

**FIRST YEAR**

**MCA**

**Pattern - A**

**SEMESTER I**

**(Theory)**

# ES0305: DISCRETE STRUCTURES

**Prerequisites:** Elementary knowledge of 1) Numbers 2) Set Theory 3) Algebra.

## **Aim and Objectives:**

The aim of this course module is to develop skills of Logics, Relation & functions, Group Theory and Graph Theory. This course has helped to pave the way for the present development and will prepare students for the present situation and the future by a modern approach.

### **Unit-1. Mathematical logic**

**(7 Hrs)**

Propositions (Statements), Logical connectivities,  $\neg$ ,  $\wedge$ ,  $\vee$ ,  $\rightarrow$ ,  $\leftrightarrow$ ,  $\leftarrow$ , Compound statements from , truth tables, tautology , implications and equivalence of statements forms logical identities, Normal forms: disjunctive normal form and simplification. Conjunctive normal form, logical implications, valid arguments, methods of proof. Theory of inference of statement calculus, predicate calculus, quantifiers free and bound variables, theory of inference of predicate calculus.

### **Unit-2. Relations**

**(7 Hrs)**

Relation defined as ordered n-tuple, Unary, binary, ternary, n-ary, Restrict to binary relations, Complement of a relation, converse relation, compositions, matrix representation and its properties, Graphical representation of relation–Digraphs Properties of binary relation – reflexive, irreflexive, symmetric, asymmetric, transitive equivalence, equivalence classes, partitions covering, compatible relation, maximal compatibility block , transitive closure–Warshall’s algorithm.

### **Unit-3. Partial Order Relation**

**(7 Hrs)**

Partial ordering relation – Hasse diagram, Chains and antichains. Lattice, maximal and minimal elements, upper bound, lower bound, Functions–definitions, domain, Range, One to one and Onto, Inverse and Composition of function,  $\partial$ : Partial function, hashing functions, characteristic functions, floor functions, ceiling functions, subjective control, injenctive (one-

to-one) Inverse functions, left reverse, right inverse, Bijection and cardinality of finite set, Infinite sets and compatibility. Properties of countable sets, Non-denumerable sets.

#### **Unit-4. Algebraic structures**

**(7 Hrs)**

Operations on sets- unary, binary, ternary, definitions of algebraic systems (restrict to binary operations), Properties – closure, idempotent, associative, communicative, associative, commutative, identity, inverse, Semigroup, subsemigroup, Monoid, submonoid group, abelian group, permutation group, multiplicatibe abelian group, cyclic group, Subgroups: Cosets, right cosets, left cosets, normal subgroups, quotient groups, isomorphism, homomorphism, automorphism.

**Group codes:** Weight and Hamming distance, minimum distance of code, generation of codes using parity checks – even parity, odd parity, parity check matrix – Hamming code, for detection and correction errors, formation of encoding function, decoding Application of residue –arithmetic to computers group codes.

#### **Unit-5. Graph theory**

**(7 Hrs)**

Graph: Basic terminology, simple and weighted graph, adjacency and incidence, hand-shaking lemma, underlying graph of a digraph, complete graph, regular graph, bipartrite graph, complete bipartrite, Isomorphism, complement of graph, connected graphs, paths-simple, elementary, circuit-simple, elementary, Edge connectivity, vertex connectivity, Eulerian path and Eulerian circuit , planner graph– regions Euler’s formula,

#### **Unit-6. Trees**

**(7 Hrs)**

Trees: Definition – leaf, root, branch node, internal node, Rooted and binary trees, regular m-ary tree. Prefix codes, Binary search tree, spanning trees, cut set, minimal spanning trees, Kruskal’s and Prim’s algorithms for minimal spanning tree, The Max flow- Min cut Theorem (Transport Network).

#### **Outcomes:**

By the end of this module students are expected to demonstrate the knowledge of

1. Mathematical Statements, Compound statements, truth tables, Normal forms, Theory of inference of statement calculus, predicate calculus.
2. Binary relations, Properties of a relation, Matrix And Graphical representation and its properties, Different types of relations.
3. Partial ordering relation, Lattice, Properties of Lattices, Definition of Functions, Different types of Functions and their properties, Non-denumerable sets.
4. Binary operations, Properties, Group Algebra and application to coding theory.
5. Simple and weighted graph, Digraph, Different types of graphs, paths, circuit, Eulerian path and Eulerian circuit , planner graph– regions Euler's formula.
6. Trees, Prefix codes, Binary search tree, Kruskal's and Prim's algorithms for minimal spanning tree, The Max flow- Min cut Theorem (Transport Network).

**Text Books:**

1. Kolman, B Bushy and Ross, S., 'Discrete Mathematical Structures for Computer S Science', Prentice Hall of India, 5<sup>th</sup> Edition, 2006.
2. C. Liu, 'Elements of Discrete Mathematics', Tata Mcgraw-Hill ,2<sup>nd</sup> Edition, 2005.

**Reference Books:**

1. Tremblay and Manohar, 'Discrete Mathematical Structures with applications to Computer Science', Tata Mcgraw-Hill ,23<sup>rd</sup> Reprint,2005
2. Rosen, 'Discrete Mathematics', Tata Mcgraw-Hill, 5th Edition, 2003.
3. R. Johnsonbaug, 'Discrete Mathematics', Pearson Education, 3<sup>rd</sup> Edition, 2003.
4. N. deo, 'Graph Theory, Applications to Computer and Engineering Sciences', Prentice Hall of India, First Edition, 2001.

# CS2015 :PROGRAMMING IN C

## **Aim :**

The course is aimed to develop problem-solving strategies, techniques and skills that can be applied to computers and problems in other areas which give students an introduction to computer and analytical skills to use in their subsequent course work and professional development. Develop skills to identify a problem and design appropriate solutions. Emphasis is on introduction of algorithms with the use of specific tools to illustrate the methods. Also, to acquaint the student to one of the programming language and preferably the procedural programming language i.e., C language and give them in-depth knowledge of important features of C. Techniques will be illustrated using sample problems drawn from various areas.

## **Objectives:**

1. To learn logic development.
2. To become proficient in C programming. Language.
3. To learn constructs of C language.
4. To learn pointers and dynamic memory handling.
5. To learn file handling with sequential ,random and index sequential files
6. To create small application with the help of c files, structures

## **Unit 1 : An Overview of C**

**(4 Hrs)**

A Brief History of C, C is middle-level Language, C is a Structured Language , Compiler Vs Interpreters , The Form of a C Program. , Library & Linking, Compilation & Execution on Dos & Unix , Variables, Data Types, Operator & Expression , Character Set , C Token , Identifier & Keyword , Constant , Data Types in C , Data Declaration & Definition , Operator & , Expression , Precedence & Associativity of Operators , Standard Input and Output.

## **Unit 2: Control Statement**

**(7 Hrs)**

Introduction , Selection Statement, if, Nested if –else, Conditional Expression , Switch statements, Iteration Statements , for loop , while loop , do-while loop , Jump Statements , Return statement., goto , break & continue , exit() function

## **Unit 3: Functions & Pointers**

**(8 Hrs)**

Function: Introduction, Arguments & local variables , Function prototype, Returning function Results , Functions Call by value and call by reference, Recursion.

Pointers: Pointers and Addresses, Declaration of Pointer , Initializing Pointer , Pointer , arithmetic , Pointer to Function.

C Preprocessor: ,Macro Substitution, File Inclusion, Conditional , Compilation

#### **Unit 4 : Arrays & Strings**

**(8 Hrs)**

Single Dimension Arrays: Accessing array elements, Initializing an array, Character, pointers and Function, Pointers Array, Pointers to Pointers, Initialization of pointer Arrays, String Manipulation Functions, Library functions, String Manipulation functions using pointers, Multidimensional Arrays , Initializing the arrays , Memory , representation , Accessing array elements

#### **Unit 5 : Structure, Union, Enumeration & typedef**

**(8 Hrs)**

Structures , Unions , Bit Fields , Enumeration, Typedef, Storage class ,specifiers: Automatic, Extern, Static, Register Storage Class.

#### **Unit 6 : Input and Output**

**(7 Hrs)**

Formatted Output-Printf., Formatted Input-Scanf, Error Handling-Stderr and Exit, Line Input And Output, Miscellaneous Functions , Command Line Arguments, File I/O, Input/Output Operations on Files , Error Handling During I/O , Operation , sequential , Random Access To Files .

#### **Outcomes:**

Upon completion of this course, the student will be able to:

1. Use the basic concepts of the C programming language to create computer applications.
2. Design, build, execute and debug C applications.
3. Use variables, arrays, strings, and disk files flow control statements, iteration and recursion in C applications.
4. Use pointers to access arrays and variables.
5. Create structured code using functions.
6. Create abstract data types.
7. Write and read simple disk files.
8. Students will be able to develop logic for problems.

#### **Text Books**

1. Herbert Schildt, ' C : The Complete Reference',Tata Mcgraw Hill Publication,2005
2. Y.P. Kanetkar ,'Let us C', BPB Publication,2005

#### **Reference Books**

1. Kernighan & Ritchie, 'C Programming Language',Eastern Economy Edition
2. S. Kochan, 'Spirit Of "C" Programming in C'
3. R. Hutchison,' Programming in C'
4. Y. Kanetkar, ' exploring C' , BPB Publication

# CS2025: WEB PROGRAMMING

## **Aim :**

- 1 To provide students with a deep, critical and systematic understanding of the most significant technologies for developing web applications.
- 2 To demonstrate how these technologies may be used on today's websites
- 3 To provide knowledge of the characteristics of good web site design principles

## **Objectives:**

1. To increase the students knowledge of available Web technologies.
2. To become familiar with scripting
3. To become familiar with graphics and interactive animations.
4. To learn and apply techniques that enhance a users web experience.

## **Unit 1 : HTML & Forms**

**(7 Hrs)**

Introduction To HTML, WWW, W3C, web publishing, Common HTML, Tags Physical & Logical, Some basic tags like <body>,changing background color of page, text color etc., Text formatting tags, <p> <br>,<hr> tags, Ordered & Unordered Lists Tags, Inserting image, Links: text, image links, image mapping , Tables , Frames, Form, Introduction with text box, text area, buttons, List box, radio, checkbox etc.

## **Unit 2 : Cascaded Style Sheet (CSS)**

**( 7 Hrs)**

Introduction to Style sheet, types of style sheets- Inline, External, Embedded CSS, text formatting properties, CSS Border, margin properties, Positioning  
Use of classes in CSS, color properties, use of <div> & <span>

## **Unit 3 : JavaScript**

**(7 Hrs)**

Intro to script, types, intro of JavaScript, JavaScript identifiers, operators, control & Looping structure, Intro of Array, Array with methods, Math, String, Date Objects with methods User defined & Predefined functions, DOM objects, Window Navigator, History, Location, Event handling, Validations On Forms

## **Unit 4 : VBScript**

**(7 Hrs)**

Introduction to VBScript, Variables, Data types, Control Structures & Loops, Functions in VBScript, Client side web scripting, Validating forms, DOM, Handling errors

## **Unit 5 : XML**

**(7 Hrs)**

Intro & features of XML, writing XML elements, attributes etc. XML with CSS, DSO, XML Namespaces, XML DTD, XML Schemas, Writing Simple sheets using XSLT, SAX & DOM Parsers, SOAP Intro.

## **Unit 6 : ASP**

**(7 Hrs)**

Introduction of ASP, Working with ASP page, Request & Response object, Application & Session, Role of Global.asa file, Server Object , Error Handling in ASP , Database Handling: Connection, Recordset, Command Object

### **Outcomes:**

At the end of the module students should be able to:

- 1 Have an understanding of the range of programming techniques and languages available to organisations and businesses and be able to choose an appropriate architecture for a web application.
- 2 Been able to demonstrate abilities to design and implement maintainable web sites. be able to make informed and critical decisions regarding client development using HTML and JavaScript.
- 3 Been able to design and implement reasonably sophisticated server-side applications using one or more suitable technologies.
- 4 Gain knowledge to critically analyse and evaluate web applications.

### **Text Books:**

1. Complete reference HTML, Thomas A. Powell , 3rd edition
2. Web Enabled Commercial Applications Development using... HTML, DHTML, Javascript, Perl CGI Ivan Bayross
3. Ivan Bayross Programming ASP.

### **Reference Books:**

1. JavaScript Bible , Danny Goodman, Machael Morrison, 3rd edition
2. VBScript Programmers reference, Wrox Press
3. VBScript in Nutshell
4. Hofstetter fred Internet Technology at work
5. Beginning XML, Wrox Press
6. Deitel & Deitel ,XML how to program.
7. Robert W. Sebesta ,Programming the World Wide Web
8. Beginning ASP 3.0 ,Wrox press
9. John Wiley & Sons C. Bates, Web Programming: Building Internet Applications, 2000, ISBN 0-471-49669-3.

# CS2035: COMPUTER ORGANIZATION

## **Aim :**

To learn structure, function and characteristics of computer systems and design of its various functional units.

## **Objectives:**

1. To understand the structure, function and characteristics of computer systems
2. To understand the design of the various functional units of digital computers
3. Study Microprocessor 8086 and Assembly Language Programming.

## **Unit 1 : Structure of a Computer System**

**( 7Hrs )**

Brief History of computers, Von Neumann Architecture, Functional Units, Signed numbers, Integer Arithmetic, 2's Complement multiplication, Booths Algorithm, Hardware Implementation, Division, Restoring and Non Restoring algorithms, and IEEE standards. Logic gates, Sequential circuits — Flip Flops, Registers and Counters.

## **Unit 2 : 16- bit Microprocessor**

**( 8Hrs )**

Introduction to 16- bit microprocessor, internal architecture and pin diagram of 8086/8088 microprocessor, Minimum and maximum mode, Timing Diagrams, Read and write machine cycles, Programmers model of 8086/88 - Addressing Modes, Instruction set, Introduction to assembly language programming: macro, procedure.

## **Unit 3 : Microprocessor and Interfacing**

**( 8Hrs )**

8086 interrupt structure, Interrupt Service Routine, Interrupt Vector Table (IVT) - location of IVT in the memory, contents of IVT, Hardware interrupts and Software interrupts - INTR, NMI and INT n, BIOS INT, Interrupt response, Execution of an ISR, priority of 8086 interrupts, .Com, .Exe file and TSR(Div. by zero, Real Time Clock) , Digital Interfacing: Programmable parallel ports, Intel 8255, block diagram and interfacing in mode0 (Analog – to –Digital converter, Digital to analog converter, Stepper motor)

## **Unit 4 : Control Unit Design:**

**(09 Hrs )**

Machine Instructions, Single Bus CPU, Micro-operations. Hardwired Control Unit and Micro-programmed Control Unit: Basic concepts. Memory Organization: Internal Memory, Characteristics of memory systems and Hierarchy, Main Memory, ROM, EPROM, RAM High-Speed Memories: Cache Memory, organization and Mapping, Replacement Algorithms, Cache Coherence, MESI protocol. Virtual Memory: Paging. Secondary Storage: Magnetic Disk, RAID, Optical memory, CDROM, DVD

## **Unit 5: I/O Organization:**

**(5 Hrs)**

Input/Output systems, Peripherals: Keyboard, Mouse, Scanners, Video Displays, Dot Matrix and Laser Printers, Standard Buses, Synchronous, Asynchronous, Parallel, Serial, PCI, SCSI, USB Ports. Programmed I/O, Interrupt driven I/O, Direct Memory Access

## **Unit 6 : Multiprocessor Configurations**

**( 5Hrs )**

Closely coupled and loosely coupled multiprocessor architectures, Problems of bus contentions, Interprocess Communications, Coprocessor and I/O Processor, Bus controller, Bus Arbitration, System Bus, Multibus. RISC and SUPERSCALAR Processors: RISC-Features, Register File, RISC v/s CISC, Superscalar Processors- Overview,

### **Outcomes:**

At the end of the course students will:

1. Get the knowledge of history of computer, integer and floating point arithmetic, algorithms for multiplication and division.
2. Get the information about 16-bit Processor 's addressing modes, Instruction pipelining and interfacing chip like 8255
3. Get knowledge of memory types, secondary memory devices, cache memory concepts and knowledge about the control unit design
4. Studied the detailing about different input and output devices with their functions.
5. Get knowledge about multiprocessor configuration, Coprocessor and I/O Processor, Bus controller, Bus Arbitration and parallel processing. Also overview of RISC,CISC and Superscalar processor

### **Text Books**

1. C. Hamacher, V. Zvonko, S. Zaky, "Computer Organization", McGraw Hill, 2002
2. Douglas Hall, "Microprocessors and Interfacing", McGraw Hill, 2<sup>nd</sup> Edition

### **Reference Books**

1. W. Stallings William, "Computer Organization and Architecture: principles of structure and function", Maxwell Macmillan Editions, 2<sup>nd</sup> Edition, 1990, ISBN 0 – 02 – 946297 – 5  
(Chapter: 2,3,4,5,7,8,9,10,11,12,13,14).
2. A. Tanenbaum, "Structured Computer Organization", Prentice Hall of India, 4<sup>th</sup> Edition, 1991, ISBN 81 – 203 – 1553 – 7 (Chapter: 1, 4, 5, 6, 8).
3. Ray Duncan " Advanced MS DOS Programming" Latest Edition.
4. W. Stallings, "Computer Organization and Architecture: Designing for performance", Prentice Hall of India, 2003, 6<sup>th</sup> Edition, ISBN 81 – 203 – 2103 – 0,
5. J. Hays, "Computer Architecture and Organization", McGraw-Hill, 2<sup>nd</sup> Edition 1988 ISBN 0 – 07 – 100479 – 3

# CS2045: FOUNDATIONS OF MANAGEMENT

## **Aim :**

This course presents a thorough and systematic coverage of management theory and practice. It focuses on the basic roles, skills and functions of management, with special attention to managerial responsibility for effective and efficient achievement of goals. Special attention is given to social responsibility, managerial ethics, and the importance of multi-national organizations.

## **Objectives:**

1. Understand fundamental concepts and principles of management, including the basic roles, skills, and functions of management;
2. Be knowledgeable of historical development, theoretical aspects and practice application of managerial process;
3. Be familiar with interactions between the environment, technology, human resources, and organizations in order to achieve high performance;
4. Be aware of the ethical dilemmas faced by managers and the social responsibilities of businesses.

## **Unit 1 : Management Concepts And Theory**

**(7 Hrs)**

What is Management? Is Management a science or an Art? Importance of Management, Challenges and Tasks of Management; Contributions of Taylor and Henri Fayol. Various approaches to Management; Functions of a Manager

### **The Planning Process:**

Introduction; Nature of Plans; Types of Plans; Importance of Planning; Steps in Planning. Why people fail in Planning; Limits of Planning; Establishing an Environment for Effective Planning; Creativity.

## **Unit 2 : Organizing**

**(7 Hrs)**

Introduction; Organizational Roles; Formal and informal Organization; Organizational Divisions: The Department; Factors Determining an Effective Span; Organizing a Process.

### **Departmentation, Basic Process in Organizing:**

Introduction; Departmentation by Simple Numbers; Departmentation by Time; Departmentation by Enterprise Function; Departmentation by Territory; Departmentation by Product; Customer Departmentation; Market Oriented Departmentation Process or Equipment Departmentation; Service Departments; Matrix Organization.

### **Unit 3 : Line and Staff Relationships**

**(7 Hrs)**

Line and Staff Concepts; Understanding of Line and Staff, A Case Example; Functional Authority; Benefits in using Staff Departments; Limitations in using Staff Departments.

#### **Staffing:**

Recruitment; Selection; Sources of New Employees; Kinds of Tests; Purpose of Employment Interview; Education and Training; An Introduction; Methods of Training.

### **Unit4 : Leadership and Motivation**

**(7 Hrs)**

Leadership-Definition and Concepts; McGregor's Theory 'X' and 'Y'; Ingredients of Leadership; Leadership Styles; The Managerial Grid; Leadership and Managing

#### **Motivation:**

Introduction; Concept of Motivation and Motivators; The theory of 'Hierarchy of Needs'; Herzberg's Theory on Motivation; The Porter and Lawler Model on Motivation; Special Motivational Techniques.

### **Unit 5 Communication:**

**(7 Hrs)**

Communication, Purpose and Importance; The Communication Process; Need for Different Types of Communication in a Business Enterprise; Barriers and Breakdowns in Communication; Towards Effective Communication

#### **Controlling Methods:**

The Control Process; Control as a Feedback System; Common types of standards used in Control Process; Control Technique; The Budget; Return on Investment Contents of Unit

### **Unit 6: Decision Making:**

**(7 Hrs)**

Introduction and Definition; Aids to Decision Making; Theories of Decision Making; Decision Making; Under Certainty; Decision Making; Under Uncertainty.

#### **Key issues in Modern Management:**

MBO; Quality Circles- A Review; Total Quantity Management; Review and Concepts

**Outcomes:**

Upon completion of this course, the student should be able to

- 1 Analyze the internal and external environment of the business, including the organization's culture and the challenges of operating in an international, multinational and global environment.
- 2 Given a specific ethical situation, analyze the situation and prepare recommendations for a course of action that will promote ethical behavior.
- 3 Evaluate the plan and provide recommendations on how the plan could be improved to include more effective planning and decision making.
- 4 Identify the functional elements of the organization, create an organizational design and provide recommendations on organizational change.
- 5 Understand the individual-organization relationship and the elements affecting individual behavior, including personality, attitudes and perceptions.
- 6 Given a leadership scenario, recommend a course of action that incorporates the concepts of motivation and leadership to influence behavior.
- 7 Improve interpersonal relations within an organization, create a plan of action that addresses the communication process, as well as the issues and methods of managing the interpersonal relationships of individuals, work groups and teams.

**Text Books :**

1. Peter F Drucker, 'Practice and Management'
2. Burton & Thakur , 'Management Today Principles And Practices'

**Reference Books :**

1. Jones, George, Hill. 'Contemporary Management', Second Edition. Irwin McGraw-Hill. 2000.
2. Griffin Houghton Mifflin Company, 'Fundamentals of Management', 3rd Edition, 2003
3. Koontz H & Weirich H, 'Essential of management'
4. Ivancevich & Gibson, Donnelly, ' Management Principles and Functions'

**FIRST YEAR**

**MCA**

**SEMESTER I**

**LABORATORY**

# EC9695 : HARDWARE LAB

## Objectives:

1. To understand the structure, function and characteristics of computer systems
2. To understand the design of the various functional units of digital computers
3. Study Microprocessor 8086 and Assembly Language Programming.

## List of Practicals

Using ALP implement the following

- 1) Display a message
- 2) Array addition
- 3) Find Odd and Even numbers.
- 4) Multiplication on two numbers using add and shift method.
- 5) Sorting of numbers from an array.
- 6) String Operations
- 7) String Manipulation
- 8) ADC
- 9) DAC
- 10) Stepper motor
- 11) Study of Mother Board
- 12) Active TSR (Real Time Clock)
- 13) Passive TSR (Div by Zero)
- 14) Graphics mode

**Note:** Staff member should take any 12 assignment

## Outcomes:

Prerequisite subject to understand Advanced Computer Architecture, and Embedded System.

## Text Books

1. Peter Abel “ Assembly Language Programming” , Pearson Education , 5<sup>th</sup> Edition,
2. Ray Duncan “Advanced MS DOS Programming” Latest Edition.

## Reference Books :

1. W. Stallings, “Computer Organization and Architecture: Designing for performance”, Prentice Hall of India, 2003, 6<sup>th</sup> Edition, ISBN 81 – 203 – 2103 – 0,
2. Douglas Hall, “Microprocessors and Interfacing”, McGraw Hill, 2<sup>nd</sup> Edition
1. INTEL – Microprocessor and Peripheral Handbook VOL

## CS7015: C PROGRAMMING LAB

### Objectives:

1. To learn logic development.
2. To become proficient in C programming language.
3. To learn constructs of C language.
4. To learn pointers and dynamic memory handling .
5. To learn file handling with sequential ,random and index sequential files.
6. To create small application with the help of C files, structures

### List of Practicals

1. Find Area, Perimeter of Square, Rectangle and Circle.
2. Find maximum of three numbers.
3. Check for the Prime and Armstrong Number.
4. Display the Floyd's Triangle.
5. Find the Fibonacci Series and Factorial of Number, GCD of numbers.
6. Implement Inter conversion of Decimal, Binary & Hexadecimal no.
7. Implement the Function with call by values with and without return values and the implementation of function using call by reference.
8. Implement Pointer Arithmetic.
9. Use the Recursion function for finding sum of digits/ reverse of digits/Fibonacci/Factorial etc.
10. Write a program for linear search, binary search.
11. Write a c program to merge the given two integer array elements in a third array. The new array should have the elements sorted in ascending order. Assume that the array to be merged are sorted in ascending order.
12. Implement the Addition and Multiplication of matrices.
13. Display upper & lower diagonal of matrices
14. Write a program to String manipulation functions e.g. string length, copy, concatenation, compare, reverse and palindrome with and without using library functions.
15. Implement Array of Structures to handle information such as Student result, Employee pay slip, Phone bill etc.
16. Implement File handling to perform Read / Write file, copy, merge file.
17. Develop a application for students result processing. Write program for creation of sequential file.
18. Write program for creation of random file for storing library data.

### Mini Project Based on C :

The objective of this mini project is to gear up student for preparation of final project in Semester. Student will select individually project based on C. The students will be assessed based on demonstration.

**Outcomes:**

Upon completion of this course, the student will be able to:

1. Use the basic concepts of the C programming language to create computer applications.
2. Design, build, execute and debug C applications.
3. Use variables, arrays, strings, and disk files flow control statements, iteration and recursion in C applications.
4. Use calculations in C applications.
5. Use pointers to access arrays and variables.
6. Create structured code using functions.
7. Create abstract data types.
8. Write and read simple disk files.
9. Students will be able to develop logic for problems.

**Text Books**

1. Herbert Schildt, "C : The Complete Reference", Tata Mcgraw Hill Publication. fourth edition,2003
2. Y.P. Kanetkar, "Let us C ",BPB Publication, fourth edition,2005

**Reference Books**

1. Byron S. Gottfried , Schaum's Outline Series "Programming With C" ,Tata Mcgraw Hill Publication.
2. Kernighan & Ritchie, "C Programming Language".
3. Stephan G. Kochan, "Programming In C " Sams Publication,Third Edition ,2004
4. R. Hutchison, "Programming In C"
5. Cooper, Mullish, "The Spirit Of C Programming", Jaico Publishing House, New Delhi, 1987.

## **CS7025: WEB PROGRAMMING**

### **Aim :**

1. To provide students with a deep, critical and systematic understanding of the most significant technologies for developing web applications.
2. To demonstrate how these technologies may be used on today's websites.
3. To provide knowledge of the characteristics of good web site design principles.

### **Objectives:**

1. To increase the students knowledge of available Web technologies.
2. To become familiar with scripting languages.
3. To be able to designing interactive web pages.
4. To become familiar with server side scripting.
5. To learn and apply techniques that enhance a users web experience.

### **List of Practicals**

1. Create your home page using HTML. The page should contain images, tables, ordered and unordered lists, internal and external links and other text formatting elements.
2. Create an online student registration form using HTML.
3. Create a webpage to show the usage of frames in HTML.
4. Create web page/s showing the working of three different types of CSS.
5. Create a web page using the class and properties of CSS.
6. Create a web page with dynamic text effects. The text and image must change color, size and background on mouse events.
7. Write a program using JavaScript to create a Digital Clock.
8. Create a user data validation form using JavaScript.
9. Write a user defined function in JavaScript to check if a string is palindrome or not. Do not use predefined function for the same.
10. Create a user data validation form using VBScript.
11. Write a program using VBScript to create a calculator.
12. Create an external DTD for a XML document storing data about students using appropriate elements, attributes and values.
13. Traverse a XML document using JavaScript.
14. Create a simple sheet using XSLT.
15. Write an ASP script to create a user login form.
16. Write an ASP script to insert, delete and search for an employee's record.

### **Mini Project Based on Web Programming:**

The objective of this mini project is to provide introductory knowledge about web programming. Student will select individually commercial project based on web programming. The students will be assessed based on individual demonstration.

## **Outcomes:**

At the end of the module students should be able to:

- 1 Have an understanding of the range of programming techniques and languages available to organisations and businesses and be able to choose an appropriate architecture for a web application.
- 2 Been able to demonstrate abilities to design and implement maintainable web sites. be able to make informed and critical decisions regarding client development using HTML and JavaScript.
- 3 Been able to design and implement reasonably sophisticated server-side applications using one or more suitable technologies.
- 4 Gain knowledge to critically analyze and evaluate web applications.

## **Text Books**

1. Complete reference HTML, Thomas A. Powell , 3<sup>rd</sup> edition
2. Web Enabled Commercial Applications Development using... HTML, DHTML, Javascript, Perl CGI Ivan Bayross
3. Ivan Bayross Programming ASP.

## **Reference Books**

1. JavaScript Bible , Danny Goodman, Machael Morrison, 3<sup>rd</sup> edition
2. VBScript Programmers reference, Wrox Press
3. VBScript in Nutshell
4. Hofstetter fred Internet Technology at work
5. Beginning XML Wrox Press
6. Deitel & Deitel ,XML how to program.
7. Robert W. Sebesta ,Programming the World Wide Web
8. Beginning ASP 3.0 Wrox press
9. John Wiley & Sons C. Bates, Web Programming: Building Internet Applications, 2000, ISBN 0-471-49669-3.
10. C. Cosentino, Essential PHP for Web Professionals, Prentice Hall, 2000, ISBN 0-1308-8903-2.

**FIRST YEAR**

**MCA**

**SEMESTER II**

**(Theory )**

# ES0315: PROBABILITY AND COMBINATORICS

## Prerequisites:

Elementary knowledge mainly in Basic Algebra, Function, Relation, Trees.

**Objectives:** In this cyber age, use of numerical and counting techniques has become an integral part of modern scientific studies. The fundamental objective of the module is to provide the opportunity for the students to develop a firm foundation in numerical and computing methodologies and introduce the concept of probability distributions and prepare them for more advanced studies involving probability theory, which is the most contemporary and essential tools needed in the breadth and depth of computer science and its applications. It is also desired to pass on to the students the hunger for knowledge and the passion for learning new techniques and apply it to the day to day world.

## Unit 1: Permutations & Combinations: (7 Hrs)

Addition principle, multiplication principle, Bijection principle,  $r$ -permutations of  $n$ -elements,  $r$ -combination of  $n$ -elements, binomial coefficients, circular permutations, permutations with repetitions, Multinomial theorem, combinations with repetitions, Distribution of objects-

1. Distinct objects in distinct cells
2. Indistinguishable objects in distinct cells
3. Distinct objects in, indistinguishable cells
4. Indistinguishable objects in distinguishable cells

## Unit2: Combinatorics and Combinatorial identities: (7 Hrs)

Combinatorial proofs of Binomial identities, Number of non-negative integer solutions of linear equations with conditions. Principle of Inclusion & Exclusion. Formula Derangement-restrictions on relative positions.

## Unit 3: Generating functions and Recurrence relation : (7 Hrs)

Generating functions for discrete numeric functions, for combinations. Recurrence Relations: -Linear Homogeneous, non-homogeneous. Pigeonhole principle.

## Unit 4: Probability: (7 Hrs)

Sample space, events, different approaches, conditional probability, Baye's rule, Random variables: univariate & bivariate, Expectation of R.V, expectation of a function of a r.v. Moment generating function & its properties. Finding mean & variance using m.g.f. cumulant generating function, cumulants properties, finding mean & variance using cumulants, characteristic function-properties, finding mean & variance

## Unit 5: Standard Discrete Probability Distributions: (7 Hrs)

Definition and properties of Binomial, Poisson, Negative Binomial, Geometric, hyper geometric, zeta distributions. (For the discrete distributions definition of r.v and derivation of

its p.m.f. is expected. Using these definitions mean & variance should be obtained.) Special properties of distributions (if any).

Joint discrete probability distribution: marginal & conditional distributions.

**Unit 6: Standard Continuous Probability Distributions: (7 Hrs)**

Definition and properties of Uniform, normal, Erlang, gamma, exponential, Ray Leigh, Laplace, Cauchy Distribution. (For the continuous distributions p.d.f. should be defined For all the above distributions using these definitions mean & variance should be obtained.) Special properties of the distribution (if any).

Joint continuous Probability distribution: marginal & conditional distributions

**Outcomes:**

By the end of the module students will be expected to

1. Acquire sound knowledge in the basics of counting techniques and be proficient with the techniques of permutations and combinations.
2. Be familiar with the combinatorial identities, generating functions, recurrence relations and Pigeonhole principle.
3. Have understanding of the fundamental concepts of probability, random events, random variables, and standard probability distributions, joint and marginal distributions.

**Text Books:**

1. D.P.Apte, 'Probability and Combinatorics', Excel Publication, Delhi, 1st edition, 2007.
2. T.Veerarajan, 'Probability & Random Process', Tata McGraw Hill. 2<sup>nd</sup> edition, 2005.

**Reference Books:**

1. Ross S., 'A first course in Probability', Pearson education, 1<sup>st</sup> edition, 2003.
2. Hwei Hsu, 'Probability, Random Variables & Random Processes', Schaum's outlines Tata McGraw-Hill, 2004.
3. Modak Andor Boxwala, 'Discrete Mathematics' (BSC computer), Manali Prakashan 2<sup>nd</sup> edition , 1999.
4. C.L. Liu, 'Elements of Discrete Mathematics', Tata McGraw Hill. 2<sup>nd</sup> edition, 2005.

# CS2065: DATA STRUCTURE

**Prerequisite:** C programming.

**Aim :**

The course is aimed to develop problem-solving strategies, techniques and skills that can be applied to computers and problems in other areas with the help of data structure. Develop skills to identify a problem and design appropriate solutions.

**Objectives:**

1. To introduce algorithmic analysis, fundamental data structures, problem solving paradigms
2. To study the representation, implementation and application of basic data structures.
3. To introduce algorithmic strategies and time complexity analysis of problems.
4. Apply Data Structures and other techniques to Real life problems.

**Unit 1: Introduction To Data Structure**

**(5 Hrs)**

Introduction, Data Types, Data Structure, Array as Data Structure, Storage Representation of Arrays, Applications of Arrays, Polynomial representation Using , Arrays, Addition of Two Polynomial, Multiplication of Two Polynomial, Sparse Matrices, Addition of Sparse Matrices, Transpose of a Sparse Matrix.

**Unit 2: Linked List**

**(8 Hrs)**

Introduction, Drawback of Sequential Storage, Linked List, Operation of Linked List, Creating a List, Displaying a List, .Inserting an element in the ,List, Deleting an element, Other Operation & Applications, Reversing a Linked List, .Concatenation of Two Lists, Representation of Polynomial, Circular Linked List & Operation, Doubly Linked List & Operation, Doubly Circular Linked List & Operation.

**Unit 3: Stack and queue**

**(8 Hrs)**

Introduction, Operation on Stack, Static & Dynamic Implementation of a Stack, Application of Stack, Recursion, Infix, Prefix & Postfix expression, .Matching Parentheses in an expression.

Queue, Definition of a Queue, Operation on a Queue, Static & Dynamic , Implementation of Queue: Types of Queue, Circular Queue, Priority Queue, DEQueue , Application of Queue, Job Scheduling, Reversing Stack using Queue.

**Unit 4:Tree**

**(10 Hrs)**

Tree Terminology, Binary Tree, Binary Tree Representation, Binary Search Tree (BST) .Creating a BST, Binary Search Tree Traversal, Preorder Traversal, Inorder Traversal Postorder Traversal .AVL tree, B tree, introduction to B tree, insertion in B tree, deletion , introduction to B+,B\* tree, Expression Tree, Threaded Binary Tree.

**Unit 5: Graph****(5 Hrs)**

Graph: Introduction, Graph Representation, Adjacency Matrix, Adjacency List, Graph Traversals, Depth First Search, Breadth First Search, topological sorting, Applications of Graph.

**Unit 6: Sorting and searching****(6 Hrs)**

Sorting: Bubble, exchange, selection, insertion, quick, heap, merge, radix, shell.  
Time and space complexity.  
Searching: linear, binary search.  
Hashing: Hashing Function ,Overflow handling

**Outcomes:**

At the conclusion of this course, students should understand common data structures and algorithms, and be able to

1. Use with various concepts of Algorithm development.
2. Use various Data Structure .
3. Apply various Sorting and Searching Techniques.
4. Apply Data Structures and other techniques to Real life problems.

**Text Books :**

1. Y. Langsam, M. Augenstin and A. Tannenbaum, “Data Structures using C & c++”, Prentice Hall India.
2. Shrivastava & Shrivastava, “Data Structure through C in depth”, BPB Publications ,Special Indian Edition

**Reference Books**

1. R.L.Kruse , “Data structure and program design in c”, Prentice Hall Of India, latest edition .
2. ISRD Group, “Data Structure Using C”, Tata Mcgraw Hill, first reprint ,2007
3. Y.P. Kanetkar, “Data Structure through C”.BPB publication
4. Seymour Lipsutz , “Data Structure” ,Tata Mc Graw Hill Publication,seventh reprint 2007
5. Balagurusamy ,C & Data Structure , Tata Mcgraw-Hill ,1/Edition ,2005

# CS2075: OPERATING SYSTEMS

## Prerequisites :

Data Structures and Algorithms.  
Computer Organization.

## Aim :

This course provides an understanding of the standard problems and their solutions in the area of operating systems (including process management, storage management, I/O systems design) and with practical experience with one or more modern operating systems.

## Objectives:

1. Identify the role of operating systems and explain the different structures of operating systems.
2. Describe OS support for processes/threads, and virtual memory, I/O and file systems.
3. Evaluate processes and/or threads synchronization mechanisms and explain deadlock conditions and ways to resolve them.
4. Identify the different design and implementation concepts for Unix/Linux
5. Use Inter-Process Communication techniques under Unix/Linux.

## Unit 1 : Introduction to OS

(7 Hrs)

Architecture, Goals & Structures of O.S., Hardware Abstraction layer, Basic functions, Interaction of OS and hardware architecture, Batch processing, multiprogramming, multitasking, time sharing, parallel, distributed & real-time OS.

Examples of OS: Linux, MS-Windows 2000

## Unit 2 : Process Management

(7 Hrs)

Process description & control: Process Concept, Process states, Process description, Process control, Threads.

Principles of Concurrency, Mutual Exclusion: S/W approaches, Semaphores, Message Passing, Monitors, Classical Problems of Synchronization: Readers-Writers problem, Producer Consumer Problem, Dining Philosopher problem.

## Unit 3 : Deadlock and Shell programming

(7Hrs)

Deadlock: Principles of deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Deadlock Recovery

Shell and Command Programming

**Unit 4 : Scheduling****(7 Hrs)**

Uniprocessor Scheduling: Types of scheduling: Preemptive, Non-preemptive, Long-term, Medium-term, Short-term. Scheduling Algorithms: FCFS, SJF, RR, Priority

Multiprocessor Scheduling: Granularity, Design Issues, Process Scheduling, Thread Scheduling, Real Time Scheduling: Characteristics, Real Time Scheduling

**Unit 5: Memory Management****(7 Hrs)**

Memory management requirements, Fixed and Variable Partitioning, Allocation Strategies (First Fit, Best Fit, Worst Fit), Fragmentation, Swapping.

Virtual Memory: Concepts, Segmentation, Paging, Address Translation, Demand paging, Page Replacement Policies (FIFO, LRU, Optimal, Other Strategies), Thrashing

**Unit 6: I/O Devices & Files****(7 Hrs)**

I/O management & Disk scheduling: I/O Devices, Organization of I/O functions, Operating System design issues, I/O Buffering, Disk Scheduling (FCFS, SCAN, C-SCAN, SSTF), RAID, Disk Caches.

File Management: Concepts, File Organization, File Directories, File Sharing, Record Blocking, Free Space management, Security Issues, Secondary Storage Management

**Outcomes:**

Upon completion of the course, the students will be able to:

1. Summarize the principles underlying the design and construction of a typical operating system, giving particular recognition to the wider applicability of the ideas and the influences from such developments as high-level languages, networking, multimedia, and security concerns.
2. Describe the concept of a process and how processes deal with scheduling, cooperation, and communication with other processes.
3. Explain the classical problems in process synchronization and know several different ways to solve such problems, including semaphores, critical regions, and monitors.
4. Describe several different schemes for managing main memory, including swapping, virtual memory, paging, and segmentation.
5. Compare and contrast several schemes for file allocation and file management.
6. Describe the characteristics of an I/O system and explain how the user, the operating system, and the hardware interact with I/O.

**Note:** Every aspect of OS should be taught in comparison W.R.T. WINDOWS 2000 & UNIX.

**Text Books:**

1. Stalling William, “Operating Systems”, Pearson Education, 4<sup>th</sup> Edition, 2001.
2. Silberschatz A., Galvin P., Gagne G., “Operating System Concepts”, John Wiley and Sons, 7<sup>th</sup> Edition, 2003.

**Reference Books:**

1. Tanenbaum Andrew S., “Modern Operating Systems”, PHI, 2<sup>nd</sup> Edition, 2001.
2. Das Sumitabha, “Unix Concepts and Applications”, Tata McGraw Hill, 3<sup>rd</sup> Edition, 2003
3. Bach Maurice, “Design of the Unix Operating System”, Pearson Education, 1<sup>st</sup> Edition, 1990.

# CS2085: COMPUTER GRAPHICS

## **Aim :**

To make students aware, about the basic Computer graphics Concepts.

## **Objectives:**

1. To understand basic concepts of computer graphics
2. To understand algorithms to draw various graphics primitives
3. To understand 2-D and 3-D transformations

## **Unit 1 : Basic Concepts**

**(7 Hrs)**

Introduction to computer graphics, lines, line segments, vectors, pixels and frame buffers, DDA and Bresenham's line and circle drawing algorithms, antialiasing, character generation: Stroke Principle, Starburst Principle, Bit map method, display of frame buffer.

Graphics Primitives: Display devices, Interactive devices: Tablets, touch panels, mouse, joysticks, track balls, light pen etc., Data generating devices: Scanners and digitizers, primitive operations, display file structure, algorithms and display file interpreter, Text and line styles.

## **Unit 2 :Polygons**

**(8 Hrs)**

Introduction, types, and representation, entering Polygons, Polygon filling: Seed fill, Edge fill, scan line fill algorithm, filling with patterns.

2D Transformations: Introduction, matrices, Scaling, Rotation, homogeneous coordinates, Translation, Co-ordinate transformation, rotation about an arbitrary point, Reflections and shear transforms.

## **Unit 3: Segments**

**(7 Hrs)**

Introduction, segment table, segment creation, deletion, renaming. Image transformations, raster techniques

Windowing and Clipping: Introduction, viewing transforms, 2D clipping, Cohen-Sutherland outcode algorithm, Polygon Clipping, Sutherland-Hodgeman algorithm, Generalized clipping.

#### **Unit 4 : 3-D Transformations**

**(8 Hrs)**

Introduction, 3-D geometry, primitives, transformations, Rotation about an arbitrary axis, Concept of parallel and perspective projections, 3D clipping, 3D viewing transformations

#### **Unit 5: Hidden Surfaces and Lines**

**(7 Hrs)**

Introduction, Back-face removal algorithm, Z buffers, scan-line, Painters algorithm, Warnock algorithm, hidden line methods, binary space partition.

Light, Color and Shading: Introduction, Diffused illumination, point source illumination, shading algorithm, reflections, shadows, ray tracing, Colour models and tables, shading algorithm, transparency

#### **Unit 6 : Curves and Fractals**

**(5 Hrs)**

Introduction, Curve generation, Interpolation, interpolating algorithms, interpolating polygons, B-Splines and corners, Bezier curves, Fractals, fractal lines and surfaces

#### **Outcomes:**

Students will be in a position to select adequate algorithm for performing various operations on 2D and 3D objects based on underlying applications

#### **Text Books**

1. S. Harrington, "Computer Graphics", McGraw-Hill Publications, 2<sup>nd</sup> Edition, 1987, ISBN 0-07-100472-6.
2. J. Foley, V. Dam, S. Feiner, J. Hughes, "Computer Graphics Principles and Practice", Pearson Education, 2<sup>nd</sup> Edition, 2003, ISBN 81-7808-038-9.

#### **Reference Books**

1. D. Rogers, J. Adams, "Mathematical Elements for Computer Graphics", Tata McGraw-Hill Publication, 2<sup>nd</sup> Edition, 2002, ISBN 0-07-048677-8.
2. D. Rogers, "Procedural Elements for Computer Graphics", Tata McGraw-Hill Publication, 2<sup>nd</sup> Edition, 2001, ISBN 0-07-047371-4.
3. F. Hill, "Computer Graphics: Using OpenGL", Pearson Education, 2<sup>nd</sup> Edition, 2003 ISBN 81-297-0181-2.
4. D. Hearn, M. Baker, "Computer Graphics – C Version", Pearson Education, 2<sup>nd</sup> Edition, 2002, ISBN 81-7808-794-4.

## **CS2095: FINANCIAL AND COST ACCOUNTING**

### **Aim :**

This course presents a thorough and systematic coverage of financial , cost and managerial accounting.

The AIM of this course is to develop students' ability to understand and use accounting information effectively in making economic decisions. (Analyzing and communicating accounting information that is useful for decision-making)

### **Objectives:**

1. To introduce students to accounting as the "language of business" and to the various financial accounting topics covered in the course with the understanding that some students may pursue more in-depth study in subsequent courses while others do not intend to continue their accounting education.
2. To teach students to apply accounting theory, standards, principles and procedures to practical accounting problems in the elementary topical areas covered in the course.
3. To teach students the fundamental rationale for the various financial accounting procedures introduced in the course.

### **Unit 1: Financial Accounting**

**(7 Hrs)**

Double Entry Accounting system, Concepts and conventions in accounting, Accounting process, Depreciation

Journalisation: Rules for Journalisation, posting in a ledger, subsidiary books, preparation of trial balance, Bank Reconciliation statement.

### **Unit 2: Final Accounts**

**(7 Hrs)**

Preparation of Trading and profit and loss Account and Balance sheet of a proprietary and partnership firms.

### **Unit 3:Cost Accounting**

**(7 Hrs)**

Advantages of Cost Accounting, Comparison with financial accounting, Classification and elements of cost, Methods of costing

### **Unit 4:Techniques of costing**

**(7 Hrs)**

Marginal costing, Break-even chart, cost, volume profit analysis., Standard costing, Advantages, Variance analysis Budgetary Control –Types of budgets and Flexible Budget VS Fixed Budget ,Preparation of Simple cash budget & flexible budgets  
Cost Reduction and cost control, value analysis.

### **Unit 5:Management Accounting**

**(7 Hrs)**

Concept of Management Accounting, Objectives of Management Accounting, Comparison with financial and cost accounting.

**Unit 6: Ratio Analysis****(7 Hrs)**

Objectives, Advantages and limitations, preparation of ratios from given information  
Funds flow analysis and cash flow analysis-understanding the concept.

**Outcomes:**

Upon completion of this course, the student should be able to Analyzing and communicating accounting information that is useful for decision-making)

**Text Books**

1. Satish Inamdar ,Cost and Management accounting”, Everest Publishing House
2. Khan and Jain Management Accounting”, Tata Mcgraw Hill.

**Reference Books**

1. A.P. Rao, Management Accounting”,EPH
2. Dr.Sanjay Patankar, Management Accounting”,
3. Dr.Mahesh Kulkarni , Management Accounting” ,
4. Duncan Williamson ,Cost and Management Accounting”, PHI
5. T.S. Grewal, Element of Accounts, S. Chand & Co.
6. Engineering Economics and financial Accounting – scitech publication 2004.
7. engineering Economics and financial Accounting by Sonversity- salem tamilnadu sonversity-2004
8. accounting and financial management by Ramchandran T – scitech publication -2001

**FIRST YEAR**

**MCA**

**SEMESTER II**

**LABORATORY**

# CS7065 : COMPUTER GRAPHICS LAB

## Objectives:

1. To understand basic concepts of computer graphics
2. To understand algorithms to draw various graphics primitives
3. To understand 2-D and 3-D transformations

## List of Practicals

1. Write a program in C to implement DDA and Bresenham Line algorithm.
2. Write a program in C to implement midpoint and Bresenham circle drawing algorithm.
3. Write a program in C to implement algorithm for filling a polygon using scan-fill method.
4. Write a program to implement 2-D transformations.
5. Write a program to implement 3-D transformations.
6. Write a program to implement animation by using line and circle drawing algorithms.
7. Write a program in C to implement line clipping algorithm.
8. Write a program in C to implement algorithm Sutherland – Hodgeman polygon clipping algorithm
9. Write a program in C to implement Bazier curve.
10. Write a program to generate fractal line and surface.

## Mini Project Based on Computer Graphics :

The objective of this mini project is to gear up student for preparation of final project in Semester. Student will select individually Commercial or Technical project based on graphics. The students will be assessed based on demonstration.

## Outcomes:

Students will be in a position to select adequate algorithm for performing various operations on 2D and 3D objects based on underlying applications

### **Text Books**

1. S. Harrington, "Computer Graphics", McGraw-Hill Publications, 2<sup>nd</sup> Edition, 1987, ISBN 0-07-100472-6.
2. J. Foley, V. Dam, S. Feiner, J. Hughes, "Computer Graphics Principles and Practice", Pearson Education, 2<sup>nd</sup> Edition, 2003, ISBN 81-7808-038-9.

### **Reference Books**

1. D. Rogers, J. Adams, "Mathematical Elements for Computer Graphics", Tata McGraw-Hill Publication, 2<sup>nd</sup> Edition, 2002, ISBN 0-07-048677-8.
2. D. Rogers, "Procedural Elements for Computer Graphics", Tata McGraw-Hill Publication, 2<sup>nd</sup> Edition, 2001, ISBN 0-07-047371-4.
3. F. Hill, "Computer Graphics: Using OpenGL", Pearson Education, 2<sup>nd</sup> Edition, 2003 ISBN 81-297-0181-2.
4. D. Hearn, M. Baker, "Computer Graphics – C Version", Pearson Education, 2<sup>nd</sup> Edition, 2002, ISBN 81-7808-794-4.

# CS7085: DATA STRUCTURE LAB

**Prerequisite:** C programming.

## **Objectives:**

1. To introduce algorithmic analysis, fundamental data structures, problem solving paradigms
2. To study the representation, implementation and application of basic data structures.
3. To introduce algorithmic strategies and time complexity analysis of problems.
4. Apply Data Structures and other techniques to Real life problems.

## **List of Practicals**

1. Write program for sparse matrix representation, transpose of sparse matrix, addition of two sparse matrix .
2. Write program for polynomial addition, polynomial multiplication (static representation).
3. Write a program for singly linked list implementation.(insert, traverse, delete)
4. Write a program for ordered linked list implementation.(insert, traverse, del)
5. Write a program for reversing linked list implementation.
6. Write a program for merging two linked lists implementation
7. Write a program for doubly linked list implementation.(insert, traverse, delete).
8. Write a program for ordered doubly linked list implementation.(insert, traverse, delete)
9. Write a program for ordered circular linked list implementation.(insert, traverse, delete)
10. Write a program for ordered circular doubly linked list implementation.(insert, traverse, delete)
11. Write program for stack implementation. (array, pointer implementation).
12. Write program for multiple stack implementation.
13. Write program for internal conversion for infix, postfix, prefix.
14. Write program for postfix expression evaluation.
15. Write program for matching parenthesis.
16. Write program for queue implementation (array, pointer).
17. Write program for circular queue implementation (array , pointer).
18. Write program for reversing stack using queue.
19. Write a program for queue application.(priority queue)
20. Write a program for binary search tree implementation.(insert, level by level traverse, delete,, pre order, post order, inorder, copy, mirror, sum\_of\_nodes, count\_leaf, display\_leaf, count\_nodes).

21. Write a program for threaded tree implementation.(insert, inorder traverse, delete).
22. Write program for depth first search in graph and breadth first search in graph.
23. Write program for searching given element in list using linear search, binary search.
24. Write program by creating separate functions for sorting list of elements using bubble sort, insertion sort, selection sort, merge sort, quick sort.

### **Mini Project Based on Data Structure :**

The objective of this mini project is to gear up student for preparation of final project in Semester. Student will select individually Commercial or Technical project based on Data Structures. The students will be assessed based on demonstration.

### **Outcomes:**

At the conclusion of this course, students should understand common data structures and algorithms, and be able to

1. Use with various concepts of Algorithm development
2. Use various Data Structure
3. Apply various Sorting and Searching Techniques
4. Apply Data Structures and other techniques to Real life problems.

### **Text Books**

1. Y. Langsam, M. Augenstin and A. Tannenbaum, “Data Structures using C & c++”, Prentice Hall India.
2. Shrivastava & Shrivastava, “Data Structure through C in depth”, BPB Publications ,Special Indian Edition

### **Reference Books**

1. R.L.Kruse , “Data structure and program design in c”, Prentice Hall Of India, latest edition .
2. ISRD Group, “Data Structure Using C”, Tata Mcgraw Hill, first reprint ,2007
3. Y.P. Kanetkar, “Data Structure through C”.BPB publication
4. Seymour Liptutz , “Data Structure” ,Tata Mc Graw Hill Publication,seventh reprint 2007
5. Balagurusamy ,C & Data Structure , Tata Mcgraw-Hill ,1/Edition ,2005

# CS7075: OPERATING SYSTEMS LAB

## Prerequisites :

Data Structures and Algorithms  
Computer Organization

## Objectives:

1. To study the operations performed by Operating Systems as a resource manager.
2. To learn the evolution of Operating Systems.

## List of Practicals

1. Execution of basic Unix commands
2. Execution of advanced Unix commands
3. Implement a shell program to find out if a given string is a palindrome or not.
4. Write a shell program to sort an array of numbers using the bubble sort method
5. Solve the Readers-Writers problem using threads and semaphores.
6. Solve the Readers-Writers problem using threads and mutex.
7. Solve the Producers-Consumers problem using threads and mutex
8. Solve the Producers-Consumers problem using threads and semaphores
9. Implement the Dining Philosopher's problem using Multithreading
10. Simulate the following CPU scheduling algorithms:
  - a. Shortest Job First (Non-preemptive)
  - b. Round Robin(Draw the Gantt charts and display the finish time, turnaround time, waiting time for each process)
11. Simulate the LRU page replacement algorithm
12. Write a program to simulate the following disk scheduling algorithms:
  - a. SSTF
  - b. SCAN

### **Mini Project Based on OS:**

The objective of this mini project is to gear up student for preparation of final project in Semester. Student will select individually Commercial or Technical project based on OS. The students will be assessed based on demonstration.

### **Outcomes:**

Student will be able to program on the LINUX platform in industry. In addition to the application programming skills acquired during the three year programme, this will give the student an added dimension

### **Text Books:**

1. Stalling William, "Operating Systems", Pearson Education, 4<sup>th</sup> Edition, 2001.
2. Silberschatz A., Galvin P., Gagne G., "Operating System Concepts", John Wiley and Sons, 7<sup>th</sup> Edition, 2003.

### **Reference Books:**

1. Tanenbaum Andrew S., "Modern Operating Systems", PHI, 2<sup>nd</sup> Edition, 2001.
2. Das Sumitabha, "Unix Concepts and Applications", Tata McGraw Hill, 3<sup>rd</sup> Edition, 2003.
3. Bach Maurice, "Design of the Unix Operating System", Pearson Education, 1<sup>st</sup> Edition, 1990.