

# Bachelor of Computer Application

## Semester – Ist

Sr.No.	Code	Name of Subject	L	P	U
1	BCA 111	English & Business Communication	4	0	4
2	BCA 112	Maths – I	4	0	4
3	BCA 113	Elements of Electronics	3	2	4
4	BCA 114	Fundamentals of Computer	3	2	4
5	BCA 115	Office Automation	1	6	4

## Semester – IInd

Sr.No.	Code	Name of Subject	L	P	U
1	BCA 121	Principles of Management	4	0	4
2	BCA 122	Maths – II	4	0	4
3	BCA 123	Digital Electronics	3	2	4
4	BCA 124	Programming Through C	3	2	4
5	BCA 125	Computer Organization & Architecture	4	0	4

## Semester – IIIrd

Sr.No.	Code	Name of Subject	L	P	U
1	BCA 231	Object Oriented Programming with C++	3	2	4
2	BCA 232	Data Base Management System	4	0	4
3	BCA 233	Principles of Programming Language	4	0	4
4	BCA 234	Financial & Cost Accounting	4	0	4
5	BCA 235	Data Structure & Algorithm	3	2	4

**Semester – IVth**

<b>Sr.No.</b>	<b>Code</b>	<b>Name of Subject</b>	<b>L</b>	<b>P</b>	<b>U</b>
1	BCA 241	Internet – technology	4	0	4
2	BCA 242	Visual Basic	3	2	4
3	BCA 243	Microprocessor 8085	3	2	4
4	BCA 244	Operating System	4	0	4

**Semester – Vth**

<b>Sr.No.</b>	<b>Code</b>	<b>Name of Subject</b>	<b>L</b>	<b>P</b>	<b>U</b>
1	BCA 351	Theory of Computation	4	0	4
2	BCA 352	Networking Essentials	4	0	4
3	BCA 353	System Analysis & Design	3	2	4
4	BCA 354	E-Commerce	4	0	4

**Semester – VIth**

<b>Sr.No.</b>	<b>Code</b>	<b>Name of Subject</b>	<b>L</b>	<b>P</b>	<b>U</b>
1	BCA 361	Software Engineering	4	0	4
2	BCA 362	JAVA	3	2	4
3	BCA 363	Oracle	3	2	4
		Project/Seminar			

# Detailed Syllabus

## BCA 1<sup>st</sup> Sem.

### English & Business Communication

#### Grammars:

- A. Review of English grammar
  - 1. Use of articles
  - 2. Use of models
  - 3. The conjunction
  - 4. Tenses (Present, Past, Future and its further forms)
  - 5. Active/Passive voice
  - 6. Reported speech
  - 7. Subject – Verb concur

#### 1. **Communication Skills**

##### A. **Reading**

- 1. Technique of reading with special emphasis on pronunciation
- 2. Division of passage into different parts according to contents, Thoughts, keeping in view the comprehension questions given beneath the passage.
- 3. Practice of answering comprehensive questions.

##### B. **Writing**

Letter writing

- 1. Types of letters
- 2. Writing of different types of letters (special emphasis to formal and business letters)

##### C. **Essay writing/Paragraph writing**

- 1. Practice of topics/Hit based essays
- 2. Practice of writing essay on the given topic to augment the Emanative power and knowledge.

##### D. **Précis writing:**

##### E. **Notice writing/Telegram writing**

- 1. Contents of the notice
- 2. Practice of writing different types of notice.

##### F. **English language lab -**

- 1. Holding seminars and organizing workshops on the language.
- 2. Presentation and group

### **Maths-1 (Discrete Mathematics)**

Sets and propositions, Propositions, permutations, combinations, relations and functions, recurrence relations and recursive algorithms, graphs and rings, Boolean algebras.

### **Elements of Electronics**

Binary logic gates; logic circuits; Boolean algebra and K-map simplification; number systems and codes; arithmetic logic units; flip-flops; registers and counters; introduction to microprocessors; architecture; instruction set and programming; memory and I/O interfacing; examples of system design.

### **Fundamentals of Computer**

**Introduction:** Classification of computer and generation, Basic architecture of computer and its building blocks, Input devices, Computer memories.

**Number System:** Binary, Octal, Decimal, and Hexadecimal representation of characters : ASCII and EBDIC codes, Binary arithmetic and logic circuit.

**Classification of Computer language:** Machine, Assembly and High level language, Brief idea of operating system, Assembler, Compiler and interpreter.

**Fundamentals of computer programming:** Problem solving through computer algorithms and flow chart level of programming.

**Operating system:** Introduction to O.S., Types of operating system, Multiprogramming, Timesharing, Batch, Real time and UNIX

**Internet:** Introduction to Internet, Components, Services and working on interne, **introduction to protocols, tools.**

Reference Books:

R1 – Computer fundamental – P.K. Sinha

R2-Fundamental of computer and IT-D.P. Sharma, Amit Choudhary

### **Office Automation**

Introduction, Operating Computer system, M.S.Office, Internet (Basic applications and use of Internet), Network, DOS, Windows 98, 2000, XP

# BCA II<sup>nd</sup> Sem.

## Principles of Management

1. Nature and importance of management
2. Principal of management
3. Planning
4. Organizing
5. Staffing
6. Directing Supervision
7. Count rolling
8. Delegation of authority

### **Reff. Books:**

Tulsian P.C. Business organization and management

## Maths – II (Calculus)

Real numbers, intervals functions, modulus function, trigonometric functions, polynomial functions, limits continuity, derivatives, and applications of derivatives, integration, application of integrations

## Digital Electronics

Binary logic gates; logic circuits; Boolean algebra and K-map simplification; number systems and codes; arithmetic logic units;

Flip-flops; registers and counters; introduction to microprocessors; architecture; instruction set and programming; memory and

I/O interfacing; examples of system design.

Reference Books:

Digital Principle & Applications

Malvino Leach

Digital Electronics

T.C. Barioo

Digital Electronics Practical Using IC'S

R.P.Jain

## Programming Through C

1. **Introduction:**
  - a. Scope of C Language
  - b. Distinction and similarities with other HLLs
  - c. Special features and Application areas
2. **Elements of C**
  - a. Character Set
  - b. Key Words
  - c. Data Types
  - d. Constants and Variables
  - e. Operators unary, binary, ternary
  - f. Operator precedence
3. **Console Input-Output**
  - a. Types of I-O
  - b. Console I-O
  - c. Unformatted console I-O: getchar (), Gets(), Puts(),
  - d. Formatted I-O : Scanf(), Printf()
4. **Control Flow:**
  - a. Statements and blocks
  - b. If
  - c. Switch
  - d. Loops: For, While, Do-While
  - e. Go to and labels
5. **Arrays:**
  - a. Basic Concepts
  - b. Memory Representation
  - c. One Dimensional Arrays
  - d. Two Dimensional Arrays
  - e. Three Dimensional Arrays
6. **Functions:**
  - a. Basic concept
  - b. Declaration and prototype
  - c. Calling
  - d. Arguments
  - e. Scope rules
  - f. Recursion
  - g Storage classes types
  - h. Library of functions math, string, system

7. **Pointers:**
  - a. Basic Concepts
  - b. &, \* Operator
  - c. Pointer expression: assignment, arithmetic, comparison
  - d. Dynamic Memory Allocation
  - e. Pointer V/S Array
  - f. Array of Pointer
  - g. Pointer V/S Function
8. **Structure, Union and Enumerated Data Types**
  - a. Basic Concepts
  - b. Declarations and Memory Map
  - c. Elements of Structures
  - d. Structure V/S Function
  - d. Structure V/S Array
  - e. Union
  - f. Enumerated data Types: Type Def, Enum
  - g. Self-referential structures
9. **File Handling:**
  - a. Types of Files
  - b. File Organization
  - c. Opening, Reading, Writing, Closing
  - d. Text and binary file

## **Practical**

1. Problem based on arithmetic expression, fixed mode arithmetic
2. Problem based on conditional statements and control structures
3. Problem based on arrays (1-D,2-D), function, pointer, files
4. Problem based on string and character manipulation

### **Reference Books:**

- |                       |                   |
|-----------------------|-------------------|
| 1. C Programming      | Stephen Kochan    |
| 2. Programming with C | Schaum's Series   |
| 3. C Programming      | V. Balaguru Swami |
| 4. Let Us C           | Yashwant Kanetkar |

## Computer Organization & Architecture

1. **Over View of Computer Organization**
  - a. Evolution of Computer
  - b. Von Neumann Architecture
  - c. Computer Gene ratios
  - d. Microprocessor and microcomputers design methodology
2. **Register and Micro-Operations:**
  - a. Register
  - b. Logic micro operations
  - c. Shift micro operations
  - d. Control functions
3. **Basic Computer Organization:**
  - a. Instruction codes
  - b. Computer Instructions
  - c. Timing and Control
  - d. Execution of Instructions
  - e. I/O and interrupt
4. **Control Logic:**
  - a. Introduction
  - b. Hardwired control
  - c. Micro programmed control units
  - d. Bit-sliced micro programming unit
  - e. Concept of nano programming
5. **Central processing organization:**
  - a. Processor Bus Organization
  - b. ALU: Simple and floating point
  - c. Stack organization
  - d. Instruction formats and designs
  - e. Addressing Schemes
  - f. Data Transfer and manipulation
  - g. Program control
6. **Arithmetic Processor Organization:**
  - a. Comparison and subtraction of unsigned binary numbers
  - b. Addition and subtraction Algorithm
  - c. Multiplication and division Algorithms
  - d. Processor configuration
  - e. Floating point operations
7. **Input/Output organization:**
  - a. Peripheral devices
  - b. I/O processors
  - c. DMA
  - d. Interrupt
  - e. Data communication
  - f. Memory management unit

## Reference Books:

- |    |                                  |                     |
|----|----------------------------------|---------------------|
| 1. | Computer Organization and Design | Pal Choudhary (PHI) |
| 2. | Structure Computers Organization | Tanenbaun (PHI)     |
| 3. | Computer System Architecture     | Morris Mano         |

# BCA III<sup>rd</sup> Sem.

## Object Oriented Programming with C++

### 1. Concept of OOP and POP.

### 2. Introduction of C++.

### 3. Elements of C++

- Character Set
- Key Words
- Data Types
- Constants and Variables
- Operators unary, binary, ternary
- Operator precedence

### 4. Control Flow:

- Statements and blocks
- If
- Switch
- Loops: For, While, Do-While

### 5. Arrays:

- Basic Concepts
- Memory Representation
- One Dimensional Array
- Two Dimensional Array
- Three Dimensional Array

### 6. Functions:

- Basic concept
- Declaration and prototype
- Calling
- Arguments

### 7. Pointers:

- Basic Concepts
- &, \* Operator

### 8. Structure, Union and Enumerated Data Types

Basic Concepts, reference operator, structure with array

### 9. File Handling:

- Types of Files
- File Organization
- Opening, Reading, Writing, Closing
- Text and binary file

**10. Class:** Declaration, Definition, use of scope resolution operator

### **Data Base Management System**

Need, purpose and goal of DBMS, Three schema architecture, ER Diagram, data models- Relational, Network, Hierarchical and Object Oriented.

**Data Base Design:** Conceptual data base design, Theory of Normalization

Primitive and Composite data types, concept of physical and logical databases, data abstraction and data independence, data aggregation, Relational Calculus.

**SQL:** DDL and DML, Relational Algebra.

Application Development using SQL: Host Language interface, embedded SQL programming, Stored procedures and triggers and views, Constraints assertions.

Internal of RDBMS: Physical data organization in sequential, indexed random and hashed files. Inverted and multilist structures, B trees, B+ trees, Query Optimization, Join Algorithm, Statistics and Cost Base optimization.

Transaction Processing, concurrency control, and recovery management. Transaction model properties and state serialisability . Lock base protocols, two phase locking.

#### **Reference Books:**

1. H.f. Korth and Silberschatz: *Database Systems Concepts*, McGraw Hill
2. Almasri and S.B. Navathe: *Fundamentals of Database Systems*,
3. C.J. Date: *Data Base Design*, Addison Wesley
4. Hansen and Hansen : *DBM and Design*, PHI

## **Principles of Programming Language**

Importance of programming languages, brief history and features, attributes of good programming language. Introduction to language translator, binding and binding time.

Language translation issues: Formal translation models-BNF grammars, regular grammar, FSA.

Elementary and structured data types, their specifications, representations, and implementation of numbers, vectors and arrays, records, character string, variable size data structure, sets, input output files. Type checking and type conversion, type equivalence.

Encapsulation and information hiding, sub programs.

Implicit and explicit sequence control. Subprogram sequence control. Recursive sub programs, exception and exception handlers. Co-routines and scheduled subprograms, task and concurrent exception.

Name and reference environments, static dynamic and block structure. Local data and local referencing environments.

Dynamic and static scope of shared data. Block structure, parameters and their transmission. Task and shared data storage requirement for major runtime elements. Program and system controlled storage management. Static and stack based storage management. Fixed size and variable size heap storage management.

### **Reference Books:**

1. Ghezzi: *Programming Language Concepts*, Addison Wesley
2. Pratt, Zelkowitz: *Programming Language Design and Implementation* PHI.
3. Sebasta: *Concept of Programming Language*, Addison Wesley
4. Sethi Ravi: *Programming language Concepts & Constructs*, Addison Wesley.

## **Financial & Cost Accounting**

1. Financial accounting  
Introduction, Basic accounting concepts, Double entry accounting, The accounting trial, Financial statements and their nature, The accounting equation, journal, types of secondary books, posting in ledger.
2. Bank reconciliation statement introduction, Purpose, cause of difference illustrations.

3. Trial balance and final accounts, Introduction, preparation of trial balance errors and their rectification, final accounts.

### **Data Structure & Algorithm**

1. Elementary and structure data types. Control structure, complexity
2. Liner arrays: Traversing, inserting, and deleting.  
Sorting: Bubble sort, Quick Sort  
Searching: Linear search, binary search
3. Generalized link list: Traversing, searching inserting, deleting.
4. Stack: Array representation of stacks; polish notation, queues, recursion, and tower of Hanoi.
5. Non Liner structures: Trees, Graph and their traversals, binary trees, binary search trees, searching, inserting and deleting in binary search trees.
6. Sorting; Insertion sort, selection sort, merge sort, radix sort, hashing

# BCA IV<sup>th</sup> Sem.

## Internet – technology

### **Introduction:**

1. Concept of Internetworking
2. Elements of internetworking
3. Elements of multimedia supported network
4. Architecture of intranet
5. Resource requirement for intranet
6. Essential components of intranet

### **Active server pages (ASP)**

1. Introduction
2. How active server page work
3. Client side scripting versus server side scripting
4. A simple ASP example
5. Server side active x components
6. Session tracking and cookies
7. Accessing a database from an active server page

### **Web servers (PWS/IIS/A pache):**

1. Introduction
2. Microsoft personal web server overview
3. Publishing, preparing applications on PWS
4. Microsoft internet servers
5. Apache web server

### **Multimedia Networking**

1. Standard capability
2. Voice over net
3. Video over net
4. Multimedia supported LAN and WAN
5. Multimedia supported OS  
Internetworking support in various OS
6. Security issues

**Reference Books:**

- |                               |                   |
|-------------------------------|-------------------|
| 1. Internet and worldwide web | H.M. Deitel       |
| 2. An Internet application    | HALL              |
| 3. Internet security          | Farmer and venema |

**Visual Basic**

**UNIT 1: INTRODUCTION TO VISUAL BASIC**

User Interface, Controls, Drawing Objects on the form, Object naming conventions, Event Procedures

**UNIT 2: PROGRAMMING FUNDAMENTALS**

Variables, Data Types, Modules, Procedures, Control Structures, Control Array, Arrays, Functions

**UNIT 3: MENUS, MDI AND DATA FILES**

Menu Editor, Writing Code for Menu Controls, Dialog Boxes, MDI Application, Menus in MDI Applications, Adding Status Bar, toolbar, Data Files

**UNIT 4: ACCESSING DATABASES**

Creating Database, Accessing Databases, Data Control, DAO, ADO  
Adding bookmark, adding field, retrieve data from table using ADO data Control.

**UNIT 5: REPORT/API/HELP/SYSTEM FUNCTIONS**

Creating Reports – Connection, Commands, Windows API, IIS  
Application, Library Functions

**Reference Books:**

**Mastering in Visual Basic**

**Microprocessor 8085:-**

**1. 8086 Microprocessor**

1.1 Architecture

1.2 Instruction

1.3 Memory Organization: RAM, ROM

**2. Addressing modes:**

2.1 Data related

2.2 Branch related

**3. Instruction Set:**

3.1 Data transfer instruction

3.2 Branch instruction

3.3 Setting operation instruction

3.4 Processor control instruction

**4. Data transfer schemes:**

4.1 Direct memory access (DMA)

4.2 Interrupt driver data transfer

**5. Memory Interfacing:**

a. Introduction to ROM & RAM chips commonly used in pins

b. Memory maps

c. Address decoding

**6. Bus standard:**

a. RS-232

b. IEEE488 (GPIB)

**7. Brief introduction of other microprocessor**

a. Motorola 6800

b. Pentium IV

c. Power PC

d. SPARC

**Reference Books:**

**Microprocessor system**

**Lbu & Gibson**

**Computer Interfacing & applications**

**Venugopal, BPB**

## Operating System

**Introduction:** Need of Operating System, its evolution, types of operating systems, batch, multiprogramming, time-sharing systems, real time systems.

**Processes and processor management:** process concept, systems programmers view of processes, operating systems view of processes, Process scheduling, Schedulers, interprocess communication and synchronization, race condition, mutual exclusion, semaphores, monitors, messages. Deadlocks prevention, avoidance, detection and recovery.

**Memory Management:**

Contiguous allocation- partitioned memory allocation - fixed and variable partitioning, memory management with bit maps - swapping - relocation- protection and sharing.

Non-contiguous allocation -

Paging - principles, page allocation, segmentation.

Virtual memory concepts, address translation, management of virtual memory, page replacement policies, protection and sharing, working set model, hardware support.

**File management:** Command language user's view of file system, file system design, disk space management directory structure, shared files, file system performance. File servers, security, and protection mechanism.

**Input/Output Management:** Device drivers, disk scheduling.

Introduction to loaders, linkers and relocating loaders.

**Case study:** UNIX.

**References Books:**

1. A.Silberschatz and Peter B Galvin: *Operating System concepts*, Addison Wesley publishing Company.
2. Deitel H.M: *Operating Systems*, Addison Wesley.
3. Stalling W: *Operating Systems*, Prentice Hall.
4. Tanenbaum: *Operating System Concepts*, Prentice Hall.

# BCA V<sup>th</sup> Sem.

## Theory of Computation

Introduction to automata theory, languages, recursive definitions, regular expressions, finite automata, transition graphs and Kleen's theorem.

Non-determination, finite automata with output, regular languages, minimization of finite automata.

Chomsky classification of languages, regular grammars, context free grammars, simplification of context free grammars, Normal forms of CFG.

Push Down Automata Theory: push down automata and context free languages.

Turing hypothesis, Turing machine, Minsky's theorem, TM variation and encoding, computability and acceptability.

Elements of prepositional logic and predicate calculus.

### **Reference Books: -**

1. Aho, Hopcroft and Ullman, *Introduction to Automata Theory, Formal Languages and Computation*, Narosa
2. Cohen, *Introduction to Computer Theory*, Addison Wesley.
3. Papadimitriou, *Introduction to Theory of Computing*, Prentice Hall.
4. K.Krishnamurthy: *Theory of Computation*.



## **System Analysis and Design**

1. Introduction
2. The System Development Life Cycle and System Analyst.
3. System Analysis
4. System Design
5. System Implementation
6. Security and Recovery in System Development

## **E-Commerce**

1. Fundamentals of E-Commerce
2. Types of E-Commerce
3. Security of E-Commerce
4. Electronic Payment System

**Reference Books: Instant E-Commerce**

**Kate J.Chase. BPB**

# BCA VI<sup>th</sup> Sem.

## Software Engineering

**Introductory Concepts:** Historical perspective, System Definition, Software Life Cycle, Software Engineering paradigms.

**System analysis:** Feasibility study requirement analysis, Cost benefit analysis, Planning systems, Analysis tools and techniques.

**System Design:** design fundamentals, Modular Design, Data and procedural design, object oriented design.

**System Development:** Code documentation, Program design paradigms, Efficiency Consideration.

**Verification, Validation and Testing:** testing methods, Formal Program Verification, Testing Strategies.

**Software Maintenance:** Maintenance Characteristics, Maintainability, Maintenance tasks and side effects.

### **Reference Books:**

1. Pressman R.S: Software Engineering: A Practitioner approach, McGraw hill
2. Sommerville I: Software Engineering, Addison Wesley
3. Ghezzi C. Jazayeri M and Mandrioli: Fundamentals of software Engg. , PHI

# JAVA

## **1. An overview of java**

- 1.1 Brief history
- 1.2 Source file, keywords and identifiers
- 1.3 Compiling and running java programs

## **2. Introduction of OOP using Java**

- 2.1 Data types, variables, arrays
- 2.2 Operators and assignments
- 2.3 Control statements

## **3. Packages:**

- 3.1 Introduction, defining and CLASSPATH
- 3.2 Access protection
- 3.3 Importing Packages

## **4. Interfaces and Inner classes:**

- 4.1 Defining interfaces
- 4.2 Implementing interfaces
- 4.3 Variables in interfaces

## **5. Exception Handling:**

- 5.1 Exception handling fundamentals and types
- 5.2 Using try and catch
- 5.3 Threw, throws and finally

## **6. Multithreaded Programming:**

- 6.1 Java thread model, thread priorities
- 6.2 The main thread
- 6.3 Created thread

## **7. Introduction to Java Library:**

- 7.1 Reading, writing and console I/O
- 7.2 Integer, Float, String class

## **8. Applet and event handling**

- 8.1 Applet basic and architecture
- 8.2 Simple applet display method
- 8.3 Requesting replanting
- 8.4 Using the status window

## 8.5 The HTML and APPLET Tag

### **Reference Books:**

The complete reference Java 2

Herbert(TMh)

Core Java 2 Vol. I & II

Cay S. Horstmann & Gary Cornell,  
Java series

Java 2.0 programming

E.Balaguruswami, (TMh)

### **Oracle**

Oracle – An Introduction

1. Introduction, Features of Oracle, Object relational database management system, Introduction to SQL, Data Types, Introduction to DDL, Constraints DML commands, Operators in SQL.
2. PL/SQL  
Introduction to PL/SQL, Cursors, Triggers, Subprograms and packages.
3. Database operations and structures  
Database operation and structure, Introduction, Database startup and shutdown, Database structure and space management, Terms related to Oracle 8i server, Memory structure and processes of Oracle8i, Privileges and roles, Database backup and recovery, Database backups.

### **Reference Book:**

The Complete Reference in SQL

### **Project (Minor)**

Seminar