

**Course Name: BCA**

**Duration of Course: 3 Years**

**Eligibility:** 10+2 or equivalent

**Lateral Entry:** Candidate who has 10th with 3 year diploma with IT/CS is eligible for 3<sup>rd</sup> Semester of BCA  
Candidate who has 10 + 2 + 1 year Diploma in Computer Application is eligible for 3<sup>rd</sup> Semester of BCA

**Semester 1<sup>st</sup>**

CODE	SUBJECTS	CRED-ITS
BCA101	Computer Fundamentals and Windows Based Applications	4
BCA102	Communication Skills in English	4
BCA103	Programming in c	4
BCA104	Data Structure	4
BCA105	C Programming Lab	2
BCA106	Windows based Application lab	2

**Semester 3<sup>rd</sup>**

CODE	SUBJECTS	CRED-ITS
BCA301	Data Communication	4
BCA302	Operating System	4
BCA303	Computer Graphics	4
BCA304	Client Server Architecture	4
BCA305	Graphics Lab	2
BCA306	DBMS	2

**Semester 5<sup>th</sup>**

**Semester 6<sup>th</sup>**

**Semester 2<sup>nd</sup>**

CODE	Subjects	Credits
BCA201	Mathematics	4
BCA202	Computer Organization and Architecture	4
BCA203	DBMS	4
BCA204	OOPS with C++	4
BCA205	LAB(C& C++)	2
BCA206	Data Structure Lab	2

**Semester 4<sup>th</sup>**

CODE	SUBJECTS	CRED-ITS
BCA401	Software Engineering	4
BCA402	Java Programming	4
BCA403	RDBMS	4
BCA404	Unix and Shell Programming	4
BCA405	Java Lab	2
BCA406	Unix Lab	

<b>CODE</b>	<b>SUBJECTS</b>	<b>CRED-ITS</b>
BCA501	Algorithm and Analysis	4
BCA502	Internet Programming	4
BCA503	Application Programming	4
BCA504	System Programming	4
BCA505	Web Designing/Internet Lab	2
BCA506	Application Programming Lab	2

<b>CODE</b>	<b>SUBJECTS</b>	<b>CRED-ITS</b>
BCA601	MIS and Enterprise Resource Planning (ERP)	4
BCA602	Computer Network and Security	4
BCA603	ADA Lab	3
BCA604	System Programming Lab	3
BCA605	Project: System Side or Application	6


## Detailed Syllabus

Subject : Computer Fundamentals and Windows Based Applications

Code: BCA101

### **Unit 1**

Computer Fundamentals: Block structure of a computer, characteristics of computers, problem solving with computers, generation of computers.

Classification of computers: Microcomputers, Minicomputers, Mainframes, Supercomputers, Network computers, Number System, Computer languages: Machine language, assembly language, higher level language. Types of high level languages: Procedure Oriented, Problem Oriented, Object Oriented, Natural Languages, Compilers and interpreters, Compilation process

### **Unit 2**

Memory types: RAM, ROM, PROM, EPROM, EEPROM, Flash memory, Cache memory.

Auxiliary Storage Devices: Magnetic Tape, Winchester Disk, Hard disk, Floppy disk, CD-ROM, DVD.

Input Devices: Their functional characteristics, Keyboard, Mouse, Joystick, Trackball, Digitizing Tablets, Scanners, Digital Cameras, MICR, OCR, OMR, Bar Code Reader, Speech Input devices, Touch screen, Touch pad, Light Pen.

Output Devices: Monitor, types of monitors, characteristics of monitors, printers, and types of printers, plotters, sound cards and speakers.

### **Unit 3**

Software: Operating system, Utility softwares, Compilers and interpreters, Word processors, Spreadsheets, presentation graphics, Operating system: Functions of operating systems, Types: Multi-user, Multiprogramming, Multitasking, Multithreading, Real time, PC operating system, Need of DBMS and features of good DBMS. Database Management Systems: Types of DBMS models, database design

### **Unit 4**

Computer Network and Communication: Network types, network topologies, network communication devices, physical communication media, Network Operating System, Multi media concepts.

Internet protocols: TCP/IP, FTP, HTTP, TELNET, Gopher, WAIS.

Internet and its Applications: E-mail, World Wide Web, Internet chatting, Newsgroups.

**Reference:1.**

1. D. H. Sanders, "Computers Today", McGraw Hill, 1988.
2. T. N. Trainer, "Computers" (4th Edition) McGraw Hill, 1994.
3. Kenneth C. Laudon, Jane P. Laudon "Management Information System"(7th Edition),
4. V. Rajaraman, "Fundamentals of Computers" (2 nd Edition), Prentice Hall of India, New Delhi, 1996.
5. B. Ram, "Computer Fundamentals", Wiley, 1997.

Detailed Syllabus

Subject : Communication Skills in English

Code: BCA102

**Unit 1**

Basic Skills :Listening,  
Speaking, Reading & Writing.  
A Practical study of Grammatical Rules (Noun, Pronoun, Adjectives, Verb, Adverb)  
Tenses :Types of Tenses

**Unit 2**

Idioms & Phrases,  
Confused words :Paronyms, Homonyms  
Synonyms, General Abbreviations, One word Substitution

**Unit 3**

Simple present, progressive & present perfect, Simple past, progressive & Past perfect,  
Indication of Futurity, the passive ( Present & Past, Present & Past Perfect).  
Reported Speech :(  
I) Declarative Sentences (II) Imperative  
(III) Interrogative (Question) (IV) Active, Passive  
(V) Preposition (VI) Articles

**Unit 4**

Writing Skills :Paragraph  
Writing, Composition Writing, Report Writing, Application & Letter Writing,  
Essay Writing.

**Reference:**

1. Tandon, R.C. Seth, R.R. Agarwal
2. V.K. Maheshwari "English Grammar and Composition" Ratan Prakashan

## Detailed Syllabus

Subject : Programming in C

Code: BCA103

### Unit 1

Data types, constants, Variables, Arithmetic and logical expressions, Data input and output, Assignment statements, Conditional statements. Iteration, Arrays, String processing, User defined data types, functions, recursion, Parameter passing by reference & by value.

### Unit 2

Structures, Multiple Structure, Array of Structure, Unions, Pointers, Character pointers, Pointers to arrays, Array of pointers, Pointers to structures. File handling, Open & closing file Binary files, Structured programming concepts, Top down & Bottom Up design approaches.

### Unit 3

Function Definition, Accessing function, function prototype, passing arguments to function (call by value, call by reference), processing as array, passing array to functions, multidimensional arrays, string functions (Strlen (), strcpy(), strcat(), strcmp() etc.)

### Unit 4

Constants, variables, Keywords, Decision Control Structure (if, Ifelse, Nested ifelse, switch), Loop control Structures (While, Dowhile, for), Continue, break. Storage classes (Automatic, Register, Static, External). Macro, Macros with arguments, macros versus functions

### **Reference:1.**

- Rajarman V., "Fundamentals of Computers", (PHI, 1992).
- D.Dromey, "How to solve it by Computer", PrenticeHall, 1985.
- E. Balguruswami "Programming in C" Tata McGraw Hill.
- Kanetkar, "Let Us C", BPB Publications.

## Detailed Syllabus

Subject: Data Structure

Code: BCA104

### **Unit 1**

Space and time complexity, Asymptotic notations ( $\Omega, \theta, O, \omega, \circ$ )  
Arrays, Searching Arrays, One Dimension and two Dimensional Arrays. Stack, Infix to Postfix, Postfix Evaluation of Queues, DQueue, Priority Queue, Singly Link list, Comparison.

### **Unit 2**

Basic concept of Trees, Tree representation by link list and by arrays, Tree reversals, Binary tree, Binary search tree (Insertion, Deletion, Traversals), AVL.

### **Unit 3**

Graph concepts, Adjacency list and adjacency matrix representation, Hamiltonian and Euler's circuit, DFS, BFS, Dijkstra's algorithm, Prims & Kruskal's algorithm.

### **Unit 4**

Linear search, Binary search, Bubble sort, selection sort, Insertion sort, Quick sort, Heap sort, Merge sort, Radix sort, Comparison in terms of space & time complexity.

### **Reference:**

1. Sartaj Sahni, "Data structures Algorithms and Applications in C++", TMH.

## Detailed Syllabus

Subject: Mathematics

Semester 2nd

Code: BCA201

### **Unit 1**

Set Theory: Set notations, Operation on sets, Subsets, Venn diagrams, Method of proof for sets, Laws of set theory, Partition of sets, Minsets, Duality principle. Relation: one-to-one, One to Many, Many to Many, relations, onto relations, Inverse relations. Functions: Defining functions, range, domain, functions and relations, Inverse of a function, composite functions. Combinatory : Rules of products, Permutations, Combinations and Power sets.

### **Unit 2**

Limit continuity, Differentiation :Derivatives of Polynomial equations, Trigonometric function, Inverse Trigonometric function, Application of Derivatives, Tangent, Normal, Maxima, Minima, Role's Trigonometric function, LMV Theorem, Introduction to Partial Derivative.

### **Unit 3**

Integration of polynomial equation, Trigonometric function, Inverse Trigonometric function Standard function, Definite Integral, Limit of Sum method, Area under the curve.

### **Unit 4**

Laws of matrix algebra, System of linear equations, Matrix inversion, Eigen Values, Eigen Vectors, Characteristic equation, Diagonalization.

### **References:**

1. B.S. Grewal & J.S. Grewal, "Higher Engineering Mathematic", Khana Publishers.
2. R.D. Sharma, "Mathematics".

Detailed Syllabus

Subject: Computer Organization and Architecture

Semester 2nd

Code: BCA202

### **Unit 1**

#### **1. Processor Organization**

General structure of CPU registers, stack, operation of stack, ALU and control unit. Instruction format, mathematical operations, fixed point addition, multiplication or division. Principle of arrays and pipe line processors, principle of instruction decoding and implementation, hardware and micro instruction based control unit

### **unit 2**

#### **2. Design of Controller**

Identifying micro instruction, minimizing micro instruction, size, parallelism in micro instruction, encoding control instruction, timing cycle and clock generation, organization of micro programme based control unit

### **unit 3**

#### **3. Memory Organization**

Static memory, dynamic memory, memory hierarchies, memory refresh, paging concept of memory compaction, interleave memory and principle of address interleaving associative memory, memory segmentation, block address calculation, concept of cache memory

### **unit 4**

#### **4. Data Transfer Technique**

Various I/O devices, IOP, CPU configuration

#### **Reference:1.**

C.W. Gear, "Computer Organisation and Programming", McGrawHill, 1975.

2. A. S. Tannenbaum "Structured computer Organisation", Prentice Hall of India.

3. M.M. Mano "Computer system architecture: Prentice Hall of India, 1983.

4. G.Langhoiz, J.Grancioni and A.Kandel, "Elements of Computer Organisation", PrenticeHall

International, 1988.



Detailed Syllabus

Subject: DBMS

Semester 2nd

Code: BCA203

### **Unit 1**

#### **1. Introduction**

Purpose of database, data abstraction, data models, instances & schemas, data independence, data definition language, data manipulation language, database manager, database administration

#### **unit 2**

#### **2. Entity Relationship Model**

Entity & Entity sets, relationship sets, mapping constraints, candidate & primary key, entity relationship diagram, reducing ER diagram to tables.

#### **3. Relational Model**

Concepts of relational model, integrity constraints, extension & intension, relational algebra, relational calculus, commercial query language, modifying the database, comments on relational model.

#### **Unit 3**

#### **4. DBMS based on Relational Model**

Introduction, the mapping operation, data manipulation facility, data definition facility, data control facility.

#### **5. Normalisation**

Introduction to functional dependence, normalization 1NF, 2NF, 3NF, BCNF, 4NF, 5NF

#### **Unit 4**

#### **6. Oracle Ingress Or Sybase**

Creation of tables, modification of tables, DDL command for RDBMS, SQL command for RDBMS, command language

#### **References:**

1. Bipin C. Desai, "An Introduction to Data Base Systems", Galgotia Publication.

2. Elmasri Navathe, "Fundamental of Database Systems" Pearson Edition.

Detailed Syllabus

Subject: OOPS with C++

Semester 2nd

Code: BCA203

### **Unit 1**

OOP paradigm, Advantage of OOP, Differentiate between functional programming and OOP approach, characteristics of object oriented language object, Definition of class, object, Inheritance, Abstraction, Encapsulation, Dynamic Binding, Manage passing, Polymorphism.

### **Unit 2**

Introduction to C++, Identifier and Keywords, Constants, C++ operator, Type conversion, Variable declaration, Statements expression, condition expression, Loop statement (for, while, do while), break, continue statement.

### **Unit 3**

Array:Definition of Array, Programming with single dimensional array, 2D array, multidimensional array, function :Function declaration, prototyping calling, Friend function, Inline function, Virtual function, call by value, call by reference.

### **Unit 4**

Classes, member function, Objects, nested classes, Inheritance, Function overloading, operator overloading virtual function, files stream, binary file operation, opening & closing file.

### **References:**

1. Yashvant Kanetkar, "Let us C++", BPB.
2. Robert Lofore, "Object oriented Programming in Turbo C++", Galgotia publications 1994.
3. Bjarne Strawrup, "The C++ Language", AddisonWesley, 1995.

## Detailed Syllabus

Subject: Data Communication

Semester 3rd

Code: BCA301

### **Unit 1**

Computer Networks, Network Hardware (Broadcast, P-P networks) Network Categorization-LAN, MAN, WAN. OSI & TCP/IP Reference Models, Transmission Media, Wireless Transmission, Cellular Radio, Communication satellites

### **Unit 2**

Data Link Layer design, Framing, Error control, Flow Control. Elementary Data Link protocols-Simplex Stop & Wait, Sliding Window Protocol.

### **Unit 3**

Multiple Access Protocols-Aloha, Carrier Sense Multiple Access Protocols, IEEE Standards-802.3 & 802.5, Satellite networks, Routing Algorithms, General Principles of Congestion control.

### **Unit 4**

Network Layer-The IP Protocol.

Elements of Transport Protocols, TCP & UDP, Overview of Application Layer.

## Detailed Syllabus

Subject: Operating System

Semester 3rd

Code: BCA302

### **Unit 1**

Introduction to operating System, Definition of batch systems, Time sharing systems, Real time systems, Multitasking, Multiprogramming, System services, System calls.

### **Unit 2**

Process management : Definition of process, Process states, process control block, process creation, process termination, threads, user threads, kernel threads, cooperating processes, Interprocess communication, CPU scheduling, FCFS, SJF, Round robin scheduling, Multilevel queues, multilevel queue with feedback.

### **Unit 3**

Process synchronization, critical section problem, semaphores, Binary semaphores, Deadlocks ;Necessary condition, prevention, avoidance of deadlock.

### **Unit 4**

Memory Management: Physical V/s Logical address, Dynamic loading, Swapping, Paging, Segmentation, Fragmentation, Virtual Memory, Demand paging, page replacement algorithms.

Disk scheduling (FCFC, SCAN, CSCAN, LOOK, CLOOK)

### **References:**

1. A.S. Tanenbaum, "Structured Computer Organisation", PHI, 1990.
2. M.M. Mano, "Computer System Architecture"(2 nd Edition), Galgotia Publication.
3. J.P. Hayes, "Computer Architecture and Organisation and Programming", McGraw Hill,1988.

Detailed Syllabus

Subject: Computer Graphics

Semester 3rd

Code: BCA303

### **Unit 1**

#### **1. Graphic Systems**

Display devices, physical input and output devices, display processors graphics software coordinate representation, graphics functions and standards

#### **2. Output Primitives**

Point plotting, line drawing algorithms DDA algorithms, Bresenham's line algorithms, circle generating algorithms, ellipses, attributes and construction techniques

### **unit 2**

#### **3. Two Dimensional Transformations**

Basic transformation translations, rotation, matrix representation and homogeneous coordinates, composite transformations scaling relative to a fixed pivot, rotation about a pivot point, general transformation equations, other transformation – reflection.

### **Unit 3**

#### **4. Windowing and Clipping Techniques**

Windowing concepts clipping algorithms, area clipping, line clipping, polygon clippings, text clipping, blanking, window to viewpoint, transformation, Cohen Sutherland algorithm

### **unit 4**

#### **5. Animation Techniques**

Animation perspectives, computer animation hardware, computer animation software and applications, PC animation, concept of simulations

### **Reference: 1.**

D. Hearn and M.P. Baker "Computer Graphics" PHI New Delhi 2 nd edition 1995.

2. J.D. Foley, A.V. Dam, S.K. Feiner, J.F.Hughes, R.L. Phillips, "Introduction to computer

Graphics” AddisonWesley

Publishing company, N.Y. 2 nd edition 1994

3. R.K. Plastock and G. Kalley “ Computer Graphics “ McGraw Hill, 1986.

## Detailed Syllabus

Subject: Client Server Architecture

Semester 3rd

Code: BCA304

### **Unit 1**

Number system, Binary arithmetic, Gray code, BCD, Logical Gates, Boolean Algebra, KMap simplification, SOP forms, POS forms, Half adder, Full adder, FlipFlops ( SR, JK, D & T),Counters, Registers.

Basic computer architecture, Functional Organization, Register organization, Arithmetic and logic unit, Central processing unit, Instruction formats, Addressing modes, Interrupts.

### **Unit 2**

Register transfer and micro operations, Register transfer language (RTL), Arithmetic, Logic and Shift micro operations, Micro program Control Organization: Control memory, Address sequencing, Micro program sequencer.

### **Unit 3**

Memory and storage: Memory Hierarchy, Cache memory, Associative memory, Interleaved memory, Virtual memory and Memory management hardware.

### **Unit 4**

Input/output organization: Peripheral devices, I/O interface, Asynchronous Data Transfer: Strobe Control, handshaking Data transfer schemes (Programmed, Interrupt initiated, DMA transfer), I/O processor.

### **References :**

1. A.S. Tanenbaum, "Structured Computer Organisation", PHI, 1990.
2. M. M. Mano, “Computer System Architecture”, PrenticeHall, 1976.
3. S. Stone, “Introduction to Computer Architecture”, Galgotia Publications, 2nd Ed. 1986.
4. J.P. Hayes, "Computer Architecture and Organisation", McGraw Hill, 1988.
5. C. William Gear, “Computer Organisation and Programming”, McGrawHill, 1985.

## Detailed Syllabus

Subject: Software Engineering

Semester 4th

Code: BCA401

### **Unit 1**

Phases in Software Development , Requirement Analysis , Software Design ,Coding , Testing, Maintenance. Software Development Process Model : Waterfall Model, Prototyping, Interactive Enhancement ,Spiral Model,Software Requirements Specifications ( SRS ) Role of SRS,Problem Analysis : Structuring Information – Data Flow Diagrams and Data Dictionary – Structured Analysis

### **Unit 2**

Planning a software project – Cost Estimation Uncertainties in Cost Estimation – Single Variable Models : COCOMO Model – Software Size Estimation Project Scheduling : Average Duration Estimation Project Scheduling : Milestones, staffing and personnel Planning Rayleigh Curve : Personnel Planning Team Structure, Software Configuration Management Configuration Identification – Configuration Control – Status Accounting and Auditing – Software Configuration and Management

### **Unit 3**

Case study : Plan for the above problem System Design : Design Objectives, Design Partitionin problem Partitioning – Abstraction, TopDown and BottomUp Strategies, Module Level Concepts Coupling and Cohesion, Design Methodology – Structured Design Structure Charts – Design Methodology – Transaction Analysis, Design Specification, Verification Design Reviews – Automated Cross – Checking Case Study : Structure Design – Design Document for the Given Problem Testing Fundamentals : Error Fault – Failures – Reliability Levels of Testing – Test Case and Test Criteria – Test Oracle Psychology of Testing – TopDown and BottomUp Approaches

### **unit 4**

Functional Testing : Equivalence Class Partitioning – Boundary Value Analysis : Case Effect Graphing – Test Case Generations Instrumentation for Structural Testing – Complexity Based Criteria – Mutation Testing – Combination Functional and Structural Approaches, Testing Process Test Plan – Test Case Specification and Test Case Execution and Analysis,

Comparison of Different V & V Techniques, Metrics : Reliability Assessment – Programmer Productivity – Error Removal Efficiency Case Study : Test Plan – Unit Test Report – Test Case Specifications for System Testing – System Test Report Error Report on a given Problem

**References:**

1. P. Jalota, "An Integrated Approach to Software Engineering", Narosa Publishing House, 1992
2. R.E.Fairley, "Software Engineering Concepts", McGrawHill, 1985
3. G.Meyers, "The Art of Software Engineering", WileyinterScience, 1979
4. M. Shooman, "Software Engineering", McGrawHill, Detailed Syllabus

Subject: Java Programming

Semester 4th

Code: BCA402

**Unit 1**

Introduction to Java: Features of Java, difference between Java and C, difference between Java and C++, data types, variables, arrays, operators arithmetic, Bitwise, relational, Boolean, various control statements.

**Unit 2**

Introduction to Classes: Class fundamentals, declaring objects, methods, constructors, garbage collection, passing parameters to methods, recursion, access control, static, final and finally method, Array Single dimensional, Multidimensional array.

**Unit 3**

Inheritance, super, multilevel hierarchy, abstract methods and classes. Packages and interfaces, importing packages, exception handling. Exception types, try, catch, finally, throw and throws, creating exception subclasses. Multithread programming, thread priorities, synchronization, messaging, creating multiple threads, inter thread communication.

**Unit 4**

Networking, socket overview, client/server, reserved sockets, proxy servers, Internet addressing, Java and the Net, TCP/IP client sockets. An introduction to AWT, GUI graphics, fonts, colours, Introduction of servlet, servlet lifecycle, JSP, JSP lifecycle.

**References:**

1. Patrick Naughton and Herbert Schildt, "The Complete Reference Java 2", Tata McGraw Hill, 1999.
2. E. Balaguru Swami, "Programming with Java"(2 nd Edition), TMH.



Detailed Syllabus

Subject: RDBMS

Semester 4th

Code: BCA403

### **Unit 1**

Basic concepts: Introduction, Data base users Data models, Schema and Instances: DBMS Architecture and Data Independence, database language , Dta modeling using E – R MODEL.

Relational Model: Relational model concepts, Relational model constraints, Update operations on relations. The relational Algebra.

### **Unit 2**

SQL- A Relational; Database Language, Database Design: Informal Design guidance for Relational Scheme, Functional Dependencies, Normal Form Based on Primary Keys. Boyce – Codd Normal Form, Multi valued Dependencies and Forth Normal Form, The database Design Process. Query Processing: Basic Algorithms for Executing query operations, Using heuristics in Query optimization.

### **Unit 3**

Concurrency Control: Concepts, Locking Techniques for concurrency, Control Concurrency control based on Time stamp ordering, multi version concurrency Techniques.

### **Unit 4**

Distributed Database: Concepts, Overview of Client Server Architecture, Data Fragmentation Replication and Allocation Technique for Design Query processing in Distributed Database.

### **References:**

1. Bipin C. Desai, “An Introduction to Data Base Systems”, Galgotia Publication.
2. Elmasri Navathe, “Fundamental of Database Systems” Pearson Edition.

## Detailed Syllabus

Subject: Unix and Shell Programming

Semester 4th

Code: BCA404

### **UNIT 1**

Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands `PATH`, `man`, `echo`, `printf`,

`script`, `passwd`, `uname`, `who`, `date`, `stty`, `pwd`, `cd`, `mkdir`, `rmdir`, `ls`, `cp`, `mv`, `rm`, `cat`, `more`, `wc`, `lp`, `od`, `tar`, `gzip`.

### **Unit II**

Unix Utilities:- Introduction to unix file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, `unlink`, `du`, `df`, `mount`, `umount`, `find`, `unmask`, `ulimit`, `ps`, `w`, `finger`, `arp`, `ftp`, `telnet`, `rlogin`. Text processing utilities and backup utilities , detailed commands to be covered are `tail`, `head` , `sort`, `nl`, `uniq`, `grep`, `egrep`, `fgrep`, `cut`, `paste`, `join`, `tee`, `pg`, `comm`, `cmp`, `diff`, `tr`, `awk`, `cpio`

### **Unit III**

Introduction to Shells:- Unix Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line

Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.

Filters:- Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count characters, Words or Lines, Comparing Files.

### **Unit IV**

`grep`:- Operation, `grep` Family, Searching for File Content.

`sed`:- Scripts, Operation, Addresses, commands, Applications, `grep` and `sed`.

## Detailed Syllabus

Subject: Algorithm and Analysis

Semester 5th

Code: BCA501

### Unit 1

Space and time complexity, Asymptotic notations ( $\Omega, \theta, O, \omega, \circ$ ), Arrays :One Dimension and two Dimensional Arrays (Storage in Row – major & column major order). Queue Structures: Insertion, deletion, Priority Queue, DQueue. Stack: Push, Pop operations, Polish notation, Algorithm for Infix to Postfix conversion, Evaluation of Postfix expression. Link lists, singly link list, Doubly link list, advantage and disadvantage.

### Unit 2

Tree basic concept, Tree representation by link list and by arrays, Binary tree, Binary search tree (Operations:Insertion, Deletion, Traversals), Heap sort, AVL, Btree. Graph concepts, Adjacency list and adjacency matrix representation, DFS, BFS, Topological sorting, strongly connected components, Prim's & Kruskal's algorithm, Dijkstra's algorithm, Warshall's algorithm.

### Unit 3

Linear search, Binary search, Bubble sort, selection sort, Insertion sort, Quick sort, Heap sort, Merge sort, Bucket sort, Radix sort and their Comparison in terms of space & time complexity.

### Unit 4

Divide & Conquer : General method, Binary search (Iterative & recursive), Merge sort, Quick sort, Selection, Strassen's matrix multiplication

### Reference:1.

- Horowitz Sahni Rajasekaran, "Fundamentals of computer Algorithms", Galgotia.
- LipSchutz, "Theory and problems of Data Structures"(Schaum's outline series), TMH.

## Detailed Syllabus

Subject: Internet Programming

Semester 5th

Code: BCA502

### **Unit 1**

INTRODUCTION TO THE INTERNET :Computers

in Business; Networking; Internet;

Electronic Mail (EMail); Resource Sharing; Gopher; World Wide Web; Usenet; Telnet; Bulletin Board Service; Wide Area Information Service.

INTERNET TECHNOLOGIES :Modem; Internet Addressing; Physical Connections; Telephone Lines.

### **Unit 2**

INTERNET BROWSERS :Internet Explorer; Netscape Navigator.

INTRODUCTION TO HTML :Designing a Home Page; History of HTML; HTML Generations; HTML Documents; Anchor Tag; Hyper Links.

HEAD AND BODY SECTIONS :Header Section; Title; Prologue; Links; Colorful Web Page; Comment Lines.

DESIGNING THE BODY SECTION :Heading

Printing; Aligning the Headings; Horizontal

Rule; Paragraph; Tab Setting; Images and Pictures; Embedding PNG Format Images.

### **Unit 3**

DHTML AND STYLE SHEETS :Defining

Styles; Elements of Style; Linking a Style Sheet to

an HTML Document; Inline Styles; External Style Sheets; Internal Style Sheets; Multiple Styles.

FRAMES :Frameset Definition; Frame Definition; Nested Framesets.

Forms :Action Attribute; Method Attribute; Enctype Attribute; Drop Down List.

### **Unit 4**

PHP Basic Data Structures and Variables. ,Control Structures,Regular Expressions and Text Handling,References and Data Structures,Packages, Modules, Classes and Objects,Processing Web Forms.

Detailed Syllabus

Subject: Application Programming

Semester 5th

Code: BCA503

### **Unit 1**

**Basics of Word processing :** Text Selection , Opening Documents and Creating Documents ,Saving Documents/Quitting Documents , Cursor Control , Printing Documents , Using the Interface (Menu, Toolbars),Editing Text (Copy, Delete, Move etc.) , Finding and Replacing Text , Spell Check Feature/Auto correct Feature, Grammar Facility , Auto text, Character formatting, page formatting.

### **Unit 2**

**DOCUMENT ENHANCEMENT :** Adding borders and shading, Headers and Footers ,Setting Up Multiple columns, Sorting blocks, margins and Hyphenating Documents , Creating Master Document, Data Source ,Merging Documents , Using Mail merge Feature for Labels and envelopes ,Graphics and using Templates and Wizards , Hands-on experience in Word processing under **DOS** ,•Familiarity in Word processing under Windows.

### **Unit 3**

**SPREADSHEET PACKAGE :**Usage of Ms- Excel, Worksheet Basics ,Data Entry in cells, entry of numbers, text and Formulae , Moving data in a Worksheet ,Moving around in a worksheet , Selecting Data range , Using the Interface (Toolbars, Menus) , Editing basics , Working with Workbooks , Saving and Quitting ,•Cell Referencing

**Unit 4:** Formatting and Calculations , Calculations and Worksheets- Using Auto fill , Working with formulae ,Efficient Data Display with Data Formatting, Number formatting etc., Working with ranges , Worksheets printing, Working with Graphs and Charts , Adding/Formatting Text data with Auto format , Creating Embedded Chart Using Chart Wizard ,Moving Charts , Updating charts , Changing Chart Types , Creating Separate Chart Sheet , Adding Titles, legends and Gridlines , Printing charts.

## Detailed Syllabus

Subject: System Programming

Semester 5th

code: BCA504

### **unit 1**

Introduction to grammars, languages, finite state machines. Introduction to Systems Programming, Introduction to Assembly Language Programming - Introduction to Instruction Formats, Data formats - Role of Base Register, Index Register.

### Unit 2

Introduction to Assembler, databases used in assembler design, Design of Assembler - Single Pass & Double Pass. Introduction to Macros, various types of Macros, Design of Macro Processor - Single Pass & Double Pass.

### Unit 3

Introduction to Loaders, functions of a loader, types of Loaders, databases used in Loaders, Design of Loaders - Absolute & DLL. Introduction to compilers: a brief discussion on various phases of compilers. Applications of FSM and grammars in compiler design

### Unit 4

Introduction to Software Tools, Text editors, Interpreters, Program Generators, Debug Monitors.

## Detailed Syllabus

Subject: MIS and Enterprise Resources Planning

Semester: 6th

code: BCA601

### **unit 1**

Organization, Management and Network Enterprises :Information system in enterprises,Information system, Organization, Management and Strategy : The changing role of Information system in organization, Decision making, Business strategy.

### **Unit 2**

Information technology Infrastructure: Computer hardware & Information technology infrastructure, Storage input and output technology, Categories of computer and Computer System, what is software, System software telecommunication and Networks.

### **Unit 3**

Managing knowledge : Knowledge management in organization, Information and knowledge work system. Enhancing management decision making : Decision support system ( MIS & DSS, Types of DSS, DSS application and Digital term), Group Discussion Support System (GDSS) What is GDSS, Characteristics of GDSS.

### **Unit 4**

Redesigning the organization with Information system : Business process reengineering and Total quality management.  
Managing international information system : The growth of international information system, Organizing international information system managing global system.

## Detailed Syllabus

Subject: Computer Network and Security

Semester: 6th

code: BCA602

### **unit 1**

Computer Networks: Uses of Computer Network, LAN, MAN, WAN, Network Hardware, Network Software, Connection Oriented and connection less services, Protocols  
Reference Models: OSI Reference Model, TCP/IP reference Model, Comparison of OSI and TCP Reference Model.

### **Unit 2**

Physical Layer : Guided transmission media :Magnetic Media, Twisted Pair, Coaxial Cable, Fibre optics, Wireless transmission, Bitrate and Baud rate, Shannon's formula for maximum data rate. Data link layer : Framing, Error control, Error detecting and correcting code, Cyclic redundancy check. Flow control, sliding window, Go back N protocol, Selective Repeat. HDLC MAC Protocol, ALOHA, CSMA/CD, Manchester Encoding, Ethernet.

### **Unit 3**

Network layer : Services provided, routing algorithms, optimality principle, shortest path routing, flooding, distance vector, link state, broadcast, multicast.  
Congestion control, load shedding, jitter control, leaky bucket algorithm.  
The Internet Protocol Introduction  
to Internetworking, The IP protocol, IP Addresses, Subnets, Internet Control Protocol, Interior and Exterior gateway routing protocol., internet multicasting mobile IP, CIDR, IPv6.

### **Unit 4**

The Transport Protocol – Elements of transport protocol, A simple transport protocol, TCP Service model, TCP protocol, Segment header, Connection management, Transmission policy, Congestion control, timer management, UDP.

### **References:**

1. A.S. Tannenbaum, "Computer Networks", Third Edition, PHI Publications, 1999.
2. D.E. Comer, "Computer Networks and Internets", 2nd Edition, Addison Wesley Publication, 2000.
3. D.E. Comer and D.L. Stevens, "Internetworking with TCP\_IP : Design,



Implementation and Internals”, Vol. II, Prentice Hall, 1990.