

## **SEMESTER ONE**

## **1.MATHEMATICS**

### **Course Objective:**

This Course is intended to provide you:

- Majorly understanding the fields of Calculus and Linear Algebra
- Relating the knowledge of these concepts to their Business and Economic Applications
- Viewing the daily routine problems faced in a Business Organization as a Mathematical Situation

### **Learning Outcomes**

This course enables you to:

- Solve business arithmetic operations with fractions to do business problems, and be able to select which math method needs to be used to do problems
- Use Matrix Algebra and its applications to perform different calculations which are otherwise complex and time consuming
- Use differential and integral calculus to do business calculations , trend analysis, study market fluctuations and be able to differentiate which math method should be used for different problems

### **Syllabus**

#### **BLOCK I: Introduction to Business Mathematics**

Introduction, Quantitative Approach, Profit and Loss, Simple and Compound Interest, Present Value, Annuities, Shares and Bonds

#### **BLOCK II: Basic Algebra**

Surds and Indices, Logarithms, Linear and Quadratic Equations, Simultaneous Equations, Inequalities with Graphs, Arithmetic Progression (A.P.), Geometric Progression (G.P.)

#### **BLOCK III: Matrices and Determinants**

Matrices, Special Types, Operations, Determinants and Non-singularity, Rank of a Matrix, Inverse of a Matrix, Solution of Equations- Unique Solution, Gauss-Elimination Method

#### **BLOCK IV: Calculus 1**

Introduction, Theory of Sets, Relations and Functions, Limits and Continuity

#### **BLOCK V: Calculus 2**

Differentiation, Maxima and Minima, Integration

## **Text and References:**

- Engineering Mathematics, E. Kreyig
- Higher Engineering Mathematics, B. S. Grewal
- Differential Calculus, Shanti Narayan
- Business Mathematics by Kashyap Trivedi and Chirag Trivedi
- Business Mathematics by D.C . Sancheti
- Business Mathematics by Qazi Zameeruddin, Vijay K. Khanna and S.K. Bhambri

## **2.INTRODUCTION TO IT**

### **Course Objectives**

This course aims to:

- To provide a fundamental understanding of computer science for the Learners in their early stages of academic career.
- To make the Learners familiar with computer nomenclatures related to hardware and software to develop an in-depth realization of several subjects and their significant roles in the field.
- To introduce Learners to basic concepts of memory, processing units, Operating System, Computer Networks and Data Communications.

### **Learning Outcomes**

On completion of the course, Learners are expected to:

- Describe and explain computer hardware and software topics for information technologies
- Understand computer and technology related issues
- Explain and use operating system concepts and functions

### **Syllabus**

#### **BLOCK I: Computer Basics**

Algorithms, A Simple Model of a Computer, Characteristic of a Computer, Problem Solving Using a Computer, Generations of Computer Systems

**Input output units:** Description of Computer Input Units, Other Input Methods, Computer Output Units

**Processor:** Structure of instruction, Description of Processor.

**Classification of Computer Systems:** Analog, Digital, Types of Computers (Micro, Mini, Main Frame) Systems.

#### **BLOCK II: Computer Memory**

Memory cells, Memory Organizations, Read only Memory, Physical devices used to construct Physical Memory, Hard Disks, Floppy Disks, CDROM

### **BLOCK III: Primary Arithmetic**

Addition, Subtraction, Signed Numbers, Two's Complement, Addition & Subtraction using 2's Complement Method, Multiple & Division of Binary Numbers. Floating point Representation, Arithmetic Operations with Normalized Floating Point Numbers.

### **BLOCK IV: Introduction to Operating Systems**

Why do we need Operating System. Batch Operating System, Multi Programming Operating System, Time Sharing Operating System. Personal Computer Operating System, Online and Real Time Systems.

### **BLOCK V: Introduction to Computer and Communication**

Type of Communication among Computers, Need of computer Communication Network, Internet and World Wide Web, Characteristics of communication Channel, Physical Communication Media, Establishing Channel for communications.

### **Text & Reference:**

- Fundamentals of Computer Science, V. Rajaraman, PHI.
- Computer Fundamentals, Anita Goel, Pearson publication
- Fundamentals of Computer Programming and Information Technology, J. B. Dixit

## **3.C PROGRAMMING**

### **Course Objective-**

- To make the student understand all the components of C, including the C language, the C Preprocessor, and the C Standard Library.
- To make the Learners familiar with some advanced practical issues, including memory management, testing and debugging, complex declarations and expression evaluation, building and using libraries, and evaluating trade-offs, such as size vs. speed and speed vs. complexity.
- To hone the ability of Learners to write C code and create and manipulate linked lists.

### **Learning Outcomes-**

- On the completion of the course, Learners are expected to:
- Be able to implement, test, debug, and document programs in C
- Understand low-level input and output routines
- Program with pointers and arrays, perform pointer arithmetic, and use the preprocessor
- Be able to write programs that perform explicit memory management

- Understand how to write and use functions, how the stack is used to implement function calls, and parameter passing options
- Understand and use the common data structures typically found in C programs -namely arrays, strings, lists, trees, and hash tables

## Syllabus

**BLOCK I : Introduction to Computer Fundamentals:** Basic Computer Organization, Computer Hardware Components, Disk, Primary and Secondary Memory, Keyboard, Mouse, Printer, Monitor, CD etc.Computer Software: Introduction to Application software, System Software, Compilers, Interpreters etc.Basic Operating System Concepts, Functional knowledge of MSDOS and WINDOWS.

**Number System:** Binary, Hexadecimal, Octal, and Decimal. Conversion from one number system to another. Computer Codes - ASCII and EBCDIC. Representation of Integers, Fixed and Floating-Point.

**BLOCK II : Introduction to 'C' Language:** Character set, Variables Identifiers, Data type, Arithmetic operation, Constant, operators, Expression, Assignments, basic input/output statements, Simple 'C. Programs. Decision making in program, Relational Logical operators, if statements, if -else, nested if-else statements, Switch, case loop, do-While, While, for loop and nesting of loop.

**BLOCK III : Arrays and Functions:** One Dimensional Arrays, Arrays Manipulation, Sorting, Searching, Problems solving Top down Approach, Modular Programming and functions, Passing Arguments, call by value and call by references, Recursive function, .Recursion,

**BLOCK IV : Pointers:** Declaration, Pointer assignments, initialization, Pointers and Dynamic Memory Allocation, Discuss Array of Pointers.

**BLOCK V : Structure and Union:** Structure definition, Declaration, structure Assignments, Arrays in structure, Structure Arrays, Pointer Structure, Nested Structure, Arrays and Arrays of Structure, Union and File Handling

## Text and References:

- Computer Fundamentals by Anita Goel
- Computer Fundamentals by Pradeep Sinha, Priti Sinha
- fundamentals of computers by Balagurusamy

## **4.PRINCIPLES & PRACTICES OF MANAGEMENT**

### **Course Objectives :**

- The aim of the course is to orient the Learners in theories and practices of Management so as to apply the acquired knowledge in actual business practices. This is a gateway to the real world of management and decision-making.
- The emphasis will be on conceptual development of practices of management.
- Managers face difficult and exciting challenges today, solid grounding in management are therefore, essential to guide large and small, profit and non-profit organizations successfully through these turbulent times.

### **Learning Outcomes :**

- Discuss and communicate the management evolution and how it will affect future managers.
- Observe and evaluate the influence of historical forces on the current practice of management.
- Practice the process of management's four functions: planning, organizing, leading, and controlling.
- Evaluate leadership styles to anticipate the consequences of each leadership style.

### **Syllabus :**

#### **BLOCK I: Introduction to Management, Managerial Roles and Skills**

Concept, Nature, Scope and Functions of Management, Levels of Management, Managerial Roles – Interpersonal Roles, Informational Roles, Decisional Roles, Managerial Skills.

#### **BLOCK II: Planning**

Importance of Planning, Objectives and characteristics, Principles of Effective Planning, Levels of Planning.

#### **BLOCK III: Organizing**

Meaning, Importance and Principles, Departmentalization, Span of Control, Factors affecting Span of Management. Communication in Organization: Formal and Informal Channels of Communication, Interpersonal Communication: Styles and Forms.

#### **BLOCK IV: Directing**

Motivation, Coordination, Directing and Management Control, Decision Making.

#### **BLOCK V: Management Control**

Introduction, Controlling and the control process, characteristics of effective control systems.

### **Text & References:**

- Human Relations and Organisational Behaviour, Mr. R.S. Dwivedi
- Organisational Behaviour, Mr. Sanjay Srivastav
- Essentials of Management, H. Koontz
- Principles and Practices of Management : Bakshi

- Student Study Material (SSM)
- Barat, N. 1998, Emerging issues in Management, Excel Books, India.
- Greenberg, J. & Baron, R.A. 1993, Behaviors in Organizations, Allyn and Bacon, Boston.
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## **5.C PROGRAMMING LAB**

### **Course objective-**

- To arm the Learners with the basic programming concepts.
- To introduce different techniques pertaining problem solving skills
- To arm the Learners with the necessary constructs of C programming.
- To emphasis on guided practical sessions

### **Learning outcomes-**

On the completion of the course, Learners are expected to:

- Be able to implement, test, debug, and document programs in C
- Understand low-level input and output routines
- Program with pointers and arrays, perform pointer arithmetic, and use the preprocessor
- Be able to write programs that perform explicit memory management
- Understand how to write and use functions, how the stack is used to implement function calls, and parameter passing options
- Understand and use the common data structures typically found in C programs — namely arrays, strings, lists, trees, and hash tables

### **Syllabus**

- Write a program to find the area and perimeter of (I) square (ii) rectangle.
- Write a Program to find the sum of first n natural numbers.
- Write a program to calculate the average of n numbers.
- Write a program to check whether the number is even or odd.
- Write a program to find largest of three numbers.
- Write a program to swap the values of two given variables.
- Write a program to find the square of a given number.
- Write a program to calculate the roots of a quadratic equation.
- Write a program to compute the sum of squares of n natural numbers.
- Write a program to reverse a given number and also calculate the number of digits in the number.
- Write a program to calculate the sum of digits of a given number.
- Write a program to calculate the factorial of a given positive number.
- Write a program to generate fibonaaci series upto n terms.
- Write a program to find the GCD and LCM of two given positive numbers.
- Write a program to print first n prime numbers.

- Write a program to print 1 if input character is capital, 2 if input character is a lowercase alphabet, 3 if input character is a digit and 4 if some other special character.
- Write a C program to check whether a number is an Armstrong number.
- Write a C program to find the power of a number.
- Write a C program to find the sum of n terms of the series:  $n - n^2/2! + n^3/3! - n^4/4! + \dots$
- Write a C program to find the maximum/minimum number in a given array.
- Write a C program to search a number in an array using linear search.
- Write a C program to sort a given array using Bubble sort.
- Write a C program to concatenate two one-dimensional arrays.
- Write a C program to add, subtract and multiply two m by n matrices.
- Write a C program to detect the occurrence of a character in a given string.
- Write a C program to count the number of characters in a given string with and without using strlen () function,
- Write a C program to copy the contents of one string to another with and without using strcpy () function.
- Write a C program to determine whether the entered character string is palindrome or not.
- Write a C program to enter the marks, address of several Learners and prepare the mark sheet of each student. Use structures.
- Write a C program to calculate net salary / printing of salary statement of an employee. Use Structures.
- Write a C program to calculate the factorial of a number using recursion.
- Write a C program to generate a fibonacci series using recursion.

## TEXTBOOKS & REFERENCES

- Let Us C-Book by Yashavant Kanetkar
- Programming in Ansi c by Balagurusamy
- 3.C Programming Language, by Brian W. Kernighan, Dennis M. Ritchie

## **SEMESTER TWO**

# **1. DATA & FILE STRUCTURE USING C**

## **Course Objective-**

This course is aims at:

- Introduction to the use, design, and analysis of data structures in computer programs.
- Detailed discussion of commonly used data structures like arrays, stacks, queues, lists, trees, and graphs.
- Study of algorithms with effective searching, sorting and hashing techniques
- Knowledge of various operations on data structure and appropriate way of handling them

## **Learning Outcomes-**

A better understanding of solving problems through computer programming along with appropriate data structures

Student will be able to create, manage and manipulate pointers to data elements & complex data types in C

Operations handling on various data structure will be easier like searching, insertion, deletion, traversing mechanism etc.

Using of data structure would be easier and effective like stacks, queues, linked list etc.

## **Syllabus**

### **BLOCK I: Basic concepts of data representation**

Abstract data types: Fundamental and derived data types, Representation, Primitive Data Structures.

### **BLOCK II: Arrays & Linked List**

Representation of arrays single and multi-dimensional arrays. Address calculation using column and rows major ordering. Various operations on arrays, Vector, Application of arrays: matrix multi multiplication, sparse polynomial and addition.

**Linked List:** Singly linked list; operations on list. Linked stacks and queue. Polynomial representations and manipulation using linked lists, doubly linked list. Generalized list structure. Sparse matrix representation using generalized list structure.

### **BLOCK III: Stacks and Queues**

Representation of stacks and queues using arrays and linked list. Circular queues, priority queue and D-queue. Application of stacks: conversion from infix to postfix expression, Evaluation of postfix expression using stacks.

## **BLOCK IV: Trees and Graphs**

Binary trees traversal method: preorder, in-order, post-ordered traversal. Recursive and non-recursive algorithm for above mentioned Traversal methods. Representation of trees and its application: Binary tree representation of a tree, Binary search tree: height balanced (AVL) tree

**Graphs:** Graph representation: adjacency list, adjacency multicasts, adjacency lists. Traversal scheme: Depth first search, Breadth first search. Spanning tree: definition, minimal spanning tree algorithms

## **BLOCK V: Searching, sorting and complexity**

Searching: Sequential and binary search, indexed search, Sorting: insertion, selection, bubble, quick, merge, heap sort.

### **Text & References:**

- T. Langsam, M.J Augenstein and A.M. Tanenbaum, "Data structure using C and C++ S econd edition, 2000, Prenticehall of India.
- R. Kruse, G.L. Tonodo and B. Leung," Data structures and progam design in C", Secon d Edition, 1997, Pearsoneducation.
- S. Chottopadhayay, D. Ghoshdastidar & M. Chottopadhayay. Data structures through la nguage", First edition, 2001,BPB Publication.
- G.L. Heileman, Data structures, Algorithms and object oriented programming," First Edit ion 2002, Tata McGraw Hill.
- E. Horowitz, Sahni and D. Mehta," Fundamentals of data structures in C++,"200 Galgoti a Publication

## **2. COMPUTER ORGANIZATION**

### **Course Objective:**

The Course aims at:

- Teaching the Learners about the evolution and basic design of the computer system
- Introducing to computer architecture and how different parts of computers are organized
- Briefing about various operations performed between different parts to do a specific task.
- To focus on both the physical design of the computer (organization) and the logical design of the computer (architecture).

## **Learning Outcome:**

By the end of the course, the student will be able to:

- Describe the structure and functioning of a digital computer, including its overall system architecture, and digital components.
- Explain the generic principles that underlie the building of a digital computer, including data representation, digital logic and processor programming.
- Present and discuss simple examples of assembly language appropriate for an introductory course.
- Learn basic assembly language programming for RISC (MIPS assembly language) and CISC (8086 assembly language) computers.
- Understand memory hierarchy.

## **Syllabus**

### **BLOCK I: Introduction**

Introduction to Computers with BLOCK diagrams, Computer generations, Impact of technology; Number systems, Binary, Octal, Hexadecimal.

### **BLOCK II: Computer Arithmetic**

Logic gates, Boolean algebra, Karnaugh's maps with building BLOCKs of basic gates, Half-adder, Full-adder, Decoders, Multiplexers, De-multiplexers, Encoders & decoders, Binary counters, Flip/Flops.

### **BLOCK III: Memory Organization**

Memory Organization, RAM, ROM, Auxiliary memory, Memory hierarchy, Associative memory, Virtual memory, Cache memory, memory management hardware.

### **BLOCK IV: Input & output Organization**

Input-Output organization, Peripheral devices to input-output interface, Direct memory access, Types of command, Modes of Transfer, Asynchronous data transfer, Strobe Control, Handshaking, DMA transfer, IO processor.

### **BLOCK V: Processor Organization**

Instruction Formats, Single accumulator organization, General register organization, Stack Organization, Addressing modes, Data Transfer & manipulation, Program control, RISC instruction set design

### **Text & References:**

- "Computer Organization and Design: The Hardware/Software Interface" by David A Patterson and John L Hennessy
- "Computer Organization and Architecture: Designing for Performance" by William Stallings
- "Computer Architecture & Organization" by Raj Kamal and Nicholas Carter
- "Computer Organization and Design" by John L Hennessy David

### **3. DISCRETE MATHEMATICS**

#### **Course Objective:**

The Objective of this course is to:

- Provide the fundamentals and the concepts of Discrete Mathematical Structures
- Give detailed overview of Applications to Computer Sciences including Mathematical Logic, Boolean algebra and its Applications, Switching circuit & Logic Gates, Graphs and Trees.
- Teach Important theorems with constructive proofs, real life problems & graph theoretic algorithms
- Understand the computational and algorithmic aspects of Mathematical Logic, Boolean Algebra, Graphs and Trees

#### **Learning Outcomes:**

On completion of this course, Student will be able to:

- Express a logic sentence in terms of predicates, quantifiers, and logical connectives
- Apply the rules of inference and methods of proof including direct and indirect proof forms, proof by contradiction, and mathematical induction.
- Use tree and graph algorithms to solve problems.
- To evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
- Identify and apply basic concepts of set theory, arithmetic, logic, proof techniques, binary relations, graphs and trees
- Apply the knowledge and skills obtained to investigate and solve a variety of discrete mathematical problems

#### **Syllabus:**

##### **BLOCK I: Discrete Mathematics**

Introduction, Statement and Logical Connection, Parallel Order Relation, Tautologies and Contradiction, Logical Equivalence, Algebra of Proposition

**Algebra of Proportions:** Boolean Algebra, Algebra of Electric Circuits and its Application, Boolean Function, Binary Operator, Binary Operation, Function, Relations, Algorithm

**BLOCK II: Logic and Propositional Calculus**

Basic Concepts of Calculus, Closure under Operations, Propositional Calculus, Alternative Calculus, Equivalence to Equation Logics

**BLOCK III: Successive Differentiation and Differential Equations**

Successive Differentiation, Standard Formulae for Nth Derivatives, Leibniz Rule, Taylor's Series, Differential Equation, First Order and First Degree Differential Equations, Variables Separable, Homogeneous Equations, Linear Equations

**BLOCK IV: Solution of Linear and Non-linear Equation**

**Linear Equation:** Direct Method, Iterative Method, Density, Methods of Matrix Inversion

**Non-linear Equation:** Introduction, Properties of the Equations, Methods of Solution

**BLOCK V: Numerical Integration & Differentiation**

Introduction, Riemann Sums, Trapezoidal Rule, Simpson's 1/3rd Rule, Gaussian Quadrature Rule

**Numerical Differentiation:** Introduction, Direction Fields, Euler Methods, Runge-Kutta Method, Picard's Method, Successive Approximation

**Texts and References:**

- Rosen, Kenneth H. Discrete mathematics and its applications / Kenneth H. Rosen. — 7th ed.
- Discrete and Combinatorial Mathematics : An applied introduction (4<sup>th</sup> edition) by Ralph Grimaldi

**4. ACCOUNTING FOR MANAGERS**

**Course Objective:**

The Objectives of the course are:

- To develop an understanding of the importance, language and techniques of Financial, Cost, Management accounting and Capital Budgeting.
- To develop skills for preparation and analysis of financial statements.
- To develop an understanding of cost classification, allocation and how the costing techniques are useful in the process of managerial decision making

## **Learning Outcomes-**

On successful completion of this course you will be able to:

- Explain and use accounting information in business decision-making contexts
- Critically analyse financial reports and financial information to advise upon and improve business practices.
- Apply the major types of financial statement analysis to plan and control business activities
- Use the major techniques of financial and management accounting to make informed business decisions
- Evaluate contemporary management accounting systems and apply these systems to improve management decision-making.

## **Syllabus:**

### **BLOCK I: Financial Accounting- Introduction, Concepts and Principles**

Accounting Concepts, Accounting Principles, Double Entry Accounting, Meaning and roles of debit and credit, Accounting equation, journalizing of transactions, Secondary Books, Bank Reconciliation Statement, ,

### **BLOCK II: Final Accounts**

Preparation of Manufacturing, Trading and Profit & Loss Account and Balance Sheet - Matching of Revenue & Expenses, Fixed Assets, Depreciation and other related adjustments, Financial Statements and their Nature

### **BLOCK III: Financial Statement Analysis**

Financial Ratio Analysis, Solvency Ratio, Liquidity Ratio, Activity Ratio, Capital Structure, Profitability Ratios, Funds Flow statement and Cash Flow Statement (AS 3), Comparative Balance Sheet, Common Size Statement

### **BLOCK IV: Cost Accounting**

Elements of Cost Classification and Allocation, Cost Sheet, Methods of Inventory Valuation (AS 2)

### **BLOCK V: Management Accounting**

Emergence of Management Accounting, Marginal Costing and Cost Volume Profit Analysis, Budgeting & Variance Analysis

## **Text and References:**

### **Text:**

- S. N Maheshwari : Financial Accounting Theory and problems – S.Chand (G/L) & Company Ltd
- Accounting for Managers, T.S. Grewal

- Accounting for Managers, Gurinder Singh

**References:**

- Williamson, D. 1999, Cost and Management Accounting, Prentice Hall of India.
- Martindale W.G. 1997, Financial Accounting, Juris Publication.
- Banerjee, A. 2000, Financial Accounting, Excel Books.
- Chadwick, L. 1995, The Essence of Financial Accounting, Prentice Hall of India.
- Sikdar, P.K. 1999, Advanced Cost & Management Accounting, Viva Publications

## **5. DATA STRUCTURE LAB**

### **Course Objective-**

- To impart the basic concepts of data structures and algorithms.
- To understand concepts about searching and sorting techniques.
- To understand basic concepts about stacks, queues, lists, trees and graphs.
- To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures skills.
- To develop the knowledge of basic data structures for storage and retrieval of ordered or unordered data

### **Learning Outcomes-**

After the completion of course, student should be able to:

- Apply advance C programming techniques such as pointers, dynamic memory allocation, structures to developing solutions for particular problems.
- Design and implement abstract data types such as linked list, stack, queue and tree by using C as the programming language using static or dynamic implementations.
- Analyze, evaluate and choose appropriate abstract data types and algorithms to solve particular problems.
- Design and implement C programs that apply abstract data types.
- This course will help in designing applications for structuring the data.

### **Syllabus**

1. Write a program to generate Fibonacci Series, using recursion.
2. Write a program to calculate Factorial of nth number, using recursion.
3. Write a program to implement Tower of Hanoi, using recursion.
4. Write a program to calculate GCD of two numbers, using recursion.

5. Write a program to calculate power of a number, using recursion.
6. Write a program to reverse a given string, using recursion.
7. Write a program to swap two elements without using third variable.
8. Write a program to remove all the duplicate elements present in the given array.
9. Write a program to search an element using Linear Search.
10. Write a program to search an element using Binary Search.
11. Write a program to sort the given array using Bubble Sort.
12. Write a program to sort the given array using Selection Sort.
13. Write a program to sort the given array using Insertion Sort.
14. Write a program to insert a new element in the given unsorted array at  $k^{\text{th}}$  position.
15. Write a program to insert a new element in the given sorted array at proper place.
16. Write a program to delete an element from the  $k^{\text{th}}$  position of the given unsorted array.
17. Write a program to delete an element from given sorted array.
18. Write a program to merge to given sorted arrays.
19. Write a program to perform addition of two matrices.
20. Write a program to perform multiplication of two matrices.
21. Write a program to check whether given matrix is diagonal matrix, upper triangular matrix, lower triangular matrix.
22. Write a program to find out transpose of a given matrix.
23. Write a program using array of pointers, sort the given array of strings, using bubble sort.
24. Write a program to implement Stack using array, also show overflow and underflow in respective push and pop operations.
25. Write a program to implement Queue using array, which shows insertion and deletion operations.
26. Write a program to implement Circular Queue using array, which shows insertion and deletion operations.
27. Write a program to implement Linear Linked List, showing all the operations, like creation, display, insertion, deletion and searching.
28. Write a program to implement Stack, using Linked List. Implement Push, Pop and display operations.
29. Write a program to implement Queue, using Linked List. Implement Insertion, deletion and display operations.

30. Write a program to count the number of times an item is present in a linked list.
31. Write a program to increment the data part of every node present in a linked list by 10. Display the data both before incrementation and after.
32. Write a program to implement Doubly Linked List, showing all the operations, like creation, display, insertion, deletion and searching.
33. Write a program to create a Binary Search Tree and display its contents using preorder, postorder and inorder traversal.
34. Write a program to implement insert, delete and search operations in a Binary Search Tree

### **TEXTBOOKS & REFERENCES**

- DATA STRUCTURES WITH C 1st Edition- Seymour Lipschutz
- Data Structures Through C In Depth 2nd Revised and Updated Edition- S K Srivastava
- Fundamentals of Data Structures in C by Sahni Horowitz (Author)

## **SEMESTER THREE**

# **1. COMPUTER NETWORKS**

## **Course Objective-**

This course aims to:

- Provide basic knowledge of data communication and networking concepts.
- Providing basic understanding of Computer networks starting with OSI Reference Model, Protocols at different layers with special emphasis on IP, TCP & UDP and Routing algorithms.

## **Learning Outcomes-**

On completion of the course, Learners are expected to:

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
- Identify the different types of network devices and their functions within a network.
- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

## **Syllabus**

### **BLOCK I: Introduction to computer networks and Data Communication**

Computer Network, Advantages and Disadvantages of Computer Network, Communication system, Analog and digital data.

**Data Transmission:** Analog Transmission, Digital Transmission, Transmission impairments

**Data Encoding:** Digital data-digital signals, Digital data-Analog signals, Analog data- Digital signals, analog data- analog signals, Synchronous and Asynchronous transfer

**Multiplexing:** Frequency division multiplexing, Time division multiplexing

### **BLOCK II: Transmission Media:**

Twisted pair, Coaxial cable, Optical Fibers, Wireless transmission, Microwaves, Radio waves, Infrared

### **BLOCK III: Protocols and Architecture:**

Protocols, OSI reference Models, TCP/IP Protocol Suit

**Data Link Control and Protocol:** Flow Control- Stop and Wait, Sliding Window, Error Detection, Error Control, HDLC

#### **BLOCK IV: Local Area Network & Wide Area Networks**

LAN Architecture, LAN topologies- Bus/ Tree LAN, Ring LAN, Star LAN, Wireless LAN, Ethernet and Fast Ethernet(CSMA/CD), Token Ring and FDDI, WAN, Circuit Switching, packet Switching, Frame Relay, ATM, ISDN

#### **BLOCK V: Network & Transport Layer**

Introduction, Routers, Routing Algorithms, Congestion Control Algorithm, Addressing, Internetworking, Transport Services, TCP, UDP

#### **Text & References:**

- Data Communication and Networking, Behrouz, Forouzan., TMH.
- Computer Networks', S. Tanenbaum, Eastern Economy ed., PHI.
- Data and Computer Communications, W. Stallings, Prentice Hall of India
- Business Data Communications & Networking, Jerry Fitzgerald, Alan Dennis, John Wiley & Sons Inc.
- Computer Networks: Protocols, Black. U., Standards and Interfaces.

## **2. OBJECT ORIENTED PROGRAMMING CONCEPT WITH C++**

#### **Course Objective:**

- C++ is one of the most widely used programming languages for solving problems.
- The objective of this course is to provide object oriented programming fundamentals using C++.
- Topics to be covered include fundamentals of syntax & semantics of C++, loops & decisions, functions, classes and structures and features of classes such as overloading and inheritance, files, streams, pointers etc.

#### **Learning Outcomes:**

After the completion of this course, a successful student will be able to do the following:

- Explain object-oriented concepts and describe how they are supported by C++ including identifying the features and peculiarities of the C++ programming language
- Apply C++ features to program design and implementation

- Use C++ to demonstrate practical experience in developing object-oriented solutions
- Design and implement programs using C++

## Syllabus

### BLOCK I

**Overview of C++:** What is Object Oriented Programming, Characteristics of OOP, Difference between C and C++.

**Basics:**-Input/Output in C++ using cin/cout, Preprocessor Directives, Data Types-Integer, Float, character, Enumerated data types, library functions, comments, storage classes, manipulators, type conversion, arithmetic operators , arrays and strings

### BLOCK II

**Loops and Decisions:** Relational operators, Logical operators, Decisions-if , if-else and switch. Loops-for, while, do-while and nested loops, precedence summary, break, continue and goto statements.

**Functions:** Simple functions, passing arguments to functions , returning values from functions, reference arguments, returning by reference, Overloaded functions, Inline functions

### BLOCK III

**Structures:** A simple Structure, specifying the Structure, defining the structure variable, accessing members of structure, structure within structure, accessing structure members using pointers

**Classes and objects:** A simple class, C++ objects as physical objects, Constructors , Destructors, objects as function arguments , returning objects from functions , static class data, array as class data member, array of objects.

### BLOCK IV

**Operator Overloading & Inheritance:** Overloading unary operator, Overloading binary operator, data conversion.

**Inheritance:** Derived and Base class, Derived class Constructor, types of Inheritance , Abstract base class , public and private Inheritance, level of Inheritance, Ambiguity in multiple inheritance

### BLOCK V

**Pointers and Virtual functions:** Pointers and Arrays, pointers and strings, pointers and functions, pointers to objects, virtual functions, friend functions, static functions, this pointer.

**Files and Streams:** streams, string I/O, character I/O, object I/O, file pointer, error handling, and command line arguments.

**Text & References:**

- Object Oriented Programming in Turbo C++ , E.Balaguruswamy, Tata McGrahill
- Object Oriented Programming with C++, Robert Lafore, Galgotia Publication
- C++ Programming, Yashavant Karnitkar, BPB Publications

### **3.DATABASE MANAGEMENT SYSTEMS**

#### **Course Objectives**

This course aims to:

- List and explain the fundamental concepts of a relational database system.
- Analyze database requirements and determine the entities involved in the system and their relationship to one another.
- Develop the logical design of the database using data modeling concepts such as entity-relationship diagrams.
- Create a relational database using a relational database package.
- Manipulate a database using SQL.
- Assess the quality and ease of use of data modeling and diagramming tools.

#### **Learning Outcomes**

On completion of the course, Learners are expected to:

- To provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques and product-specific tools.
- To familiarize the participant with the nuances of database environments towards an information-oriented data-processing oriented framework
- To present SQL and procedural interfaces to SQL comprehensively
- To give an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design
- To motivate the participants to relate all these to one or more commercial product environments as they relate to the developer tasks

## **Syllabus**

### **BLOCK I: Introduction to DBMS**

Definition of DBMS, Data Independence, DBMS Architecture, Levels, Database Administrator, File System Approach Vs DBMS Approach, Advantages of Using a DBMS, Data Models , Schemas, and Instances.

### **BLOCK II: Relational Database & ER Model**

Relational System, Codd's Rule, Relational Model, Optimization, Tables and Views, Entity, Types of Entity, Weak Entity Attributes, Entity sets, Entity – Relationship Diagrams.

### **BLOCK III: Relational Model Objects**

Domains and Relations, Relations and predicates, Relational Data Integrity; Primary Key, Candidate Key, Foreign Key and their rules; Relational operators, Relational Algebra, Relational Calculus, SQL Language, Data definition, Data retrieval and update operations.

### **BLOCK IV: Database Design**

Definition Of Functional Dependencies, Process Of Normalization, First Normal Form, Second Normal Form, Third Normal Form. Boyce Codd Normal Form, Fourth Normal Form, Fifth Normal Form.

### **BLOCK V: Data Recovery & Protection**

Recovery- Transaction recovery, System recovery, Media Recovery, Concurrency Control Techniques, Locking, Dead Lock, Serializability; Security- Introduction.

### **Text & References:**

- Fundamental of Database Systems, Elmasri & Navathe, Pearson Education, Asia
- Data Base Management System, Leon & Leon, Vikas Publications
- Database System Concepts, Korth & Sudarshan, TMH
- Introduction to Database Systems, Bipin C Desai, Galgotia
- Oracle 9i The Complete Reference, Oracle Press

## **4.OPERATING SYSTEMS**

### **Course Objective**

This course aims to:

- Learn about the role of operating system as a resource manager of the system as a whole
- Tell about fundamental concepts that are applicable to a variety of systems
- Study the concept of processes and threads
- Learn scheduling of the CPU and management of memory
- Develop an understanding of the concept of file system

## Learning Outcomes

On completion of the course, Learners are expected to:

- Explain operating system as a resource manager of the system
- Tell about fundamental concepts that are applicable to a variety of systems
- Identify the processes and threads
- Understand CPU scheduling and Memory management
- understand file system in operating system

## Syllabus

### **BLOCK I: Operating System As A Resource Manager**

Operating System Classifications, Monitor, Multiprogramming, Time Sharing, Real Time Systems, Multiprocessor Systems and Operating System Services.

### **BLOCK II: CPU Scheduling**

Basic Scheduling Concepts, Process Overviews, Process States, Multiprogramming, Scheduler and Scheduling Algorithms, Multiple Processor Scheduling

**Deadlock:** Deadlock Characterization, Deadlock Prevention, Deadlock Avoidance and Deadlock Recovery

### **BLOCK III: Memory Management**

Bare Machine, Resident Monitor, Partition, Paging and Segmentation, Virtual Memory And Demand Paging, Replacement Policies, Cache Memory

### **BLOCK IV: File Systems**

File Support, Access Methods, Allocation Methods- Contiguous Linked And Index Allocation

**Protection and Access Control-**Access Matrix Model Of Protection, Access Hierarchies, Access List, Capabilities

**Directory Systems:** Single Level, Tree Structured, Acyclic Graph and General Graph Directory, File Protection

### **BLOCK V: Overview of UNIX Operating System**

Command-Language User's View Of Unix, Implementation Of Unix, Unix Summary Etc.

## Text & References:

- Operating Systems Concepts, Silberschatz Galvin, Fifth Edition Addition Wesley Publication.
- Modern Operating Systems, A S Tanenbaum, Prentice Hall of India New Delhi, 1995.
- Design of UNIX Operating System, Maurice J. Bauch, Prentice Hall of India.
- Operating Systems Design, Peterson & Galvin

## **5.C++ AND DBMS LAB**

### **Course Objectives-**

This course aims to:

- C++ course provides in-depth coverage of object-oriented programming principles and techniques using C++.
- Topics include classes, overloading, data abstraction, information hiding, encapsulation, inheritance, polymorphism, file processing, templates, exceptions, container classes, and low-level language features.
- The course also relates C++ to GUI, databases, and real-time programming. The course material embraces the C++ language standard with numerous examples demonstrating the benefits of C++.
- DBMS lab offers a detailed understanding to create a database and query using SQL, design forms and generate reports.
- It will provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques and product-specific tools.
- DBMS lab will familiarize the participant with the nuances of database environments towards an information-oriented data-processing oriented framework.

### **Learning Outcomes-**

At the end of the course, Learners will:

- Be able to understand the difference between object oriented programming and procedural oriented language and data types in C++.
- Be able to program using C++ features such as composition of objects, Operator overloading, inheritance, Polymorphism etc.
- Be able to simulate the problem in the subjects like Operating system, Computer networks and real world problems.
- Be able to Design databases.
- Be able to retrieve information from data bases.
- Be able to Use procedures to program the data access and manipulation.
- Be able to create user interfaces and generate reports.

## Syllabus

### Part-I List of C++ programs:

- WAP to find greatest of three numbers.
- WAP to calculate factorial of a number.
- WAP to print Fibonacci series of 'n' numbers , where n is given by the programmer
- WAP to check whether a number is prime or not.
- WAP to find the number of characters and words in a string .
- WAP to read a set of numbers in an array & to find the largest of them.
- WAP to implement bubble sort using arrays.
- WAP to read a set of numbers from keyboard & to find sum of all elements of the given array using a function.
- WAP to exchange contents of two variables using call by value.
- WAP to exchange contents of two variables using call by reference.

### Part-II:

#### List of DBMS programs:

- Consider the insurance database given below. The primary keys are made bold and the data types are specified.  
PERSON( **driver\_id**:string , name:string , address:string )  
CAR( **regno**:string , model:string , year:int )  
ACCIDENT( **report\_number**:int , accd\_date:date , location:string )  
OWNS( **driver\_id**:string , **regno**:string )  
PARTICIPATED( **driver\_id**:string , **regno**:string , **report\_number**:int ,  
damage\_amount:int)
- a) Create the above tables by properly specifying the primary keys and foreign keys.
- b) Enter at least five tuples for each relation.
- Consider the following database of student enrollment in courses and books adopted for that course.  
STUDENT( **regno**:string , name:string , major:string , bdate:date )  
COURSE( **curso**:int , cname:string , dept:string )  
ENROLL( **regno**:string , **curso**:int , **sem**:int , marks:int )  
BOOK\_ADOPTION( **curso**:int , **sem**:int , book\_isbn:int )  
TEXT( **book\_isbn**:int , book\_title:string , publisher:string , author:string )

- a) Create the above tables by properly specifying the primary keys and foreign keys.
- b) Enter atleast five tuples for each relation.
- c) Demonstrate how you add a new text book to the database and make this book to be adopted by some department.
- d) Produce a list of text books (includes courseno , book\_isbn , book\_title ) in the alphabetical order for courses offered by the 'CS' department that use more than two books.
- e) List any department that has **all** its books published by a specific publisher.

### **Text & References**

- The C++ Programming Language - Anna University 3 Edition
- A Laboratory Course in C++ 2nd Edition
- Learning SQL-Book by Alan Beaulieu
- SQL Fundamentals-Book by John J Patrick

## **SEMESTER FOUR**

## **1.SOFTWARE ENGINEERING**

### **Course Objective:**

This course aims to:

- Acquaint Learners with the concepts and methods available for software development in industrial environments.
- Learners will be exposed to a variety of topics such as design notations, costing techniques, and testing methods,
- Learn about tools which are available to support software specification, design, testing, and maintenance.

### **Learning Outcomes**

On completion of the course, Learners are expected to:

- Understand the process to be followed in the software development life cycle.
- Find practical solutions to the problem
- Solve specific problems alone or in teams
- Manage a project from beginning to end
- Work independently as well as in team
- Define, formulate and analyze a problem

### **Syllabus**

#### **BLOCK I: Introduction**

Evolution of Software Engineering, Software Problems, Issues Involved In Software Engineering, Fundamental Qualities of a Software Product, Approaches to Software Engineering, Planning the development Process Software Life Cycle Models: Development/Product Life Cycle Model, Kinds of Software Life- Cycle Model Project Management Concepts,Project Management Activities

#### **BLOCK II: Software Requirement Specification**

Requirement Engineering, Requirement elicitation, Requirement analysis, requirement documentation, Case Study.

#### **BLOCK III: Software Project Planning & Design**

Size Estimation, Cost Estimation, Models, COCOMO, COCOMO II, Putnam Resource allocation model, Software Risk Management.

Design: Software Designing Principles Various Strategies, BLOCK Level Concepts, Structured Design Methodologies

#### **BLOCK IV: Software Reliability & Metrics**

Basic Concepts, Software quality, software reliability models, Capability maturity models, ISO 9000. Software Metrics, Token Count, Data Structure Metrics, Information Flow Metrics and Metrics analysis.

#### **BLOCK V: Software Testing & Maintenance**

Testing: Testing Process, Some terminology, Functional Testing, Structural Testing, Levels of Testing, Debugging and Testing Tools.

Software Maintenance: Maintenance Process, Maintenance Model, Estimation of maintenance cost, Regression Testing, Reverse Engineering, Software Re-engineering, Configuration Management and Documentation.

#### **Text & References:**

- Software Engineering, A Practitioner's Approach - Roger S. Pressman.
- An Integrated Approach to Software Engineering, Pankaj Jalote.
- Software Engineering Concepts, Richard Fairley.

## **2.COMPUTER GRAPHICS**

#### **Course Objective:**

This course aims to:

- Understand the structure of modern computer graphics systems
- Understand the basic principles of implementing computer graphics primitives
- Familiarity with key algorithms for modeling and rendering graphical data
- Develop design and problem solving skills with application to computer graphics

#### **Learning Outcome:**

On completion of the course, Learners are expected to:

- The course provides the necessary theoretical background for introductory computer graphics and demonstrates the application of computer science to graphics.
- It also offers an opportunity for Learners to formulate and implement applications of computer graphics.
- This course further allows Learners to develop programming skills in computer graphics by programming assignments.

## Syllabus

### **BLOCK I : Introduction of Graphics**

Overview of graphic system, Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, graphic Software

### **BLOCK II : Output Primitives**

Output primitives: Points and lines, circle and ellipse generating algorithms, Conic section, Polynomial and spline curves, pixel addressing, Filled area primitives and functions

### **BLOCK III**

**2-D Geometrical transforms** : Translation, scaling, rotation, reflection and shear transformations, homogeneous coordinates, composite transforms, transformations between coordinate systems.

**2-D Viewing**: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Clipping

### **BLOCK IV**

**3-D Object representation**: Polygon surfaces, quadric surfaces, spline representation, Bezier curve and spline curves, Bezier surfaces.

**3-D Geometric transformations**: graphic, geometric, coordinate and composite transformations

**3-D viewing**: Viewing pipeline, viewing coordinates, projection transforms and clipping.

### **BLOCK V : Visual-Surface Detection Methods**

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting and area sub-division

### **Text & References:**

- Computer Graphics, Donald Hearn, M Pauline Baker, 2<sup>nd</sup> Edition, PHI 1999
- Schaum Series, Computer Graphics
- Computer Graphics, N. Krishnamurthy, TMH

### **3.PROGRAMMING IN VISUAL BASICS**

#### **Course Objective-**

- This course is aimed to provide a fundamental understanding of Visual Programming Environment for the Learners in their early stages of academic career.
- Various concepts regarding GUI such as Manipulating GUI Tools like Command Buttons, Checkboxes, Combo boxes, etc. through Programming in a Visual Environment will be introduced for Learners to develop a Healthy Programming attitude towards new and emerging Technologies in the field of Visual Programming.
- After this course, you will be able to understand fundamental concepts of Visual Programming and development of various GUI applications.

#### **Learning Outcomes-**

On the completion of the course, Learners are expected to:

- Analyze program requirements
- Design/develop programs with GUI interfaces
- Code programs and develop interface using Visual Basic .Net
- Perform tests, resolve defects and revise existing code

#### **Syllabus-**

##### **BLOCK I: Introduction to Visual Basic**

Introduction, CUI, GUI, Why Visual Programming, Different Visual Programming Languages, Initial Screens, Different applications, Starting a new project, MDI and SDI, Variables and constants, Data Types, Scope of variables, Operators, Forms, Basic Controls (Text box, Labels, Command buttons, Image Control, Picture box), Properties, Methods and Events, Message Box, Input Box

##### **BLOCK II: Controlling Program Flow and other controls**

Determinate and Indeterminate Loops, Making Decisions, Select Case, Nested If-Then, Go to.

Some More Controls: Option Button, Check Boxes, List and Combo and Boxes, Timers, Scroll bars.

Additional Controls: File List Box, Directory List Box, Drive List Box.

##### **BLOCK III: Arrays, Function and Procedure**

Arrays, Control arrays, Sub procedure, Functions, Built in functions.

##### **BLOCK IV: Database handling**

Introduction, Database access methods, DAO, ADO, RDO, Database handling through ADO, SQL.

### **BLOCK V: Grid control and Reports**

Tables, Datagrid Control, Flexgrid Control, Data reports, Data reports control

#### **Text & References:**

- Visual Basic 6 from Ground Up, Gary Cornell, TMH Publication.
- Graphics Shaders: Theory and Practice
- Mastering Visual Basic, PHI.

## **4.OBJECT ORIENTED DESIGN USING UML**

### **Course Objective-**

- On completion of this course student will be able to understand object-oriented concepts and methodology, exhibit a general understanding of programming, preferably using the Java programming language.
- Describe the object-oriented software development process, including object-oriented methodologies and work flows.
- Evaluate system requirements to establish the use cases and domain model of the problem area.

### **Learning Outcomes-**

On the completion of the course, Learners are expected to:

- Possess an ability to practically apply knowledge software engineering methods, such as object-oriented analysis and design methods with a clear emphasis on UML.
- Have a working ability and grasping attitude to design and conduct object-oriented analysis and design experiments using UML, as well as to analyze and evaluate their models.
- Have a capacity to analyze and design software systems, components to meet desired needs.
- Show an ability to form and work on multi-disciplinary teams that are able to perform multiple-faceted tasks from domain analysis and understanding to design and develop software systems based on object-oriented thinking. This may also provide an ability to communicate their models and solutions in an effective manner.
- Display an ability to identify, formulate and solve software development problems: software requirements, specification (problem space), software design, and implementation (solution space).

## **Syllabus**

### **BLOCK I: Introduction to UML**

Importance of modeling, principles of modeling, object oriented modeling, History of UML, Key UML Diagrams, conceptual model of the UML.

### **BLOCK II: Object Oriented Modeling and Class Diagrams**

Object Oriented concepts, classifier, Relationship, Association, Aggregation, Generalization, Inheritance, Dependences, Constraints, Instances, Object diagram. And Case study.

### **BLOCK III: Structural and Dynamics Modeling**

Use case diagram: use case, actor; State machine view: Action, State, event, transition, State chart diagram; Activity View: Activity Diagram, Case study.

### **BLOCK IV: Behavioral Modeling**

Sequence Diagram: Interactions, Object, message, Activation; Collaboration diagram, Collaboration interaction, Collaboration role, Message, case study

### **BLOCK V: UML Environment**

Deployment diagram: nodes and packages; Application of UML in embedded system, web application and commercial application

### **Texts & References**

UML Distilled: A Brief Guide to the Standard Object Modeling Language

UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design

Learning UML 2.0

Building Web Applications with UML

The Unified Modeling Language Reference Manual

## **5. COMPUTER GRAPHICS AND VISUAL BASIC LAB**

### **Course Objective-**

- Complements computer graphics and art courses by providing additional competence in software applications, libraries, and graphical user interfaces to support computer graphics and design projects by providing supervised practice and individualized computer assisted learning on software and techniques commonly found in the computer graphic design field.

- This course introduces computer programming using the Visual BASIC programming language with object-oriented programming principles.
- Emphasis is on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger.
- Upon completion, Learners should be able to design, code, test and debug at a beginning level.

### **Learning Outcomes-**

On the completion of the course, Learners are expected to:

- Develop design drawings that demonstrate computer graphics and design skills.
- Prepare technical drawings that demonstrate expertise in desired career objective
- Create electronic files of graphic presentations for art and computer graphics and design courses.
- Design, create, build, and debug Visual Basic applications.
- Explore Visual Basic's Integrated Development Environment (IDE).
- Implement syntax rules in Visual Basic programs.
- Explain variables and data types used in program development.

### **Syllabus-**

#### **Computer Graphics**

1. Program to Draw a Line using DDA Algorithm
2. Program to Draw a Line using Bresenham's Algorithm
3. Program to Draw a Circle using Mid - Point Algorithm
4. Program to Draw a Circle using Bresenham's Algorithm
5. Program to Draw an Ellipse using Mid - Point Algorithm

#### **Visual basics lab**

1. Form Design – Keyboard & Mouse events
2. Programs on usage of data types - variant, Control arrays
3. Simple applications using file system controls
4. Database applications using data control.

#### **Textbooks & references**

- Computer Graphics Programming: GKS — The Graphics StandardBook by Günter Enderle, Günther E. Pfaff, and K. Kansy
- Computer Graphics : A Programming Approach 2nd Edition
- Visual Programming (Using Visual Basic) PB
- Visual Basic: Computer Programming for Beginners: Learn the Basics of Visual Basic and Visual Studio

**SEMESTER**

**FIVE**

## **1.JAVA PROGRAMMING**

### **Course Objectives:**

This course aims to:

- Focus on programming concepts in the Java programming language,
- Provide help in writing programs in Java using object-oriented paradigm.
- Provide knowledge about Java as a language that is used as a primary tool in many different areas of programming work.

### **Learning Outcomes:**

On completion of the course, Learners are expected to:

- Knowledge of the structure and model of the Java programming language
- Use the Java programming language for various programming technologies
- Develop software in the Java programming language,
- Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements
- Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem
- Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems.

## **Syllabus**

### **BLOCK I**

**Internet Fundamentals:** Overview of OSI Reference model, media access, topology design, Discuss Network Layer Problems., Router, Bridges and Gateways, TCP/IP protocol suite, MOSAIC, NETSCAPE, Web Browser

### **BLOCK II**

**Java Programming: Introduction,** Operator, Data types, Variables, Arrays, Methods & Classes, Applications and Applets

### **BLOCK III**

**Java Graphics:** Introduction to AWT, Html basic tags, Applet Classes, String Handling, Layout Manager, Graphics, Event Handling

### **BLOCK IV**

**Exception Handling and Multithreading:** Exception handling, fundamentals exception types, uncaught exceptions, throws, throw, try and catch, finally, built-in expressions, creating your own exception, multithreading fundamentals.

## **BLOCK V**

**Java Packages:** Package creation, Additional Packages, Interfaces, Input Output Exploring java.io, SWING and AWT Controls, Discuss advantages of Swing over AWT

### **Text & References:**

- Naughton, Schidt "The Complete Reference JAVA 2 " TMH
- Balaguruswamy "Programming in JAVA"
- Comer "Computer Networks & Internet"
- Deitel & Deitel "Java™ How to Program, 6/E"

## **2.E-COMMERCE**

### **Course Objective:**

This course aims to:

- Provide the fundamentals of E-Commerce and mobile commerce
- Assess E-Commerce strategies and applications, like online marketing, E-Government, E-Learning and global E-Commerce
- Learn e-commerce infrastructure and various business models
- Understand legal issues and privacy in E-Commerce
- Learn the infrastructure of the network for e-commerce
- Provide detailed analysis of electronic payments

### **Learning Outcome**

On completion of the course, Learners are expected to:

- Understand the concepts of e-commerce with its effective diversity of M-commerce
- Understand and apply the strategies of e-commerce
- Work effectively with electronic payment with proper security measures
- Identify legal issues and corrective actions for them
- Recognize the essential network requirements for E-commerce

## **Syllabus**

### **BLOCK I: Introduction**

Traditional commerce: an overview, What is E-commerce? , Comparison between Traditional and Electronic commerce, Issues associated with electronic commerce.

Inter Organizational E- commerce, Intra Organizational E-Commerce, Architectural frame work.

### **BLOCK II: Network Infrastructure**

Network infrastructure for E Commerce. Market forces behind I-Way. Component of I Way. Access Equipment. Global Information Distribution Network, Broad band Telecommunication.

### **BLOCK III: Mobile Commerce**

Introduction to Mobile Commerce. Mobile Computing Applications. Wireless Application Protocols. WAP Technology. Mobile information Devices .

### **BLOCK IV**

**Web Security:** Introduction to Web Security, Firewalls & Transaction Security, Client Server Network, Emerging Client Server Security Threats. Firewalls and Network Security. IT Act 2000

**Encryption:** World wide web & security, Encryption, Transaction security, Secret Key Encryption, Public key Encryption, Virtual Private Networks, Implementation & management issues.

### **BLOCK V**

**Electronic Payment Scheme:** Traditional Payment methods, View of internet payment process, Understanding card payment schemes on internet, Cyber Cash, Verizon and First **Virtual payment schemes, SET and JEPI, Electronic cheques, Digital Cash.**

**Electronic Data Interchange (EDI):** History of EDI, Implementation difficulties of EDI, EDI working concepts, Financial EDI, EDI and Internet.

### **Text & References:**

- Sokol. " From EDI to Electronic Commerce : A Business Initiative " , TMH
- Greenstein & Feinman, " Electronics Commerce", Tata McGraw Hill
- Diwan Sharma, " E Commerce", Excel
- Asset international, " Net Commerce " , TMH
- Bajaj & Nag, " E Commerce : The cutting edge of Business", TMH
- Ravi Kalakota. Andrew Whinston. "Frontiers of Electronic Commerce ". Addison Wesley
- Denial Amor "The E Business revolution", Addison Wesley

### **3.WIRELESS COMMUNICATION AND NETWORK SECURITY**

#### **Course Objectives:**

This course aims to:

- Introduce the emerging areas of Wireless Network security.
- Acquire a solid understanding of different components involved in the Wireless Network security techniques and different ways of distributing the multimedia data.
- Provide various techniques of Wireless Network security

#### **Learning Outcomes:**

On completion of the course, Learners are expected to:

- Identify computer and network security threats, classify the threats and develop a security model to prevent, detect and recover from the attacks.
- Encrypt and decrypt messages using BLOCK ciphers, sign and verify messages using well known signature generation and verification algorithms.
- Analyze existing authentication and key agreement protocols, identify the weaknesses of these protocols.

#### **Syllabus**

##### **BLOCK I Introduction to Wireless Communication:**

Introduction, Modern Wireless Communication Systems: Second Generation (2G) Cellular Networks, Third Generation (3G) Wireless Networks, Wireless Local Loop (WLL) and LMDS, Wireless Local Area Networks (WLANs), Bluetooth and Personal Area Networks (PANs), Cellular concepts: frequency reuse, strategies, interference & system capacity, trucking & grade of service, improving coverage & capacity in cellular systems.

##### **BLOCK II Modulation Techniques for Mobile Radio Communication:**

Frequency Modulation, Amplitude Modulation, Amplitude Modulation, Angle Modulation, Digital Modulation, Line Coding, Pulse Shaping Techniques, Linear Modulation Techniques.

##### **BLOCK III Multiple Access Techniques & Mobile Propagation:**

Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Spread Spectrum Multiple Access / Code Division Multiple Access (CDMA), Space Division Multiple Access (SDMA), Packet Radio Protocols, Pure ALOHA, Slotted ALOHA, Carrier Sense Multiple Access Protocols (CSMA), Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA)

##### **BLOCK IV Introduction to Network Security:**

Introduction Attributes of a secure network, Security Management for Networks Risk

Assessment, Introduction to ID, Malicious Software, Denial of Service Attack, Introduction to Firewall, VPN, Intrusion Prevention System

**BLOCK IV Cryptography and other security technologies:**

Encryption Techniques, Cryptography: Introduction, public key Cryptography and RSA algorithm, Hashing.

**User Authentication:** Introduction, method, factors, strong user authentication, Application: Digital signatures, Kerberos, Biometrics. Electronic Mail Security: Pretty Good Privacy, S/MIME.

**Text & References:**

- Raj Pandya, "Mobile & Personnel communication Systems and Services", Prentice Hall India, 2001.
- Theodore S. Rappaport, "Wireless Communication- Principles and practices," 2nd Ed., Pearson Education Pvt. Ltd, 5th Edition, 2008.
- Hideki Imai, Mohammad Ghulam Rahman & Kazukuni Kobara, "Wireless Communications Security", Artech House, 2006.
- Tom Karygiannis, Les Owens, "Wireless Network Security 802.11, Bluetooth and Handheld Devices", National Institute of Standards and Technology, US Dept. of Commerce Special Publication 800-48, 2002.
- "Wireless Network Security", Edited by Yang Xiao, Xuemin Shen and Ding-Zhu Du, Springer, 2007.
- William Stallings, "Cryptography and Network Security", Pearson Education, 2003.

**4.DATA WAREHOUSING AND MINING**

**Course Objectives:**

- To introduce the basic concepts of Data Warehouse and Data Mining techniques.
- Examine the types of the data to be mined and apply pre-processing methods on raw data.
- Discover the concept of analytical processing and data marts

**Learning Outcomes:**

- Process raw data to make it suitable for various data mining algorithms.
- Discover and measure interesting patterns from different kinds of databases.
- Apply the various techniques of mining

## **Syllabus**

### **BLOCK I: Introductory Concepts**

#### **Data Warehousing**

Introduction, Structure, Granularity, Structuring Data In The Data Warehouse, Purging Warehouse Data, Reporting And The Architected Environment, Incorrect Data In The Data Warehouse, Competitive Advantages

#### **Data Warehouse Design**

Introduction, Data Warehousing, OLTP and OLAP, considerations for building data warehouse

### **BLOCK II: Implementation and Techniques**

**Implementation:** Introduction, Building Data warehousing Team, Defining Data warehousing project, Data warehousing Project management, Project estimation for Data warehousing, Data warehousing Project implementation

**Techniques:** Introduction, Bitmapped indexes, Star Schemas, Read Only tablespaces, Parallel Processing, Partition Views, Data Warehouse Models, Optimizing Extraction Process

### **BLOCK III: Data Mining**

Introduction, Data warehousing (OLAP) to Data mining(OLAM), Data mining, Objectives of data mining, Business context for data mining, Process improvement, Data integration and transformation, Marketing and Customer Relationship Management, Technical context for data mining, Machine learning, Decision support (DSS), Computer technology

### **BLOCK IV:**

**Data Mining Algorithms:** Introduction, Process of data mining, Database segmentation or Clustering, Predictive Modeling, Link analysis

**Data Mining Techniques:** Introduction, Data Mining Techniques, Automatic Cluster Detection, Decision Trees, Neural Networks

### **BLOCK V: Data Mining Environment**

Introduction, Applications of BI and Data Mining in various sectors, CRIME, Genetics, National Data warehouses and case studies, Other Areas for Data Warehousing and Data Mining

#### **Text & References:**

- Data Warehousing in the real world, Sam Anchory and Dennis Murray
- Data Mining, Pieter Adrians and Doif Zantinge

## **5.JAVA AND UNIX LAB**

### **Course Objective-**

- This course introduces basic understanding of UNIX OS, UNIX commands and File system and to familiarize Learners with the Linux environment.
- To make student learn fundamentals of shell scripting and shell programming. Emphases are on making student familiar with UNIX environment and issues related to it.
- Programming in the Java programming language.
- Knowledge of object-oriented paradigm in the Java programming language,
- The use of Java in a variety of technologies and on different platforms

### **Learning Outcomes-**

On the completion of the course, Learners are expected to:

- To run various UNIX commands on a standard UNIX/LINUX Operating system
- To do shell programming on UNIX OS.
- Have knowledge of the structure and model of the Java programming language, (knowledge)
- Use the Java programming language for various programming technologies (understanding)
- Develop software in the Java programming language

### **Syllabus**

#### **Java lab**

- Program to illustrate class, objects and constructors
- Program to implement overloading, overriding, polymorphism etc
- Program to implement the usage of packages
- Program to create our own exception
- Program for handling file operation
- Implement the concept of thread programming
- Program to implement Generic class and generic methods
- Applet program for passing parameters
- Applet program for running an audio file
- Program for event-driven paradigm in Java

#### **Unix lab**

- Write a Shell Script that takes a search string and filename from the terminal & displays the results.
- Write a Shell Script that takes pattern and filename as command line arguments and displays the results appropriately i.e. pattern found/pattern not found.
- Write a Shell Script that accepts only three arguments from the command line. The first argument is the pattern string, the second argument is the filename in which the pattern

is to be searched and the third argument is the filename in which the result is to be stored.

- Write a Shell Script which creates the following menu and prompts for choice from user and runs the chosen command.
  - Today's date
  - Process of user
  - List of files
  - Quit to UNIX
- Write a Shell Script that computes the factorial of a given number
- Write a Shell Script that works like a calendar reminding the user of certain things depending on the day of the week.
- Write a Shell Script that changes the extension of a group of files from txt to doc
- Write a Shell Script that accepts both filename and a set of patterns as positional parameters to a script.
- Write a Shell Script which will redirect the output of the date command without the time into a file

### **Text & References**

- Java Programming-Book by D. S. Malik
- Java: A Beginner's Guide- Book by Herbert Schildt
- Unix Programming Environment 1st Edition- Brian W Kernighan
- Introduction to Unix and Shell Programming by M.G. Venkateshmurthy
- Unix concepts and applications - sumitabha das (author)

## **6. FRENCH LAUNGUAGE I**

### **Course Objectives:**

This course intends to familiarize you with:

- Demonstrate understanding of elementary French grammar;
- Recognize and comprehend basic spoken French within a given context.
- Nuances of French grammar and its necessity

### **Learning Outcome:**

This course helps:

- Students understand basic French grammar
- Get an idea through practice in listening, speaking, reading, writing and grammar practice
- Learn vocabulary and grammar necessary to communicate in various situation
- Acquire cultural material about regions where French is spoken

## **Syllabus**

### **Block I: Subject**

Subject Pronoun, Être and Avoir

**Block II: Articles**

Indefinite articles, Definite articles, Demonstrative articles

**Block III: Pronoun and Prepositions**

Pronoun Tonique and Prepositions, Contracted Articles

**Block IV: Verbs**

–er verbs, –ir verbs, –re verbs

**Block V: Negation**

Negation, Interrogation, Future Proche

**Text and References:**

- Learn French-For Beginner, Rosemary Schell,
  - Elementary French Grammar, Charles P. Du Croquet
  - An Elementary French Grammar, Jean Gustav Keetels
  - Entre Amis, Michael D. Oates
  - En bonne forme, Simone Renaud & Dominique van Hooff
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## **SEMESTER SIX**

# **1.MULTIMEDIA AND ITS APPLICATIONS**

## **Course Objective:**

This course aims to:

- Provide an overview of different multimedia technologies like audio and video including multimedia devices
- Equip with the Knowledge about the basics concepts of multimedia and its applications.
- Provide the understanding of its relevance with internet and its future aspects.
- Understand the future trends and developments in the field of multimedia

## **Learning Outcomes:**

On completion of the course, Learners are expected to:

- Define different multimedia technologies like audio and video
- Explain various multimedia devices
- Identify the concepts of multimedia and its applications.
- Visualize the relevance of multimedia with internet
- Identify the usage of multimedia with advancement of technology

## **Syllabus**

### **BLOCK I: Introductory Concepts**

Multimedia - Definitions, Basic properties and medium, Type, Multimedia applications , Introduction to making multimedia - The Stages of project, the requirements to make good multimedia, Multimedia skills and training .

### **BLOCK II: Multimedia-Hardware and Software**

Multimedia Hardware - Macintosh and Windows, production Platforms, Hardware peripherals - Connections, Memory and storage devices, Media software - Basic tools, making instant multimedia, Multimedia software and Authoring tools, Production Standards.

### **BLOCK III : Multimedia building BLOCKs Creating & Editing Media elements:**

Text, image, Sound, animation Analog/ digital video Data Compression: Introduction, Need, Difference of lossless/lossy compression techniques, compression algorithms

### **BLOCK IV:**

**Multimedia and the Internet:** History, Internet working, Connections, Internet Services,

The World Wide Web, Tools for the WWW - Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, Designing for the WWW –Working on the

Web, Multimedia Applications - Media Communication, Media Consumption, Media Entertainment, Media games.

**Knowledge based multimedia system:** introduction, intelligent multimedia system, knowledge sources for Multimedia Interaction, Intelligent Automated Multimedia Output Generation,

### **BLOCK V: Multimedia-looking towards Future:**

High Definition Television (HDTV) and Desktop Computing, HDTV standards, Digital Communication and New Media, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Virtual Reality, Digital Camera. Assembling and delivering a Multimedia project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM: The CD family, production process, CD-i – Overview – Media Types Technology.

### **Text & References:**

- Tay Vaughan, “Multimedia: Making it work”, Tata McGraw Hill.
- Ralf Steinmetz and Klara Naharstedt, “Multimedia: Computing, Communications Applications”, Pearson
- Keyes, “Multimedia Handbook”, Tata McGraw Hill.
- John F. Koegel Bufford, *Multimedia Systems*, Pearson Education
- Judith Jeffloat, *Multimedia in Practice (Technology and Applications)*, PHI
- Ze-Nian Li and Mark S. Drew, *Fundamentals of Multimedia*, Prentice-Hall

## **2.WEB TECHNOLOGIES**

### **Course Objective:**

This course aims to:

- Provide a fundamental understanding of web site creation
- Provide understanding of client-side technologies (XHTML, CSS, forms, JavaScript).
- Develop simple back-end database to support a website.

### **Learning outcomes:**

On completion of the course, learners are expected to:

- Apply the knowledge of html to structure web pages and applications.
- Program using html and advanced features of html
- Use CSS to styling and visually format web pages and applications.
- Apply the knowledge of JavaScript programming for interactive front-end web development.
- Understand the client-side technologies like XHTML
- Develop simple back-end database to support a website

## **Syllabus**

### **BLOCK I:**

**Introduction to web:** Introduction, WWW, URL, Protocols and programs, secure connections, application and development tools, the web browser, Server, setting up UNIX and Linux web servers, Logging users, dynamic IP

**Web Design:** Web site design principles, planning the site and navigation,

### **BLOCK II**

**HTML:** History of HTML (Hypertext Mark-up Language), Structure of HTML Document: Text Basics, Structure of HTML Document: Images and Multimedia, Links and webs, Document Layout, Creating Forms, Frames and Tables.

**Style sheets :** Need for CSS, introduction, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2

**Javascript :** Client side scripting, What is Javascript, How to develop Javascript, simple Javascript, variables, functions, conditions, loops and repetition

### **BLOCK III**

**Advance script,** Javascript and objects, the DOM and web browser environments, forms and validations

**DHTML :** Combining HTML, CSS and Javascript, events and buttons, controlling the browser, Event Handling, Data Binding

### **BLOCK IV : XML//////////**

Introduction to XML, XML Basics, XML Structure, Developing a DTD from XML code, Viewing XML, Viewing XML using the XML Data Source Object, Viewing XML using Style Sheet, AJAX

### **BLOCK V**

**PHP :** Starting to script on server side, Arrays, function and forms, advance PHP

**Databases :** Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, editing the database

### **Text & References:**

- HTML, DHTML, JavaScript, Perl, CGI, Ivan Bayross, BPB Publication.
- HTML Complete Reference, BPB Publication
- HTML Black Book , Stephen Holzner, Wiley Dreamtech.
- Jeffrey C. Jackson, "Web Technologies : A Computer Science Perspective", Pearson
- Rajkamal, "Web Technology", Tata McGraw-Hill, 200

## **3. FRENCH LAUNGUAGE II**

### **Course Objectives:**

This course intends to familiarize you with:

- Demonstrate understanding of elementary spoken French
- Recognize and comprehend basic spoken French within a given context.
- Strengthen the learner's self-confidence in learning and perfecting his/her French, thanks notably to pronunciation and phonetics sessions.

### **Learning Outcome:**

This course helps:

- Students understand basic French
- Get an idea through practice in listening, speaking, reading, writing and grammar practice
- Strengthen the learner's self-confidence in learning and perfecting his/her French
- Acquire cultural material about regions where French is spoken

## **Syllabus**

### **Block I: Numbers**

General number counting, help recognize and pronounce numbers, learn binary formats of numbering in French

### **Block II: Professions**

Recognize various professions, understand French terms of every profession to help in spoken conversation

### **Block III: Possessives**

Introduction, recognize the various possessives, difference in oral and spoken possessives in French, gender difference in possessives

### **Block IV: Family**

Identify specific terminology for various family members, oral and written formats, pronunciation, phonetic terminology

### **Block V: Adjectives, Colors**

Various adjectives, French term for colours, pronunciation and phonetic terminology

### **Text and References:**

- Essential French Verbs, Weston Marie-Therese
- The Everything Essential French Book: All You Need to Learn French in No Time, Bruce Sallee and David Hebert
- Easy French Step-by-Step, Myrna Bell Rochester
- Entre Amis, Michael D. Oates