
1030	Reena	Tata Docomo	12-Aug-09	100	150	9036225636
1040	Karan	Airtel	12-Jan-09	90	200	9896325415
1060	Anoop	Reliance	12-Sep-09	365	220	9342653326

1. Display Customer Name, Handset Model, connection, Validity of the connection
2. Display All Mobile Handsets along with Connection and Activation date
3. Display all Connection Details along with handset model and Handset purchase date
4. Display The Handset Details which is having highest amount than Samsung handset
5. Display Customer Name, Handset Model, connection, Validity which is having validity of one year
6. Display Customer number, customer name, connection and activation date of connections activated between 01-Jan-08 to 30-Dec-09
7. Display Customer number, Model, Connection which is having '\_Airtel' Connection
8. Display Customer number, Model, Connection which is having model is Nokia and connection is Airtel
9. Select Customer number, customer name and model which is having price more than model Samsung
10. Perform Cartesian join on Mobile Handsets and Connection details table

**University of Mysore**

**Bachelor of Business Management**

**English- IV**

**Poetry:**

1. "Character of a Happy Life" – Henry Wotton
2. "The Dead Fox Hunter"- Robert Graves
3. "Refugee Blues" – W. H. Auden
4. "Bazaars of Hyderabad" – Sarojini Naidu
5. "Money Madness" – D. H. Lawrence

**Short Stories:**

1. "The Fly" – Katherine Mansfield
2. "Moonlight" (Clair de Lune) – Guy de Maupassant

**Essays:**

1. "Science and Tradition" – Bertrand Russell
2. "Stay Hungry, Stay Foolish" – Steve Jobs





# **Bachelor of Computer Applications**

## **SEMESTER V**

1. Constitution of India\*
2. Environmental Studies\*
3. Java
4. Operation Research
5. Computer Systems & Network Security
6. System Software

## **5BCA5: COMPUTER SYSTEM SECURITY [ELECTIVE I]**

### **UNIT – I**

#### **Security polices, Standards & Guideline**

Different Types of polices standards & guidelines

Common Elements

Policy Standards & Guide development

Policy Creation

Regulatory Considerations

#### **Security Attacks, Services & Mechanisms**

Attacks Services & Mechanisms

Security Attacks

Security Services

A model for internet work security

### **UNIT-2**

#### **Conventional Encryption**

Conventional Encryption Techniques

Steganography

Classical Encryption techniques

#### **Intruders, Viruses & Worms**

Intruders

Viruses & Related Threats

### **UNIT-3**

#### **Firewalls**

Hardware Firewalls

Software Firewalls,

Advantages and Disadvantages of Firewalls

Hardware Firewalls Design Principles

Trusted Systems

Applications of Software Firewalls

Applications of Hardware Firewalls

#### **References Books**

1. Security Architecture Design, Deployment & Operations by Cistopher M king, Curtis E. Dalton, T.Ertem Osmanoglu
2. Cryptography & Network Security Principles & Practice (Second Edition)

## **5BCA1: Constitution of India**

- I. Meaning of the term —“Constitution”—Its importance-making of the Indian Constitution 1946-49-Dr.Ambedkar’s contribution-Preamble-Method of amending the constitution and its limitation-An over view of constitutional developments.
- II. The democratic institutions created by the Constitution-bicameral system of legislature and cabinet form of government at the Center and States-Role and Position of President and Prime Minister-Adult Franchise System-Election Commission, Panchayat Raj System.
- III. Fundamental Rights and Duties- Their content and significance-Special, rights created in the constitution for Dalits, Backwards, Women, Children and the Religious and Linguistic Minorities.
- IV. Enforcing rights through writs: Certiorari, Mandamus, Quo Warranto and Habeas Corpus-public interest Litigation-Directive Principles of State Policy-The need to balance Fundamental Rights with Directive Principles-Constitution and sustainable development.
- V. Doctrine of Separation of Powers-Legislative, Executive and Judicial and their composition and functioning in India-Features of Indian Federalism-Center State relations. Measures for national Unit-Public Service Commissions.

### **References Books:**

1. J.C. Johari, The constitution of India- A Politico-Legal Study-Sterling Publications, Pvt.Ltd.New Delhi.
2. J.N.Pandey:Constitutional Law of India, Allahabad, Central Law Agency, 2002.
3. Granville Austin:The Indian Constitution-Corner Stone of a Nation-Oxford, NewDelhi.2000.



## **5BCA2: Environmental Studies**

### **I. The Multidisciplinary nature of Environmental Resources.**

Definition, Scope and Importance, Need for Public awareness.

### **II. Natural Resources and associated problems.**

a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining dams and their effects on forests and tribal people.

b) Water Resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food Resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case study.

e) Energy Resources: Growing energy needs, renewable and non-renewable energy resources use of alternate energy sources. Case studies.

f) Land Resources: land as a resource, land degradation, man induced landslides, soil erosion and desertification.

### **III. Ecosystems: concept, structure and function, producers, consumers, decomposers, Energy flow , Ecological succession, Food chains, food webs and ecological pyramids.**

Introduction, types , characteristics, structure and function of following ecosystems:

a) Forest Ecosystem

b) Grassland Ecosystem

c) Desert Ecosystem

d) Aquatic Ecosystems(pond, streams, lakes,,rivers,oceans,estuaries)

### **IV. Biodiversity and its conservation: Introduction, Definition:genetic, species and ecosystem diversity, Biogeographical classification of India, value of Biodiversity, Biodiversity at Global, National and local levels. India as a mega-diversity nation. Hot-spots of biodiversity. Threat to biodiversity, Endangered and endemic species of India. Conservation of bio-diversity.**

### **V. Environmental Pollution: Definition, causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards.**

### **VI. Social Issues and the Environment: From Unsustainable to sustainable development, Urban problems related to energy, Water conservation, rain water harvesting , watershed management, Resettlement and rehabilitation of people; its problems and concerns. Case studies.**

Environmental ethics:Issues and possible solutions.

Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.

Wasteland reclamation, Consumerism and waste products, Environment protection Act, Air(prevention and control of pollution) Act, Water (Prevention and control of pollution)Act, Wildlife protection Act, Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

### **VII. Human population and Environment: Population growth, variation among nations. Population explosion-Family Welfare Programme.Environment and human health. Human Rights. Value Education.HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health. Case studies.**

### **VIII. Field work: visit to a local area to document environmental assets-river/forest/grassland/hill/mountain.**

Visit to locate polluted site, study of common plants, insects, birds, study of simple ecosystems.

### **References:**

1. Agarwal, K.C.2001 Environmental Biology, Nidi publications Ltd.Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt.Ltd.,Ahmedabad-380013
3. Brunner R.c>,1989,Hazardous Waste Incineration,k McGraw Hill Inc.480 p.
4. Trivedi R.K. and P.K.Goel, Introduction to Air pollution. Techno-science publications.
5. Wagner K.D.1998. Environmental Management, W.B.Saunders Co.Philadelphia, USA.

## 5BCA3 - JAVA

### UNIT-1

Fundamentals of Object-Oriented Programming.

Introduction to Java : Origin and features of Java. Java Program Structure, Java Tokens, Java statements, Java Virtual machine, Command Line Parameters, Java Variables and Data Types, Operators, Decision Making, Branching and looping statements.

Classes, Objects and Methods used in Java: Class fundamentals, Methods, Constructors, Overloading, Inheritance, Interfaces, One and two dimensional arrays, Vectors, Strings, Wrapper Classes.

### UNIT-2

Java Packages: API packages, system packages, naming conventions, creating and accessing a package, adding a class to a package, hiding classes.

Multi-threads Programming: Java thread Model, Main Thread, creating a Thread, Creating Multiple Threads, Extending the thread class, Stopping and blocking a thread, Life cycle of a thread, Managing Errors and Exceptions.

Applet Programming: Introduction, how applet differ from application, Applet life cycle, Applet tag, passing parameters to applet. Abstract Windows Toolkit: Components, Container, Panel, Label, Button, Checkbox, CheckboxGroup, Choice, List, TextField, TextArea, Scrollbars.

### UNIT-3

Graphics Programming: The Graphics class, Lines and Rectangles, Circles and Ellipses, Drawing Arcs, Drawing Polygons, Line Graphs, Using Control Loops in Applets.

Managing Input/output Files in Java: Stream Classes, Byte Stream Classes, Character Stream Classes, Creation of Files, Reading/Writing characters, Reading/Writing Bytes, Handling Primitive Data Types, Concatenating and Buffering Files, Random Access Files.

Networking: InetAddress, TCP/IP Client Sockets, TCP/IP Server Sockets, URL, URLConnection.

JDBC Objects: JDBC Driver Types, Loading the JDBC Driver, Connect to the DBMS, Create and Execute a Sql Statement, Process Data Returned by the DBMS, Database Connection, Statement Objects.

### Reference Books:

1. Programming with Java – A PRIMER by E.Balagurusamy, Tata McGraw-Hill 3<sup>rd</sup> Edition
2. The Complete Reference - Java-2 by Patrick Naughton and Herbert Schildt Published by Tata McGraw-Hill India.
3. The Complete Reference – J2EE by Jim Keogh, published by Tata McGraw-Hill.



## 5BCA4 - OPERATION RESEARCH

### Unit I:

Definition of the term Operation Research – Nature , Management Application , Modeling , Principles of modeling , features , Different Phases , scope , Advantages and Limitations of O.R. General method for solving O.R models and Role o O.R in decision making. Some important definitions – solutions to LPP, feasible solution, basic solutions, Basic feasible solution, Optimum basic feasible solution, unbounded solution. Assumptions in LPP, Limitations of LPP, Applications of LPP and advantages of LPP. Standard Linear Programming – Formulation of a Linear Programming Solving L.P.P. by Graphical Method Problem. And Simplex Method.

### Unit II:

Artificial Variable Technique – two phase method and Big M method,  
Duality – Meaning, definitions of primal problem , General rules for converting any primal problem into its dual . Characteristics of Dual problem, Advantages of Duality, Dual formulation procedure and Problems to obtain the dual of LPP. Fundamental Duality theorems, Primal and Dual correspondence.

### Unit III:

Transportation Problems – Method of finding initial basic feasible solution to Transportation problem-North West Corner, Least Cost Method and Vogel's Method.  
Method of finding initial basic feasible solution to Assignment Problem using Hungarian Method.  
Sequencing Problems – Definitions, terminology and notations, Principle assumptions, Processing \_n' jobs through two machines  
Travelling Salesman (Routing) Problems - Formulations of TSP as an assignment problem

### Reference Books:

1. -Operation Research”, by S.D.Sharma Kedarnath Ramnath Publishers 16th edition 2010.



## **5BCA6: SYSTEM SOFTWARE [ELECTIVE II]**

### **UNIT I**

#### **Introduction**

Review of programming languages, System software and machine architecture – Hypothetical Machine architecture - Data and instruction formats - addressing modes - instruction sets

#### **Assemblers**

Elements of assembly language, Basic assembler functions - Assembler algorithm and data structures - One pass and two pass assemblers – Detailed flowchart.

### **UNIT-2**

#### **Loader and Linker**

Basic loader functions – Types of loader-Compile and go, General loading scheme, Design of an Absolute Loader, Relocation , Program Linking , Self relocating programs, Linkage Editors, Linking for Overlays

### **UNIT-3**

#### **MACRO PROCESSORS and Editor**

Basic macro processor functions - Macro Definition and Expansion – Macro Processor Algorithm and data structures - Machine-independent macro processor features , Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-Implementation example

Text editors - Overview of the Editing Process - User Interface – Editor Structure. - Interactive debugging systems

### **REFERENCES**

1. D. M. Dhamdhere, –Systems Programming and Operating Systems”, Second Revised Edition, Tata McGraw-Hill, 1999.
2. John J. Donovan –Systems Programming”, Tata McGraw-Hill Edition, 1972.
3. Leland L. Beck, –System Software – An Introduction to Systems Programming”, 3rd Edition, Pearson Education Asia, 2000.



# **Bachelor of Computer Applications**

## **SEMESTER VI**

1. Project Work