**Subject:** **Fundamental of Information Technology**
**Code: X111**

## UNIT 1:

1. **Introduction to computers**: Introduction to computers, characteristics of computers, advantages & disadvantages of Computers, Classification of Digital Computer Systems: Microcomputers, Minicomputers, Mainframes, Supercomputers, Network computer                                                    (4 Hours)
2. **Anatomy of Computer**: Introduction, Functions & Components of a Computer, Central Processing Unit, Memory- RAM, ROM, PROM, EPROM, EEPROM, Flash Memory                                                    (3 hours)
3. **Auxiliary Storage Devices**: Introduction, Magnetic Tape, Winchester Disk, Hard Disk, Floppy Disk, Zip Disk, Jaz Disk, Superdisk, Optical Disk, CD-ROM, Magneto-Optical Drives.                                                    (3 Hours)

## UNIT 2:

4. **Input  and output Devices**: Introduction, Keyboard, Mouse, Trackball, Joystick, Digitizing Tablet, Scanners, Digital Camera, Bar Code Reader, Speech Input Devices, Touch Screen, Touch pad, Light Pen, Monitor, Printers, Plotters, Sound Cards & Speakers                                                    (5 Hours)
5. **Introduction to Computer Software**: Introduction, Operating Systems, Utilities, Compilers & interpreters, word processors, spreadsheets, presentation graphics, database management systems, image processors.            (3 Hours)

6. **Operating Systems**: Introduction, Functions of an operating System, Classification of Operating Systems.                                     (2 Hours)

## UNIT 3:

7. **Programming Languages**: Introduction, machine language, assembly language, high level language, types of high level languages.                      (3 hours)
8. **Introduction to Computer Security**: Types of computer crimes, Computer security, Emerging security solutions, crime & security, computer Crime by authorized users, computer crime through unauthorized access, potentially malicious computer programs, Introduction to cryptography.      (5 Hours)
9. **Computer Viruses**, **Trojan horse & Worms**: Introduction, types & categories of viruses, Virus vaccines
                                          (2 hours)

## UNIT 4:
# Introduction to office automation

  i) **Word Processing:** Introduction, Basic Capabilities of Word Processors, Advanced Features of Word Processors
  ii) **Electronic spreadsheets**: Introduction, Electronic Spreadsheets, Characteristics of a Spreadsheet, Spreadsheet Packages
  iii) **Presentation software**: Introduction, Presentation Basics, The ingredients of a Good

Presentation, Presentation Packages. (10 Hours)

**Text Books**
1. Introduction to information technology – Pearson III edition
**Reference Books**:
1. Peter Norton's Introduction to Computers –Second Edition
2. Comdex Computer Course Kit- Vikas Gupta

**I Semester - BCA**

Subject: **Fundamentals of C**
Code: **X112**

## UNIT 1:

**1. Problem Solving Technique :** Problem Definition, Problem Analysis, Design of problem solutions and use of design tools, Algorithms- Steps involved in developing an algorithm, Advantages and disadvantages of Algorithms, Example Algorithms. Flowcharts- Steps involved in developing an Flowcharts, Advantages and disadvantages of Flowcharts. Coding, Debugging, Program Documentation, Program Maintenance, program Development.

(6 hours)

**2. Basic Programming Constructs for Computer Programming:** Sequence construct, Selection construct- Simple-if statement, if-else statement, if-else –if statement, Multiple Selection Statement. Iteration construct- While statement, do-while statement, for statement.

(4 Hours)

## UNIT 2:

**3. Introduction to C** : History and features of C, Character set, C token, Keywords & identifiers, Constants, Variables, data types, Declaration of variables, assigning values to variables, defining symbolic constants.

(4Hours)

**4. Operators and Expression**: Arithmetic, Relational, logical, assignment, increment & decrement, conditional, bitwise & special operators, evaluation of expressions, Precedence of arithmetic operators, type conversions in expressions, operator precedence & associatively, mathematical functions. Example programs.

(4Hours)

**5. Managing Input and Output operations**: Reading & writing a character, formatted input and output. Example programs (2 Hours)

## UNIT 3:

**6. 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 go to statement

(4 Hours)

**7. Decision making and looping**: The while statement, the do statement, for statement,

exit, break, jumps in loops                                        (2 Hours)

    **8. Arrays**: Declaration, initialization & access of one dimensional & two dimensional arrays, Programs.                                        (4 Hours)


**UNIT 4:**

   **9. Searching Technique:** Linear Search, Binary Search, Bubble Sort

   **9. Handling of character strings**: Declaring & 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 (4 Hours)

   10.  **User defined functions:**  Need for user defined functions, Advantages        and Disadvantages of functions.                              (1 Hours)

Text Book:
        1) Programming in C- H.K Gungurao, N.S Manjunath, M.N Nachappa.
         2) Programming in ANSI C- E Balagurusamy

Reference Books:
        1) Let us C- Yashwanth Kanitkar


### Semester - BCA
**Subject:**       **Mathematics**
**Code:**         **X113**

### UNIT I
**Sets,Relations and functions-** Recapitulation of sets, subsets, cardinality of a set, Cartesian product of two sets. **Mathematical Logic**: Proposition and truth values, Connectives, their truth tables,  Inverse, converse, contrapositive of an implication.
**Tautology and Contradiction**- logical equivalence, Standard theorems, examples from Switching circuits, truth table and problems.


### UNIT 2
**matrices and Determinants**- Definition of matrices, types of matrices, addition, Scalar multiplication and multiplication of matrices-Problems.
**Determinants**- Definition of determinants, second, third order, solving a system of equations using cramer's rule.
**Trigonometry**- Radian measures, conversion of degree into radians and radians into degrees.
**Trigonometric functions**-Definition of trigonometric functions, problems.
### UNIT 3
**Analytical geometry**-Points, distance formula with proof, problems.
Statements of the following formulae. Section formula, Midpoint formula
Area of a triangle, centroid of the triangle. Problems.

**Locus**- definition of the problem involving circle,perpendicular bisector and area of triangle.
**Circles**-definition , typ4es of circles, $x^2+y^2=r2$,$(x-h)^2+(y-k)^2=r^2$. General form of a circle (without proof),problem s to find centre, radius. Touching circles, equation and the length of tangent(without proof), problems.

## UNIT 4

**Elementary Graph theory**-Recapitulation of polyhedral and networks
Definition of a graph and related terms like vertices, degree of a vertex, odd vertex, even vertex, edges, loops, multiple edges, (u, v) walk, trivial walk, closed walk, trail, path, closed path, cycle, even and odd cycle, cut vertex and bridges.
**Types of graphs**-finite graph ,infinite graph, multiple graph, simple graph, (pq) graph, null graph, complete graph, bipartite graph, regular graph, self complementary graph, sub graph, super graph, connected graph, Eulerian graph, and trees.
**Theorems**-In a graph with p vertices and q edges , degree of vertices is always the twice the number of edges. Vi=2q.

**Text Books**
→ A Classic text book of mathematics for II Puc by T Prakash Prabhu  and others S D M excellent publication.
→ A Classic text book of mathematics for I Puc by T Prakash Prabhu  and others S D M excellent publication.

**II Semester - BCA**

**Subject:** **Database Management System**
**Code:** **X212**

**UNIT I**
Database System Concepts and Architecture, History of Database Systems, Database Systems versus File Systems. Data Abstraction, Data independence, Schemas and Instances, Data models, Database Languages, Database Users, DBA. Structure of Database Systems,

(4 Hours)

Data Modeling using E-R model, Entity types, sets, Attributes, Keys, Relationships, Relationship Types, Roles, and Structural Constraints, Weak Entity sets,  E-R Diagrams. Different types of database models and their advantages and disadvantages.

(6 Hours)

**UNIT II**

Basic structure of Oracle System: Database Structure and its manipulation in Oracle, Storage organization in Oracle. (1 Hours)

Creation of Database:  Creating, changing and dropping the tables. Integrity

Constraints   specification, maintaining reference integrity constraints, Data insertion,

deletion and   modification.                                                              (4 Hours)

Querying the database: Information retrieval using SELECT statement, Various  features of SELECT statement , Aggregate functions, ORDER BY clause, Working with expressions  and subqueries   Handling of multiple tables. Views :   Creation of views, modification, data insertion and limitations of views.                                (5 Hours)


### UNIT III
PL/SQL   Basics:   Introduction,   character set, reserve words,   Block structure,  Data types, Conditional  statements,  looping  statements.                             (10 Hours)


### UNIT IV
Stored procedures and functions.
Cursors -  Implicit  and  explicit cursors, cursor  attributes,  triggers,  packages.
Exceptions.                                                                                               (10 Hours)


### Text Books
1. Database systems concepts by Silberschatz and Korth, McGraw Hill Publication. (Chapter 1)
2. Fundamentals of  Database  systems  by  Elmasri  and  Navathe,  Pearson  Education Asia publication 4$^{th}$ Edition (chapter 2,3)
3. Commercial application Development using Oracle D2k by; Ivan Bayross, BPB  publications (chapter 1,2,3,4,5,6)

### Reference Books:
1. SQL, PL/SQL The Programming Language – Oracle by Ivan Bayross, BPB publications.
2. Oracle 8 PL/SQL Programming by Scott Urman, Tata McGraw hill Edition

### II Semester - BCA

**Subject:**        **Computer Organization and Architecture**
**Code:**
**UNIT- I**        **12 Hrs.**

**Digital  Computer  System**: Introduction  to  Number system, Decimal number, Binary number, Octal and Hexadecimal numbers, Number base conversion, Complements, Binary codes, Binary logic, Integrated Circuits, Binary arithmetic, Addition and Subtraction in the 1's and 2's complement system, Addition and Subtraction in the  9's  and  10's  complement  system.  Boolean  algebra  :Basic  definitions,  Axiomatic definition of Boolean algebra, Basic theorems and properties of Boolean algebra, Venn diagram.

**UNIT -II**        **12 Hrs**

**Digital logic gate:** Boolean functions, Canonical and Standard forms, other logic operations, Digital logic gates, Universal gate. Simplification of Boolean function: The map method, Two and three variable maps, Four - variable maps, Don't Care conditions, Product of sum Simplification, NAND implementation, NOR implementation. Implementation of EX-OR, EX-NOR using NAND and NOR gate.

**UNIT -III     12 Hrs.**

**Adder and Subtractor** : Half Adder, Full Adder, Half Subtractor, Full Subtractor, Binary parallel adder, BCD adder. Combinational Logic: Some common combinational circuits used in digital systems. Code converter, Exclusive-OR and Equivalence functions. Magnitude comparator, Decoders, Encoders, Multiplexers, Demultiplexers.

**UNIT -IV        12 Hrs.**

**Sequential Logic** : Introduction, Flip flops, RS-FF, D-FF. T-FF, and JK-FF. Triggering of flip-flops, Master slave Flip flop, state table, and State diagram. State equations, Flip Flop excitation tables, Sequential circuits design. Registers, Counters: Synchronous Counters design using RS, JK, D, & T flip flops. Ripple counters Introduction, Registers, Shift registers, Timing sequences, Bidirectional shift register.

**Text Book**

M.Morris Mano, **Digital Logic and Computer Design**, PHI

**Reference Books**

1. Thomas L Floyd, **Digital Fundamentals**, 10th Edition, Pearson, 2011.

2. Thomas .C. Bartee, **Digital Computer Fundamentals**, 6th edition, TMH

**II Semester - BCA**

**Subject: Advanced C and C++**
        **Advanced C and C++**

**Unit I**

**1**.User Defined Functions: multi functions program, The form of C functions, return values & their types, calling a function, category of functions, handling of non integer functions, nesting of functions, recursion, functions with arrays, the scope & lifetime of variables in

functions. **(5 hours)**

**2.Structures and union**: Structure definition, giving values to members, structure initialization, comparison of structure variables, arrays of structures, arrays within structures, structures within structures, structures & functions, unions, size of structures, bit fields. **(5 Hours)**

**3.Pointers**: Understanding pointers, accessing the address of a variable, declaring & initializing pointers, accessing a variable through its pointer, pointer expression, pointer increments & scale factor, pointers & arrays,  malloc(), calloc(), free() and realloc() **(4 Hours)**

## Unit II

 **1. Principles of Object Oriented programming:**  basic Concepts, benefits,  application. **(2 hours)**

**2. Beginning with C++:**  Program features, comments, cin, cout, return statement, Structure of a C++ program.Dynamic initialization of variables, reference variables, the operators::, ::*, .*, delete, endl, new, setw **(3 hours)**

**3.Classes and objects:** structures, specifying a class, creating objects, accessing class members, defining member functions, making outside functions inline, nesting of member functions, private member functions, arrays within a class, memory allocation for objects, static data members, static member functions, arrays of objects, objects as function arguments, friends functions, returning objects, const member functions, pointers to members. **(7 hours)**

## Unit III

**1. Constructors and destructors:** Parameterized constructors, multiple constructors, constructors with default arguments, dynamic initialization of objects, copy constructor, dynamic constructors, constructing 2 dimensional arrays, destructors. **(4 Hours)**

**2.Operator overloading:** defining, overloading unary and binary operators, overloading binary operators using friend functions, manipulation of strings using operator overloading, type conversions – basic to class, class to basic, one class to another class. **(6 hours)**

## Unit IV

**1. Inheritance:**  Defining a derived class, single inheritance, protected members, multilevel inheritance, multiple inheritance, hierarchical inheritance, hybrid inheritance, virtual base classes, abstract classes, constructors on derived classes, nesting of classes.

**(6 Hours)**

**2. Pointers, virtual functions, polymorphisms:** Pointers to objects, this pointer, pointers to derived classes, virtual functions, pure virtual functions. **(4 Hours)**

## III Semester - BCA

**Subject:       Data Structure using C++**
**Code:**

## UNIT-1
**Introduction:** Algorithmic notation.                                                                           2 Hrs
**Linear Data Structures and sequential storage representation:** Concept and terminology for non-primitive data structures, storage structures for arrays, structures and arrays of structures, Stacks definitions and concepts, operation on stacks, applications of stacks, Recursion, infix to postfix, evaluating postfix expressions, queues, priority queues. 8 Hrs

## UNIT-2

**Linear Data Structures and Linked storage representation:** Pointers and linked allocation, linked linear lists, operations on linear lists  using singly linked storage structures, Circularly linked linear lists, Doubly linked linear lists.                                                                 12 Hrs

## UNIT-3

**Nonlinear Data Structures:** Trees –definition and concepts, operations on binary trees, linked storage representation of  binary trees, tree creation and traversal.        8 Hrs
Graphs- Matrix representation of graphs, breadth first search, depth first search. 2 Hrs

## UNIT-4

**Sorting and searching:**- Sorting, selection sort, bubble sort, merge, quick, searching, sequential and binary searching.                                                                                 10 Hrs
**Text Book:**
1. An Introduction to Data Structures with Applications 2$^{nd}$ Edition– J.P.Trembly and Sorenson   McGraw Hill 2001
**Reference Books⊛(MLA or APA style )**
   1) Data Structures using C & C++ - Yedidyah Langsun, Moshe J Augenstein, Tenenbaum – PHI Ltd
   2) Algorithms + Data Structures= Programs – Niklaus Wirth  PHI 1976
   3) Data Structures and Algorithms- Aho, A.V.Hopcroft and Ullman  - Addison Wesley 1980
   4) Fundamentals of Data Structures – Horowitze and Sahni- Gogotia Bookstore
   5) Data Structures and Program Design – Robert, L Krunse, PHI
   6) Data and File Structures- Mary Lunis, PHI

7) Theory and problems of Data Structures- Seymour Lipshutz, McGraw Hill

**III Semester - BCA**

**Subject:** **Operating System and Unix Concepts**

**Code :** **X314**

## UNIT-1

**Introduction:** Operating System, simple batch systems, Multiprogrammed batched system, time sharing systems, real-time systems, system components, and Operating system services        2 Hrs

**Process:** Process concept, process scheduling, Cooperating processes, threads        4 Hrs

**CPU Scheduling:** Basic concepts, scheduling criteria, scheduling algorithms.        4 Hrs

## UNIT-2

**Process synchronization:** Critical section problem, synchronization (algorithms excluded), semaphores, classical problems of synchronization        4 Hrs

**Deadlocks:** Deadlock characterization, methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, recovery from Deadlock.        6 Hrs

## UNIT-3

**Memory Management:** Logical versus physical address space, swapping, contiguous allocation, paging, segmentation.        4 Hrs

**Virtual Memory:** Demand paging, page replacement , page replacement algorithms, allocation of frames        4 Hrs

**File System:** File Concept, access methods, directory structure, file system structure, allocation methods        2 Hrs

## UNIT-4

**Introduction to Unix:** History, System- V release, Kernel and shell, Features of Unix        2 Hrs

**Commands and Utilities & Unix File System:** Locating commands, Internal and external commands, arguments, options and filenames, flexibility of usage, Help. General Utilities: cal, date, who, tty, passwd, echo, bc, script, spell, uname, wc, zip, tar, sort, Unix File System:-Categories, names, parent-child relationship, absolute path name, changing, creating, removing directories, listing files & directories, relative path names. Handling files-displaying, creating, copying, deleting, renaming files, printing, ,comparing files.        6 Hrs

**Shell Programming:**

Shell, pattern matching and quotations. Redirection, pipes. Vi editor- modes, working with Text. File ownership-permissions, octal notation. Shell scripts, command line arguments. Operators and conditional execution-if-else, case, Looping- while, for. Expr computations

**UNIX/LINUX Practical demonstrations** – 6 Hrs

**Text Book:**
1. Operating System Concepts – 5<sup>th</sup> edition -  Abraham Silberschatz & Peter Galvin- McGraw Hill
2. Unix – Concepts and Applications  - Sumitabha Das.   Tata McGraw Hill
**Reference Book**⊛
1. Operating systems – Milan Milenchivic- McGraw Hill
2. Unix Programming Environment – Bryan Kernighan and Rob Pike  - PHI
3. Operating systems incorporating Unix and Windows-  3<sup>rd</sup> edition Colin Ritchie BPB Publications

## III Semester - BCA

**Subject:**  **Microprocessor System**
**Code   :**  **X413**

## UNIT-1
**Introduction and Architecture of 8086:** Historical evolution of microprocessors, microprocessor based computer system, computer data formats, internal microprocessor architecture, the programming model, types of registers, flags and segment registers.     4 Hrs
**Addressing Modes:** Register, immediate, direct, register indirect, base plus index, program memory addressing modes, stack memory addressing modes.                8 Hrs

## UNIT-2

**Data Movement Instructions:**
MOV instruction-various types, push, pop, LEA, string data transfer, miscellaneous data transfer instructions-XCHG, XLAT, segment override prefix, IN and OUT.                7 Hrs
**Assembler Details:**
Directives, memory organization(tiny, small, large)                5 Hrs
## UNIT-3

**Arithmetic and Logic instructions:**-
Add, subtract, multiply and divide instructions, BCD and ASCII arithmetic, basic logic instructions, shift and rotate, string comparison                8 Hrs
**Interrupts:**-
Introduction, interrupt vectors, instructions, controlling carry fag bit, WAIT, HLT, LOCK, ESC, BOUND, ENTER and LEAVE.                4 Hrs

## UNIT-4
**Program Control Instructions:**-

Jump- various types(conditional and unconditional), Loop-do while and repeat until loops in MASM 6.x, Procedures and parameter passing CALL and RET instructions

12 Hrs

**Text Book:**
1. Intel Microprocessors 4<sup>th</sup> edition- Burry M Brey - PHI

**Reference Books⊛(MLA or APA style )**
1. Microprocessor X86 programming – K R Venugopal and Rajkumar - BPB
2. Schaum's Series Assembly language programming
3. Microprocessors and Interfacing – DV Hall, Tata McGraw Hill

**III Semester - BCA**

**Subject:        Computer Networking**
**Code:  X415**

**UNIT-1**

**Networking Basics –** Introduction, Uses of Computer Networks,
Network Hardware-LAN, MAN, WAN, Wireless networks.
Network Software, Protocol hierarchies, Design issues for the layers, Interfaces and services, Connection oriented and connectionless services,
**LAN Technologies -**  Direct, Point to point communication, shared channels, Topologies, Ethernet, ATM,CSMA, CSMA / CD, Wireless LANs
**Client Server Interaction –** Introduction – client server  paradigm , characteristics –client, server  programs and server class computers – Requests, responses and direction of data Flow, Transport protocols and client-server interaction                    10 Hrs.

**UNIT-II**
**Basics of Data Transmission –** Transmission Media, Need for Asynchronous Communication – using Electric current to send bits – standards for communication – Baud rate, framing, errors – Full duplex Communication – Hardware limitations – Bandwidth – noise – Long distance communication – introduction, sending signals and Modem hardware used, Carrier frequency and multiplexing, Base and Broad band technologies.  Packet Transmission – Concept of  packets, Packets and TDM, Packets and Frames – Byte stuffing – Transmission errors – Parity bits, cyclic Redundancy check
10 Hrs

**UNIT-III**

**Protocols and layering** – Need – protocol suites – OSI Model – Seven layers – Basis for layering.                                                                                                  1 Hrs
**Internetworking** – Concepts, Architecture – Introduction -  Concept – Internetworking, Physical Network Connection with Routers – Internet Architecture – Protocols for Internetworking  - Layering And TCP / IP Protocols.  IP addresses – Virtual Internet, IP address scheme, - classes – Computing the class of an address – Dotted decimal notation – Authority for addresses – special IP Addresses – Routers and IP address.

6 Hrs

**ARP** – Protocol addresses and Packet Delivery – Address Resolution – techniques – Table lookup – closed form computation – Message exchange – ARP message delivery – format – send, identify, cache and processing ARP.                3 Hrs


**UNIT-IV**

**IP Datagram and Forwarding** – connectionless service – virtual packets – IP Datagram – Forwarding – IP address and Routing Table Entry – Mask field and Datagram forwarding – IP Datagram – Header format.  IP encapsulation and Fragmentation – Datagram Transmission and Frames, Encapsulation, Transmission across an Internet MTU, Datagram size and encapsulation – Reassembly – Fragment loss                6 Hrs
**TCP** – Reliable Transport Service – Need for Reliable transport – TCP – Services provided – End to end  Service, Packet loss and Retransmission , Retransmission times, Buffers, Flow control and windows, Three-way handshake, congestion control, TCP Segment format.
                4 Hrs


**Text Book** -
        Computer Networks and Internets
                    -   2nd Edition – Douglas E. Comer  - Pearson Education
**Reference**
        1). Internetworking with TCP /IP   Volume I II and III
                    - Douglas E Comer - PH I
        2). Computer Networks – 3rd Edition – Andrew S. Tanenbaum  - PHI

**III Semester BCA**

**Subject: Programming in VB.NET**
**UNIT-1**


**Module 1: Overview of the Microsoft .NET Platform**

What Is the Microsoft .NET Platform?, What Is the .NET Framework?, What Are the .NET

Framework Components?, What Are the Visual Basic .NET Enhancements?


**Module 2: Development Environment Features**

Describing the Integrated Development Environment – start page, menu system, tool bars,

new project, graphical designers, code designers, intellisense, object browser, tool box,

solution explorer, class view window, properties window, component tray, server explorer,

output window, task list command window.


**Module 3:**

Constants, variable declaration, Data Types, array and strings

**UNIT-II**
**Module 4:**

Making decisions with if…else, select case, switch, choose, loop statements: Do, For, ForEach…Next, while, with

**Module 5:** Sub procedures and functions, passing variable number of arguments, optional procedure arguments, static variables.

**Module 6:**

Exception handling – structured, unstructured

**UNIT-III**
**Module 7:**

Windows forms – TextBox, RichTextBox, Labels, link Labels

**Module 8:**

Windows forms – Buttons, Check Boxes, radio buttons, panels, group boxes.

**Module 9:**

Windows forms – List boxes, checked list boxes, combo boxes, picture box

**UNIT-IV**
**Module 10:**

Object oriented programming methods, classes and objects, members, abstraction, encapsulation, inheritance, polymorphism, overloading, overriding, constructors, destructors, access modifiers, interfaces.

**Module 11:**

Data access with ADO.Net, database basics, creating connections and connection provide data adaptors, creating data set, binding controls to database, navigating in dataset – add, delete, update data

**Module 12:**

Handling database in code, OLEDB connection class, SQL connection class, Oracle Connection class, OLEDB command, SQL command, Oracle Command, OLEDB Adapter, SQL Data adaptor, OLEDB date reader, Creating date connection in code, date reader.

<center><b>IV Semester - BCA</b></center>

**Subject:** **web development in .NET**
**Unit 1**

Html – Concepts of Hypertext, Versions of HTML, Elements of HTML syntax, Head and Body Sections Building HTML documents, Inserting texts, images, hyperlinks, backgrounds and

colour controls, different html tags, table layout and presentation, use of font size and attributes. List types and its tags, use of frames and forms in web pages, ASP & HTML Forms.

**UNIT-2**

**Introduction to JavaScript:** JavaScript in web pages, advantages, Basic Programming techniques-data types and literals, type casting, variables, operators and expressions, programming constructs- conditional checking, looping. Functions, placing text in a browser, Dialog boxes, Document Object Model-Introduction, DOM, objects in HTML, properties and methods. Browser objects, html object hierarchy. Handling events in JavaScript, other built-in objects in JavaScript-string, math, date, user defined objects.                    10 Hrs

**Unit 3**

 Adding controls to a web form, buttons, text box, labels, checkbox, radio buttons, list box. Adding controls at runtime. Running a web application, creating multiform web project. Form validation: Clint side validation, server side validation, validation controls: required field comparison range. Calendar control, ad rotator control, internet explorer control.

Introduction to ADO.Net

XML in .NET, XML basics, attributes, fundamental XML classes: Document, text writer, text reader. XML validations, XML in ADO.NET, the XML Data Document.

Web services - Introduction, state management – view state, session state, application state. SOAP, web service description language, building and consuming a web service. Web application deployment. Caching. Threading concepts

**Unit 4**

An introduction to HTML 5, HTML 4 Doctype Declaration, HTML 5 is open to Interpretation, 4 Doctype Declaration, WAI – ARIA and HTML 5, drawing with the canvas element, Video on the Web, Geo Locations in HTML5, Working Offline in HTML5, Building Forms in HTML5, Using CSS today, understanding CSS Transitions, Hover Crafting with CSS, Enriching Forms Using CSS3 Properties, Transforming the Message, CSS3 – In Conclusion.

**Text books:**

1. Neha Kotecha, Sonal Mukhi, Vijay Mukhi, **ASP.NET with C# The basics**, BPB publishers, 2011.

2. Ivan Bayross, **HTML 5 and CSS 3 made simple**, BPB publications, 2011

3. Programming in C#, E. Balagurusamy

**Reference Books:**

1. **C# Made Simple,** BPB Publishers

2. Kogent solutions Inc, **ASP.Net 3.5 in simple steps,** Wiley, 2011

3. Mark Pilgrim, **HTML5: Up and Running**, O'Reilly, 2010

4. Laura Lemay, Rafe Colburn, Denise Tyler, **Sams Teach yourself web publishing with HTML and XHTML in 21 days**, 3rd Edition, SAMS, 2010

**IV Semester - BCA**

Subject:       **Programming in Java**
Code   :       **X412**

**Unit - I**
**Java Evolution**                                                          **(2 Hrs.)**
Java history, Java features, Hardware and Software requirements, Java support systems, Java environment.

**Overview of Java Language:**                                    **(2 Hrs.)**
Introduction, Simple Java program, More of Java, An application with two classes, Java program structure, Java Tokens, Java Statements, Implementing a Java program, Java Virtual Machine, Command line arguments.

**Constants, Variables and Data types:**                     **(3 Hrs.)**
Introduction, Constants, variables, Data types, Declaration of variables, giving values to variables, Scope of variables, Standard default values.

**Operators and Expressions**                                   **(3 Hr.)**
Introduction, Arithmetic operators, Relational Operators, Logical operators, Assignment operators, Increment and decrement operators, conditional      operator, Bitwise operators, special operators, Arithmetic expressions,   Evaluation of expressions, Precedence of arithmetic operators, Type      conversions in expressions, operator precedence and associatively,     Mathematical functions.

**Unit-II**

**Decision making and branching**                              **(4 Hr.)**
Introduction, 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.

**Decision making and Looping**                                **(4 Hr.)**
Introduction, The While statement, the Do statement, the For statement, Jumps in loops, labeled loops.

**Arrays, Strings and Vectors**                                 **(2 Hrs.)**
Arrays, One-dimensional arrays, creating an Array, Two Dimensional Arrays, Strings, Vectors, Wrapper Classes.

**Unit-III**
**Classes Objects and Methods**                                **(4 Hr.)**
Introduction, Defining a Class, Adding variables, Adding Methods, Creating Objects, Accessing Class members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance, Overriding Methods, Final        variables

and Methods, Final classes, Finalizer Methods, Abstract methods         and         Classes, Visibility control.

## Interfaces: Multiple Inheritance                                      3(hrs)
Introduction, Defining Interfaces, Extending interfaces, Implementing interfaces, Accessing interface variables.

## Packages: Putting Classes Together                                    (3 Hrs.)
Introduction, Java API packages, Using System Packages, Naming conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a package, Hiding Classes.

## Unit – IV
### Multithreaded Programming                                            (3 Hrs.)
Introduction, Creating Threads, Extending the Thread Class, stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread methods, Thread Exceptions, Thread priority, synchronization, Implementing the 'Runnable' Interface.
### Managing Errors and Exceptions                                       (3 Hrs.)
Introduction, Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using finally statement, throwing our own exceptions, Using Exceptions for Debugging.
### Applet Programming                                                   (4 Hrs.)
Introduction, How Applets differ from Applications, preparing to write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable Applet, Applet Tag, Adding Applet to HTML page, Running the Applet, Passing parameters to Applets, aligning the Display.
### Text Book:

1. Programming with JAVA – A Primer Second Edition – E. Balaguruswamy,
   Tata McGraw- Hill Publishing Company Limited.
## Reference Books: :

1. Beginning Java 2 – JDK 1.3 Edition – Ivor Horton, Wrox Press Limited.
The Complete Reference Java 2 – Third Edition – Patrick Naughton, Herbert Schildt, Tata McGraw Hill Publishing Company Limited.


## V Semester - BCA

## Subject: Data Mining

**UNIT-I**                                                               **12 Hrs.**
**INTRODUCTION** : Introduction, Data Mining as a Subject
**DATA WAREHOUSING** Introduction, Definition, Multidimensional Data Model, OLAP Operations, Warehouse Schema, Data Warehousing Architecture, Warehouse Server, Metadata, OLAP Engine, Data Warehouse Backend Process, Other Features
**DATA MINING** Introduction, Data Mining Definitions, KDD vs. Data Mining, DBMS vs. DM,

Other Related Areas, DM Techniques, Other Mining Problems, Issues and Challenges in DM, DM Application Areas, DM Applications-Case Studies

**UNIT-II**                                                 **12 Hrs.**
**ASSOCIATION RULES** Introduction, Association Rule, Methods to Discover Association Rules, Priori Algorithm, Partition Algorithm, Pincer-Search Algorithm, Dynamic Itemset Counting Algorithm, FP-tree Growth Algorithm.
**CLUSTERING TECHNIQUES** Introduction, Clustering Paradigms, Partitioning Algorithms, k-Medoid Algorithms, CLARA, Hierarchical Clustering, DBSCAN, Categorical Clustering Algorithms, STIRR.

**UNIT-III**                                                 **12 Hrs.**
**DECISION TREES** Introduction, Decision Tree, Tree Construction Principle, Best Split, Splitting Indices, Splitting Criteria, Decision Tree Construction Algorithms, CART, ID3
**ROUGH SET THEORY** Introduction, Definition, Example, Rough Sets and Fuzzy Sets.
**OTHER TECHNIQUES** Introduction, Neural Network, Learning in NN, Unsupervised Learning, Data Mining using NN: A Case Study, Genetic Algorithm, Support Vector Machines.

**UNIT-IV**                                                 **12 Hrs.**
**WEB MINING** Introduction Web Mining, Web Content Mining, Web Structure Mining, Web Usage Mining, Text Mining, Unstructured Text, Episode Rule Discovery for Texts, Hierarchy of Categories Text Clustering
**TEMPORAL AND SPATIAL DATA MINING** Introduction, Temporal Data Mining, Temporal Association Rules, Sequence Mining, The GSP Algorithm, Episode Discovery, Event Prediction Problem, Time-Series Analysis, Spatial Mining

**Text Book:**
Arun K Pujari, **Data Mining Techniques**, 2nd Edition, Universities Press India, 2010.
**Reference Book:**
Jiawei Han, Micheline Kamber, **Data Mining Concepts And Techniques**, 3nd Edition, Elsevier,
2010.

<div align="center">

**IV Semester BCA**

</div>

**Subject: TCP/IP**

**Unit – 1**

Evolution of open Networks, Layering of Communication process, TCP/IP Layering, standardization, Internetworking concept and architectural model, Internet addresses.

Link Layer Encapsulation, physical addresses, IEEE & MACs. ARP – Operations, Cache & time outs, RARP – Overview, Operations, Primary and Backup RARP Servers, Loopback Interface.

**Unit – 2**

IP Routing Principles, Routing IP Datagrams, RIP, OSPF, HELLO, BGP, Traceroute program, CIDR – Subnetting, VLSM, Supernetting

**Unit – 3**

UDP Header, UDP Checksum, Multiplexing, De multiplexing & ports, Maximum Datagram Size, Sliding Windows, TCP – Passive and Active Opens, RTT Estimation, TCP Connection Establishment and Termination, Delayed Acknowledgement and Nagles Algorithm, TCP Timers, Multicasting – IP Multicast addresses, IGMP.

DNS – Basics, Resolution, Caching, DNS Message Format, TELNET Protocol, Rlogin – Protocol.

**Unit – 4**

FTP – Protocol, Process Model. TFTP, NFS, SMTP – protocol. POP, IMAP, MIME.

IPV6 – Features, Datagram format, Use of Multiple Headers, IPV4 Vs IPV6.

**Text book:**

Commer Douglas E, **Internetworking with TCP/IP**: Principles, Protocols, And Architecture, Vol. I, 5$^{th}$ Edition, Phi Learning, 2010

**Reference Book:**

1. Peter Loshin, **TCP/IP Clearly Explained**, Elsevier India, 1999
2. Behrouz A Forouzan, **TCP/IP Protocol Suite,** 2$^{nd}$ Edition, Tata Mc-Grow Hill Publications, 2003.

**IV Semester – BCA**

Subject:        **E-Commerce**
Code  :        **X315**

**UNIT – 1**

1. E-Commerce

   Introduction, Brief history of E-Commerce, Definition, Features of E-Com, Benefits or advantages of E-Commerce, Disadvantages of Traditional Business Application, B2B business, B2B E-Commerce diagram, Advantages of B2B, Disadvantages of B2B, B2C E-Commerce  (B. Pradhan)

2. Networking & Internet Technologies

   Networking, Advantages, Disadvantages, types of computer networks, Network Topologies, Transmission media, VSAT , OSI reference model, TCP/IP, wireless network, e-mail, MIME            (B. Pradhan)

**UNIT – 2**

3. Electronic Data Interchange (EDI)

EDI, Benefits, How EDI process works, EDI software, EDI Standards, EDI requirements, EDI Standards (154), steps to successful EDI (B. Pradhan)

4. Security E-Commerce

Introduction, Meaning and Definition, Internet Security Concepts (Confidentiality/Integrity/Authentication), Issues regarding security on Internet, Remedies to product the e-environment, tools to protect Data Security, the firewall concept, components of the firewall, Cryptography (170-175), Encryption of Decryption (176 – 180) (Bhupati) Digital Signature, (172-174), (M.C. Trivedi)

**UNIT – 3**

5. Electronic Payment System

Introduction, EPS, features, types of e-payment, e-cash, e-cheque, Advantages of e-cheque, disadvantages, smart card, credit card, advantages/disadvantages of credit card, security threats (Puja walia) E-wallet (222 – Bibhuti)

6. E-Services (275 – 304) (B. Pradhan)

Introduction, E-learning, E-education, Web enabling services, matchmaking, information selling, entertainment, auctions, internet banking, security and privacy issues in i-banking, attacks and compromises, authentication techniques, payment gateway, e-stock, travel services, e-employment/e-jobs, e-governance.

**UNIT – 4**

7. M-Commerce/Mobile Computing: (Puja Walia)

Introduction, meaning of wireless and mobile computing mobile service typology and fundamentals (M.C. Trivedi) (53,54) Mobile computing framework, mobile information access devices (M.C. Trivedi) (56 – 57) (portable computers) (PDA), Applications of mobile computing, Application of mobile & wireless computing to distinguish fields, advantages of m- computing, disadvantages of m-computing.

8. Education & Training online

Introduction, meaning of education, meaning of training, edutainment, online education and training, advantages of online education and training, disadvantages of online-education and training, tools and techniques for virtual classes/training programme

**Text books**
1. E-Commerce concepts, models and strategies by CSV Murthy, 1st edition, Himalayan

publications (Selections 10.21 to 10.28, 13.19 to 13.25, Chapter 19, Chapter 21.17 to 21.22)
2. Frontiers of E-Commerce by KoaKota and Wintson, Indian edition 2001, Chapter 5.4, 6.1 to 6.4, 8, 22.2 to 22.5
3. E-Commerce the cutting edge of business by Kamalesh Bajaj and Debjani.

## IV Semester – BCA

**Subject:** **Artificial Intelligence**
**Code   :** **X516**

### UNIT-I

(12 Hours)

Overview of AI: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success.

Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem

Heuristic search techniques :Generate and test, hill climbing, best first search technique, problem reduction. constraint satisfaction

### UNIT – II

(12 Hours)

Knowledge representation: Definition and importance of knowledge, Knowledge representation, Various approaches used in knowledge representation, Issues in knowledge representation

Predicate Logic: Representing Simple Facts in logic, Representing instances and 'is a' relationship, Computable function and predicate.

### UNIT – III

(12 Hours)

Natural language processing :Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing.
Learning: Introduction learning, Rote learning, Learning by taking advice, Learning in problem solving, Learning from exa"1ple-induction, Explanation based learning

### UNIT – IV

**(**12 Hours)
Expert System: Introduction, Representing using domain specific knowledge, Expert system shells. LISP and other AI Programming Language

**Text Book**:
    1.   Introduction to Artificial Intelligence and Expert Systems – Dan W Patterson    PHI

**Reference:**
1. D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999
2. Nils J Nilsson ,"Artificial Intelligence -A new Synthesis" 2nd Editor (2000), Harcourt Asia Ltd.
3. E.  Rich and K. Knight, "Artificial intelligence", TMH, ,2nd ed., 1999.

4. AI: A Modern Approach by Stuart Russell and Peter Norvig Second Edition 2006, Prentice Hall

<div align="center">

**V Semester - BCA**

</div>

**Subject:**     **Management and Entrepreneurship**
**Code   :**

**UNIT 1:**

**Management**
Introduction, meaning, nature and characteristics of management, scope and functional areas of management, management as a science, art of profession, management and administration, roles of management, levels of management.

**Planning**
Nature, importance and purpose of planning process, objectives, types of plants(meaning only), decision making, importance of planning, steps in planning and planning premises, hierarchy of plans.

**UNIT 2:**
**Organizing and Staffing:**
Nature and purpose of organization, principles of organization, types of organization, departmentation committees, centralization vs. decentralization of authority of responsibility, nature and importance of staffing, process of selection and recruitment(in brief).

**Direction & controlling:**
Meaning and nature of directing styles, communication – meaning and importance, coordination – meaning and importance and techniques of coordination, meaning and steps in controlling.

**UNIT 3:**
**Entrepreneur**
Meaning of entrepreneur, evolution of the concept, functions of and entrepreneur, types of entrepreneur, entrepreneur – emerging class, concept of entrepreneurship, evolution of entrepreneurship, development of entrepreneurship, stages in entrepreneurial process, role of entrepreneurs in economic development, entrepreneurship in India,  entrepreneurship its barriers.

**Small scale industries**
Definition, characteristics, need and rationale, objectives, scope, role of SSI in economic development, advantages of SSI, government policy towards SSI, Different polices of SSI, impact of liberalization, privatization and globalization on SSI, ancillary industry and tiny industry (definition only).
**UNIT – 4**

**Preparation of Project**
Meaning of project,  project identification, project selection, project report, need and

significant of report, contents, formulation, guidelines by planning commission for project report, network analysis, errors of project report, project appraisal, identification of business opportunities, market feasibility study, technical feasibility study, financial feasibility study and social feasibility study.

**Text books**
1. Principles of management – P.C. Tripathi, P.N. Reddy – Tata McGraw Hill
2. Dynamics of Entrepreneurial Development and Management – Vasant Desai – Himalaya Publishing House
3. Entrepreneurship Development – Poornima M Charantimath small business enterprises – person education – 2006 (2 & 4)

## Reference Books ( MLA or APA style )
1. Management Fundamentals – Concepts, Application, Skill Development, Robert Lusier, Thomson
2. Entrepreneurship Development – S.S. Khanka – S. Chand & Co
3. Management – Stephen Robbins, Pearson Education / PHI, 17th Edition, 2003

## V Semester - BCA

**Subject: Java Server Pages**

**UNIT - 1**
**The J2EE Platform**
Introduction
Enterprise Architecture styles Two - Tier Architecture
Three Tier Architecture N - Tier Architecture Enterprise Architecture The J2EE Platform
Introduction to J2EE APIs (Servlet, JSP, EJB, JMS, JavaMail, JSF, JNDI) Introduction to container
Apache Tomcat as a Web Container J2EE 1.4 as an Application Server
**Database programming with JDBC:** Introduction and Need for JDBC Database Drivers
JDBC APIs for database Connectivity (Java. sql Package)
Connection Statement
Prepared statement Callable statement Result set
Other JDBC APIs Database Meta Data
Result Set Meta Data
**UNIT - 2**
**Servlet Programming**
Introduction to Servlets
Servlets Implementation
The servlet interface The Generic Servlet class The single thread Model interface The Http Servlet class
Service( ) doGet( ) doPost( ) doDelete( )
doOption( ) doPut( )
doTrace( )
Servlet Exceptions
The Servlet Exception class, The unavailable Exception class, Servlet Lifecycle ,

Servlet Request and Response, The Http Servlet Request interface, GetAttribute( )
setAttribute( ) , getAttributeNames( ) getparameters( )
getParameternames( ) getParameterValues( ) getRemoteHost( ) getRemoteAddr( )
getCookies( )
getHeaders( )
getQueryString( ) getSession( )
The Http servlet Response Interface
getWriter( )
getcontentType( ) addCookie( )
encodeURL( ) sendRedirect( ) setHeader( ) setStatus( )
Session Tracking Approaches URL Rewriting
Hidden Form Fields Cookies
Session API
Session Tracking with Servlet API The Http Session interface
GetAttribute( )
GetAttributeNAmes( ) GetCreationTime( ) GetId( )
GetlastAccessedTime( ) IsNew( )
RemoveAttribute( ) SetAttribute( )
SetMaxInactiveinterval( )
Invalidate( )
Servlet Collabration
Request Dispatching with Request Dispatcher interface
Forward( )
Include( )
Servoet Context
The servlet Context interface getContext( )
getRequestDispatcher( ) getServerInfo( )

**UNIT – 3**
**JSP Programming**
Introduction to JSP JSP development
Basic JSP LifeCycle JSP Elements
Directive Elements Page Directive
Include directive Scripting elements
Declaration Scriptlets Expressions Action lelemtns
Standard action <jps : param> <jsp : include> <jsp : forward> <jsp : plugin>
Comments and template data Scope of JSP variables
Page
Request Session
Application
Using implicit objects The request object
The response object The out object
The session object The config object
The exception object The application object
Handling Errors and Exception Dealing with exception in the page
directive
Dealing with exception in the Deployment Descriptor
Adding exception handling in JSP pages

Including and forwarding from JSP pages
Include Action Forward Action, getInitParameter( )
getInitParameterNames( ) getAttribute( )
setAttribute( )
removeAttribute( )
**JSP Expression Language:** EL Introduction, EL Implicit Objects EL Operators , EL Functions
**JSP Standard Tag Library:** JSTL Introduction core tags
xml tags sql tags fmt tags Core tags
<c : out> <c : set> <c : if>
SQL tags
<sql : query> <sql : update> Fmt tags
<fmt : formatNumber> <fmt : formatDate>

## UNIT 4

### Database Connectivity

Database Programming using JDBC, Studying Javax.sql.*package, accessing a database from

a JSP page, Application-specific Database Action, Developing Java Beans in a JSP page,

introduction to Struts framework.

### V Semester - BCA

**Subject:** **Computer Graphics**
**Code: X512**
**Unit-1** **(12 hrs)**

### Raster Graphics Algorithm for 2D primitives

Introduction-Output Technology-Raster and Vector display system, Software portability and
Graphics Standards, Conceptual Framework of Interactive Graphics.
Scan converting-lines, circles and ellipses, Filling rectangles, polygons, ellipse arcs, pattern
filling, Thick primitives, Line Style, Pen Style, Clipping in a Raster World, Clipping lines,
circles, ellipses and polygons, Generating characters.

**Unit-2** **(12 hrs)**

**2D Graphics**
2D transformations, Homogenous coordinates Matrix representation of 2D transformation,
Composition of 2D transformation, Window to Viewport transformation.

**Unit-3** **(12 hrs)**

**3D Graphics**
Matrix representation of 3D transformation, Composition of 3D transformation,
Transformations as change in coordinate systems
**Unit-4** **(12 hrs)**

**Multimedia**

Introduction, Multimedia data streams, sound and audio file formats, images and graphics
file formats, data compression and optical storage media

**Text Books**

1. Foley J.D Van Dan A. Fundamentals of interactive computer Graphics, Addison Wesley.
2. Multimedia Computing, communication and application by Rolfsteinmetz, Redson Education

Reference Books:

Hearn D Baker P.M COMPUTER GRAPHICS (PHI)

1. Rogers D.F Adam J: Mathematical Elements for Computer Graphics, McGrawHill
2. Harrington D: Computer Graphics-A programming approach, Tata McGraw Hill
3. Foley, J.D Van Dam A, Feiner S.K and Hughes; Computer Graphics principles and practice, Addison Wesley
4. Giloi W K:Interactive computer graphics, prentices Hall
5. Newman W, Sproul R.F: Principles of Interactive computer Graphics, McGrawHill
6. Rogers D.F Procedural Elements of Computer Graphics.
7. Satish Gupta, Main Stream Multimedia, Van No stand 1993
8. Robert Jennings, Windows 3.1 Multimedia, Que Corporation 1992

## V Semester - BCA

**Subject:** Software Engineering
**Code :** X513

## Unit 1
**Introduction** (2 Hours)
The Software Problem, Software Engineering Problem, The Software Engineering Approach

**Software Processes** (8 Hours)
Software Process, Characteristics of a Software Process, Software Development Process, Waterfall Model, Prototyping, Iterative Enhancement, Spiral Model, Project Management Process, Phases of management process, Metrics, Measurement, and Models, Software Configuration Management Process, Configuration Identification, Change control, Status accounting and auditing, Process Management Process, Building estimation models, Process Improvement and maturity,

## Unit2
**Software Requirements Analysis and Specification** (5 Hours)
Software Requirements, Need for SRS, Requirement process, Problem Analysis, Analysis Issues, Informal Approach, Structured Analysis, Prototyping, Requirements Specification, Characteristics of an SRS, Components of an SRS, Specification Languages, Structure of a Requirements Document, Validation, Requirement Reviews

**Preliminary Design** (5 Hours)
Design Principles, Module-Level Concepts, Design Notation and Specification, Data Flow Diagrams, Structured Design Methodology, Verification

## Unit 3
**Detailed Design** (6 Hours)
Module specification, Specifying functional module, Detailed design, PDL, Logic/Algorithm

Design, Verification, Design Walkthroughs, Critical Design Reviews, Consistency checkers
**Coding**                                                                    (4 Hours)
Programming Practice, Top-Down and Bottom-Up, Structured Programming, Information
Hiding, Programming Style, Internal Documentation, Verification, Code Reading, Static
Analysis, Proving Correctness, Code Inspections or Reviews, Unit Testing

**Unit 4**
**Testing and Maintenance**                                                   (10 Hours)
Testing Fundamentals, Error, Fault, and Failure, Top-Down and Bottom-Up Approaches, Test
Cases and Test Criteria, Psychology of Testing, Functional Testing, Equivalence class
partitioning, Boundary value analysis, Cause-effect graphing, Structural Testing, Control flow
based criteria, Data flow based testing, Preventive and Corrective Maintenance activities
**TEXT BOOKS**
1. Integrated Approach to Software Engineering by Jalote Pankaj. – 3rd Edition

**Reference Books**
1. Software Engineering by Roger Pressman – McGraw Hill Publication

### V Semester - BCA

**Subject:**      **Distributed Computing**
**Code  :**      **X515**
**Unit-1**

### Principles of DC and Distributed Databases                          (12 hrs)

Chapter 1: Introduction to Principles of DC, Distributed Databases: An Overview,-Features of
Distributed  versus  Centralized  Databases,-Why  Distributed  Databases?,-Distributed
Database Management Systems (DDBMSs)

Chapter 2: Review of Databases:- The Relational Model, Database Applications, Programs
and Transactions

Chapter 3: Levels of Distribution Transparency,-Reference Architecture for Distributed
Databases,-Types of Data Fragmentation
> Query Processing and Concurrency Control in DBMS: Transaction Concept,
> Transaction State, Implementation of Atomicity and Durability, Concurrent
> Executions  , Serializability: Conflict Serializability, Recoverability,-Lock-Based
> Protocols:->Locks, Granting of Locks, The Two-Phase Locking,
> Protocol,-Timestamp-Based Protocols

**Unit-2**                                                                    (12 hrs)
Distributed Database concept, Distributed Concurrency Control, Commit Protocols
Fault Tolerance:,-Introduction - Issues  - Atomic Actions and Committing   - Commit
Protocols - Nonblocking Commit Protocols- Voting Protocols->Static Voting,Commit
Protocols

**Unit-3**                                                     **(12 hrs)**

Distributed deadlock detection and resolution -Introduction             - Preliminaries - Deadlock Handling Strategies in Distributed Systems  - Issues in Deadlock Detection and Resolution       - Control Organizations for Distributed Deadlock Detection - Centralized Deadlock-Detection Algorithms - Distributed Deadlock Detection Algorithms->A Path-Pushing Algorithm - Hierarchical Deadlock Detection Algorithms->The Menasce-Muntz Algorithm-Perspective- Distributed Algorithms

Distributed Mutual Exclusion -Introduction - The Classification of Mutual Exclusion Algorithms - Preliminaries  - A Simple Solution to Distributed Mutual Exclusion  - Non-Token-Based Algorithms - Lamport's Algorithm

Agreement Protocols-Introduction - The System Model - A Classification Of Agreement Problems- Solutions to the Byzantine Agreement Problem * The Upper Bound on the Number of Faulty Processors * An Impossibility Result

**Unit-4**                                                     **(12 hrs)**

      **Distributed Programming**

      -Developing distributed applications using Servlets and JSP
      -Development of Enterprise-wide applications.

**Text Books:**
1. Principles and Systems by  Ceri.S and Pelagatti S, McGraw Hill
2. Database System Concepts by Abraham Silberschatz, Henry K Forth and S.Sudarshan
3. An Introduction to Databases by Desai
4. Advanced Concepts in Operating System by Mukesh Singhal and Niranjan Shivaratri
5. Professional JSP 2ND Edition by Simon Brown, Robert Burdick, Jayson Falkner, Ben Galbraith, Rod Johnson, Larry Kim, Casey Kochmer, Thor Kristmundsson, Sing Li, Wrox Publication

## V Semester – BCA

**Sub: SAP and Cloud Computing**

### Unit I

INTRODUCTION TO ERP-Introduction to SAP R/3. SAP R/3 ARCHITECTURE-Central System,Distributed Presentation,2-Tier Configuration,3-Tier Configuration.SYSTEM LANDSCAPE AND FLOW--Single System Landscape,Two System Landscape,Three System Landscape,Multi System Landscape. INSTALLATION OF SAP-Installation Concepts on Windows & UNIX and Quick Sizing,Naming Convention, Software Kit, SAP Licensing,Installation Procedure - Windows Application Server for UNIX SAP System,R/3 Directory Structure, Kernel.GUI ADMINISTRATOR—Optimization,Security.OPERATION MODES--Manual Switching of OP Modes,Exceptional Mode,Monitoring.PROFILE MAINTENANCE & PARAMETER SETTING---System Profile,Transport Profile,Client Profile,Authorization Profile

USER ADMINISTRATION

- Creating and Maintaining Master Records, Architecture
- Logon and Password Security, Protecting Special Users
- Creating and Maintaining Single and Mass Users and User Groups
- Copying, Deleting, Locking/Unlocking Users
- Explanation of Terms Object Class, Authorization Object, Authorization, Profile
- Create/Maintaining Authorization/Profile Manually
- Create/Maintaining Roles/Generating Profiles by using PFCG

### CLIENT ADMINISTRATION

- Client Maintenance
- Copying Client within R/3 System (Local)
- Copying client between R/3 Systems (Remote)
- Export/Import
- Protecting Client
- Monitoring and Verifying a Client Copy
- Deleting Client

Tips and Troubleshooting

**Unit II**

### TRANSPORT MANAGEMENT SYSTEM

- TMS Terminology and Concepts
- Configuring TMS and Checking Transport Directory
- Configuring Transport Domain, Domain Controller and Group
- Configuring Virtual SAP System and Displaying Configuration
- Including SAP systems in the Transport Domain
- Creating Consolidation and Delivery Routes
- Maintaining SAP Systems without Common Transport Directory
- Configuring External Systems
- Locking and Unlocking TMS for a SAP System
- Deleting SAP System from the Transport Domain
- Deleting TMS Configuration

### SAP ROUTER

- Installation of SAP Router
- Creating Route Permission Table
- Setting Route String Entry for SAP Router
- Using Various Administrative Options

### DATABASE MANAGEMENT

- Introduction to Oracle
- Oracle Architecture
- Introduction to SAPDBA

- Creating Tables and Table Space Adjustment
- Database Backup, Restore and Recovery

## Unit III

**Cloud Computing**

**Introduction To cloud**

1. Virtualization concepts
    1. Types of Virtualization & its benefits
    2. Introduction to Various Virtualization OS
        1. Vmware , KVM etc
    3. HA/DR using Virtualization
    4. Moving VMs
    5. SAN backend concepts
2. Cloud Fundamentals
    1. Cloud Building Blocks
    2. Understanding Public & Private cloud environments

**Cloud as IaaS**

3. Private Cloud Environment
    1. Basics of Private cloud infrastructure
    2. QRM cloud demo
4. Public Cloud Environment
    1. Understanding & exploring Amazon Web services
    2. Managing and Creating Amazon EC2 instances
    3. Managing  and Creating  Amazon EBS volumes
    4. Tata Cloud details & demo
5. Managing Hybrid Cloud environment

## Unit IV

**Setting up  your own  Cloud**

6. How to build private cloud using open source tools
7. Understanding  various cloud plugins
8. Setting up your own cloud environment
    1. Auto Provisioning
    2. Custom images
    3. Integrating tools like Nagios
9. Integration of  Public and Private cloud

**Future directions**

10. Cloud Domain and scope of work
11. Cloud as PaaS, SaaS
12. Cloud Computing Programming Introduction

13. Trends and market of cloud

**VI Semester - BCA**

Project Work