



# **St. PETER'S UNIVERSITY**

**St. Peter's Institute of Higher Education and Research**

**(Declared Under Section 3 of the UGC Act, 1956)**

**AVADI, CHENNAI – 600 054**

**TAMIL NADU**

**M.C.A.**

**(Code No: 413-A, 414-A, 415-A)**

**(Effective from 2010 – 2011)**

**(Distance Education)**

**Regulations and Syllabi**

**(I & II & III Year)**

**St. PETER'S INSTITUTE OF DISTANCE EDUCATION**

**Recognized by Distance Education Council and**

**Joint Committee of UGC – AICTE - DEC, New Delhi**

**(Ref. F. No. DEC/SPU/CHN/TN/Recog/09/14 dated 02.04.2009 and**

**Ref.F.No.DEC/Recog/2009/3169 dated 09.09.2009)**

**St. Peter's University**  
**St. Peter's Institute of Distance Education**  
Chennai – 600 054.

**Code No: 413-A, 414-A & 415-A**  
**M.C.A. PROGRAMME**  
(Distance Education)

**Regulations and Syllabi**  
(Effective from 2010 – 2011)

**1. Eligibility:**

- (a) Candidates who passed Three Year Undergraduate Programme of the University or any other examination recognized as equivalent thereto with Mathematics at Higher Secondary Level are eligible for admission to Three Year M.C.A. Programme.
- (b) Candidates who passed PGDCA / DOEACC Level 'A' / BCA / B.Sc.(IT / Computer Science / Software Engineering / B.E. of the University or any other examination recognized as equivalent thereto are eligible for admission in Second Year (III & IV Semesters) of Three Year M.C.A. Programme.
- (c) Candidates who passed M.Sc. (IT / Computer Science) of the University or any other examination recognized as equivalent thereto are eligible for admission in Third Year (V & VI Semesters) of Three Year M.C.A. Programme.

**2. Duration:** Three Years Comprising 6 Semesters.

**3. Medium:** English is the medium of instruction and examination.

**4. Methodology:** The methodology of distance education includes supply of self-instructional study materials in print format and in CD, face-to-face instruction for theory and practicals for a limited period during week ends and on holidays, provision of virtual class in phased manner, dissemination of information over e-mail, Student - Support Service at various Centres of the University, Continuous Assessment and End Assessment conducted by the University at various parts of India.

**5. Weightage for Continuous and End Assessment:** There is no weightage for Continuous Assessment (CA) unless the ratio is specifically mentioned in the scheme of Examinations. The End Assessment (EA) has 100% weightage.

**6. Credit System:** Credit system be followed with 18 credits for each semester and each credit is equivalent to 25-30 hours of effective study provided in the Time Table of the formal system.

## 7. Scheme of Examinations (for I to VI Semesters)

### I Semester

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
110MCT01	Computer Architecture	3	100	100
110MCT02	Data Structures Using 'C'	3	100	100
110MCT03	Business Processes	3	100	100
110MCT04	Operating System	3	100	100
110MCT05	Accounts and Financial management	4	100	100
<b>Practical</b>				
110MCP01	Data structures using 'C' lab	1	90 10	100
110MCP02	Operating Systems Lab	1	90 10	100
	<b>Total</b>	<b>18</b>	<b>800</b>	<b>800</b>

## II Semester

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
210MCT01	Foundations of Computer Applications	4	100	100
210MCT02	System Software	3	100	100
210MCT03	Design and Analysis of Algorithms	3	100	100
210MCT04	Object Oriented Programming Using 'C++'	3	100	100
210MCT05	Relational Database Management Systems	3	100	100
<b>Practical</b>				
210MCP01	Algorithms Using 'C++' Record	1	90 10	100
210MCP02	DBMS Lab Record	1	90 10	100
	<b>Total</b>	<b>18</b>	<b>800</b>	<b>800</b>

## III Semester

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
310MCT01	Data Communication and Computer Networks	3	100	100
310MCT02	Unix And Network Programming	3	100	100
310MCT03	Micro processor and its Applications	3	100	100
310MCT04	Programming in Java	3	100	100
310MCT05	Advanced Software engineering	3	100	100
<b>Practical</b>				
310MCP01	Micro processor lab Record	1	90 10	100
310MCP02	Programming in Java Lab Record	1	90 10	100
310MCP03	UNIX and Network lab Record	1	90 10	100
	<b>Total</b>	<b>18</b>	<b>800</b>	<b>800</b>

## IV Semester

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
410MCT01	Middleware technologies	3	100	100
410MCT02	Object Oriented System Analysis Design	3	100	100
410MCT03	Computer Graphics and multimedia Systems	3	100	100
410MCT04	Network Security	3	100	100
E*	<b>Elective I</b> (any one)	3	100	100
410MCP01	Middle ware technologies lab Record	1	90 10	100
410MCP02	Computer Graphics and multimedia lab Record	1	90 10	100
410MCP03	Mini Project - Software Development lab with CASE tools and Testing tools Record	1	90 10	100
<b>Total</b>		<b>18</b>	<b>800</b>	<b>800</b>

### List of Electives For Semester IV

Code No.	Subject Title
410MCT05	Human resource management
410MCT06	ECommerce
410MCT07	ERP

## SEMESTER – V

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
510MCT01	Web Technology	3	100	100
510MCT02	Mobile Computing	3	100	100
510MCT03	Data mining and Data warehousing	4	100	100
510MCT04	C# and Dot Net Technologies	3	100	100
E2***	Elective II	3	100	100
<b>Practical</b>				
510MCP01	Web technology lab Record	1	90 10	100
510MCP02	C# and Dot Net lab Record	1	90 10	100
<b>Total</b>		<b>18</b>	<b>700</b>	<b>700</b>

## LIST OF ELECTIVES FOR SEMESTER V

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
510MCT05	Free open Source Software	3	100	100
510MCT06	Network management and monitoring	3	100	100
510MCT07	Grid Computing	3	100	100
510MCT08	Image processing	3	100	100

## SEMESTER – VI

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Practical</b>				
610MCP01	Project Work	1	100	100
	<b>Total</b>	<b>18</b>	<b>100</b>	<b>100</b>

**8. Passing Requirements:** The minimum pass mark (raw score) be 50% in End Assessment (EA).

**9. Grading System:** Grading System on a 10 Point Scale be followed with 1 mark = 0.1 and the conversion of Grade point as given below.

$$\text{Overall Grade Point Average (OGPA)} = \frac{\text{Sum of Weighted Grade Points}}{\text{Total Credits}}$$

$$= \frac{\sum (EA)C}{\sum C}$$

**The Overall Grade:** The Overall Grade and Classification of all successful candidates be arrived at from the Overall Grade Point Average as stipulated in the following conversion Table.

Grade	Over all Grade Point Average(OGPA)	Over all weighted Average marks	Classification
O	9.00 to 10.00	90.00 to 100	First Class
A	8.00 to 8.99	80.00 to 89.99	First Class
B	7.00 to 7.99	70.00 to 79.99	First Class
C	6.00 to 6.99	60.00 to 69.99	First Class
D	5.00 to 5.99	50.00 to 59.99	Second Class
<b>F</b>	0.00 to 4.99	0.00 to 49.99	<b>Fail</b>

The Grade Sheets of successful candidates provide particulars such as (1) Overall weighted Average Marks, (2) Overall Grade Point Average, (3) Overall Grade and (4) the Overall classification.

**10. Pattern of the Question Paper:** The question paper for End Assessment will be set for three hours and for the maximum of 100 marks with following divisions and details.

**Part A:** 10 questions (with equal distribution to all units in the syllabus). Each question carries 2 marks.

**Part B:** 5 questions with either or type (with equal distribution to all the units in the syllabus). Each question carries 16 marks.

The total marks scored by the candidates will be reduced to the maximum prescribed in the Regulations.

## **11. Syllabus**

# I SEMESTER

## 110MCT01 COMPUTER ARCHITECTURE

### UNIT – I INTRODUCTION TO DIGITAL DESIGN

Data Representation - Data Types - Complements - Arithmetic Operations - Representations -Fixed Point, Floating Point , Error detection codes - Binary Codes- Logic Gates, Boolean Algebra, Map Simplification - Combinational Circuits: Half-Adder, Full Adder- Flip Flops – Sequential Circuits

### UNIT-II DIGITAL COMPONENTS-REGISTER TRANSFER & MICRO OPERATIONS

ICs - Decoders - Multiplexers - Registers - Shift Registers - Binary Counters - Memory Unit  
- Register Transfer Language - Register Transfer - Bus And Memory Transfers - Arithmetic ,Logic And Shift Micro Operations , Arithmetic Logic Shift Unit.

### UNIT - III COMPUTER ORGANIZATION AND PROGRAMMING

Instruction Codes - Computer Registers - Computer Instructions - Timing And Control –  
Instruction Cycle - Memory Reference Instructions - I/O And Interrupt – Machine Language – Assembly Language - Assembler - Program Loops – Programming Arithmetic and Logic Operations -Subroutines - I/O Programming.

### UNIT - IV INPUT - OUTPUT ORGANIZATION

Peripheral Devices - Input-Output Interface - Asynchronous Data Transfer - Modes Of Transfer – Priority Interrupt - DMA - IOP - Serial Communication.

### UNIT - V MEMORY ORGANIZATION AND CPU

Memory Hierarchy - Main Memory - Auxiliary Memory - Associative Memory - Cache Memory-Virtual Memory - Memory Management Hardware - CPU: General Register Organization – Control Word - Stack Organization - Instruction Format - Addressing Modes – Data Transfer And Manipulation - Program Control.

### Reference Books

- 1 M..Morris Mano, "Computer System Architecture", Prentice Hall of India, 3rd edition, 2003.
- 2 M.Morris Mano, "Digital Logic & Computer Design" PHI 2006.
- 3 Alan B.Marcovitz, "Introduction to Logic design", Tata McgrawHill, Second edition, 2005.

# 110MCT02 – DATA STRUCTURES USING 'C'

## UNIT - I INTRODUCTION TO C LANGUAGE

Overview of 'C' language - Constants, Variables and Data Types - Operators, Expressions and Assignment statements - Managing Input/Output Operations - Formatted I/O - Decision Making – Branching - IF, Nested IF - Switch - goto - Looping- While, do, for statements. Arrays - dynamic and multi-dimensional arrays - Character arrays and Strings – String handling Functions - User defined Functions - Categories of Functions - Recursion Basics of Structures-Declaring a Structure - Array of Structures -Passing Structures elements to Functions- Passing entire Structure to Function - Structures within Structures - Union – Union of Structures - Enumerated Data Types – typedef Statement. Pointers - Declaration, Accessing a variable, dynamic memory allocation, Pointers versus Arrays, Array of pointers, Pointers to functions and structure Pointers.

## UNIT - II LISTS, STACKS AND QUEUES, TREES

Abstract data types- List ADT-Stack ADT-recursion-Queue ADT - Trees - General, Binary trees- Search tree ADT- Binary Search Trees- AVL trees, Threaded trees- Splay Trees- B-Trees.

## UNIT - III SORTING AND SEARCHING

Sorting - Internal Sorting - Quick Sort, Heap Sort, Radix Sort - External Sorting - Merge Sort, Multi-way Merge Sort, Polyphase Sorting- Basic Search Techniques - Tree Searching – General Search Trees - Hashing.

## UNIT - IV GRAPHS AND THEIR APPLICATIONS

Graphs - Definitions - Topological sort- Shortest Path Algorithms - Network flow problems- Minimum Spanning Tree - Applications of Depth First search - Introduction to NP-completeness.

## UNIT - V STORAGE MANAGEMENT

Automatic list Management- Garbage Collection - Algorithms for Garbage collection and compaction- Dynamic memory management- Buddy Systems.

### Reference Books

1. Weiss "Data Structures and Algorithm Analysis in C ", Addison Wesley , Second Edition, 2007
2. Aaron M.Tanaenbaum, Yedidyah Langsam, Moshe J. Augenstein "Data Structures using C" Printice hall of India, 2007
- 3.Seymour Lipschutz, " Data Structures" Schaums' outline series, Tata Mcgraw Hill, NewDelhi, 2007.
- 4.E.Balagurusamy " Programming in ANSI C " , Tata McGraw Hill, 2004
5. Yashavant P. Kanetkar "Understanding Pointers In C" , BPB Publications, NewDelhi, 2002
6. Byron C Gotfried, Programming with C, Schuams' outline series, 2nd edition, Tata McGraw Hill,2006.

## **110MCT03 BUSINESS PROCESSES**

### **UNIT – 1: INTRODUCTION**

Organizational behaviour- Foundations of Individual behavior-Perception and Individual decision making-values, attitude and job satisfaction.

### **UNIT – 2: GROUPS IN ORGANISATION**

Foundations of group behaviour- Understanding work teams- Communication - Leadership.

### **UNIT – 3: ORGANISATION SYSTEM**

Foundations of organization structure - Technology - Work design and stress - Human resource policies and practices - Organisational Culture.

### **UNIT – 4: BUSINESS PROCESS RE-ENGINEERING AND IT**

Basic concepts and the need for BPR-Principles of BPR and the role of IT-BPR and restructuring the organization.

### **UNIT – 5: NETWORK ORGANIZATIONS**

Networked organization- virtual corporations.

### **REFERENCE BOOKS**

1. R. Radhakrishnan and S.Balasubramanian "Business Process Reengineering: Text Cases", PHI, 2008.
2. Stephen P. Robbins "Organizational behavior", PHI, 12th edition, 2006.
3. Turban, Mclean, Wetherbe, "Information Technology for management" John Wiley and Sons, 2001.
4. Ravi Kalakota and Marcia Robinson, "E-Business; Roadmap for Success; Pearson Education, 2000.
5. Vikram Sethi & William R King, "Organizational transformation through business process reengineering", Pearson education, 2006.

# **110MCT04 OPERATING SYSTEMS**

## **UNIT I INTRODUCTION**

Main frame Systems, Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time systems – Hand held Systems, Operating Systems Structures: System Components – Operating System Services - System calls - System Programs – System Design and Implementation - CPU scheduling: Basic Concepts – Scheduling Algorithms.

## **UNIT II PROCESS MANAGEMENT**

Process Concepts - Process Scheduling - Operation on Process - Co-Operating process - Inter

Process Communication - Threads: Multithreading Models - Process Synchronization: The Critical Section Problem – Synchronization Hardware - Semaphores – classical problem of Synchronization – Monitors - Deadlock: Deadlock Characterization - Methods for handling Deadlocks - Deadlock Prevention – Deadlock Avoidance - Deadlock Detection – Recovery from Deadlock.

## **UNIT III MEMORY MANAGEMENT**

Background – Swapping - Contiguous Memory Allocation - Paging - Segmentation – Segmentation with paging - Virtual Memory: Demand paging - Page Replacement - Thrashing.

## **UNIT IV FILE SYSTEMS**

File Concepts - Access methods - Directory Structure - File Protection - File System Implementation: File System Structure and Implementation – Directory Implementation – Allocation methods Free Space Management – Recovery - Disk Structure – Disk Scheduling.

## **UNIT –V OVERVIEW OF LINUX**

LINUX- The operating System; Compiling the Kernel; Introduction to the Kernel: Important data structures, Main algorithms, Implementing System Calls. LINUX Architecture-independent memory model, Virtual address space for a process, Block device caching, Pages under LINUX.

## **TEXTBOOKS**

1. Silberschatz, Galvin, Gagne " Operating System Concepts" Sixth Edition, 2003
2. Pradeep K.Sinha, "Distributed OS concepts and Design ", IEEE computer Society Press, PHI 1998.
- 3.. M. Bek et al : LINUX Kernel Internals, Addison-Wesley, 1997.

## **REFERENCES**

1. Andrew S. Tanenbaum , "Modern Operating Systems", PHI , 2<sup>nd</sup> Edition 2001
2. Achut S. Godbole and Kahate Atul , "Operating Systems & Systems Programming ", Tata Mcgraw Hill, 2003.  
Charles Crowley, " Operating systems: A Design Oriented Approach", Tata McGraw Hill, 1999.

# **110MCT05 ACCOUNTING AND FINANCIAL MANAGEMENT**

## **UNIT I: FINANCIAL ACCOUNTING**

Meaning and Scope of Accounting-Principles-Concepts-Conventions-Accounting Standards-Final Accounts-Trail Balance-Trading Account-Profit and Loss Account-Balance Sheet-Accounting Ratio Analysis-Funds Flow Analysis-Cash Flow Analysis

## **UNIT II: ACCOUNTING**

Meaning-Objectives-Elements of Cost-Cost Sheet-Marginal Costing and Cost Volume Profit Analysis-Break Even Analysis-Applications-Limitations-Standard Costing and Variance Analysis-Material-Labor-Overhead-Sales-Profit Variances

## **UNIT III: BUDGETS AND BUDGETING CONTROL**

Budgets and Budgetary Control-Meaning-Types-Sales Budget-Production Budget-Cost of Production Budget-Flexible Budgeting-Cash Budget-Master Budget-Zero Base Budgeting-Computerized Accounting

## **UNIT IV: INVESTMENT DECISION AND COST OF CAPITAL**

Objectives and Functions of Financial Management-Risk-Return Relationship-Time Value of Money Concepts-Capital Budgeting-Methods of Appraisal-Cost of Capital Factors Affecting Cost of Capital-Computation for Each Source of Finance and Weighted Average Cost of Capital.

## **UNIT V: FINANCING DECISION AND WORKING CAPITAL MANAGEMENT**

Capital Structure-Factors Affecting Capital Structure-Dividend Policy-Types of Dividend Policy-Concepts of Working Capital-Working Capital Policies-Factors affecting Working Capital-Estimation of Working Capital Requirements

## **TEXTBOOK**

1. S.N.Maheswari, "Financial and Management Accounting", Sultan Chand & Sons, 2003
2. I.M.Pandey, "Financial Management", Vikas Publications, 4<sup>th</sup> Reprint, 2002

## **REFERENCES**

1. S.P.Iyengar, "Cost and Management Accounting", Sultan Chand & Co,
2. I.M.Pandey, "Elements of Management Accounting" Vikas Publishing House, 1993

# PRACTICALS

## 110MCP01: DATA STRUCTURES LABORATORY

### LIST OF EXPERIMENTS

- 1 Create a Stack and do the following operations using arrays and linked lists  
(i)Push (ii) Pop (iii) Peep
- 2 Create a Queue and do the following operations using arrays and linked lists  
(i)Add (ii) Remove
3. Implement the operations on singly linked list, doubly linked list and circular linked list.
- 4 Create a binary search tree and do the following traversals  
(i)In-order (ii) Pre order (iii) Post order
5. Implement the following operations on a binary search tree.  
(i) Insert a node (ii) Delete a node
- 6 Sort the given list of numbers using heap and quick sort.
7. Perform the following operations in a given graph  
i) Depth first search (ii) Breadth first search
- 8 Find the shortest path in a given graph using Dijkstra algorithm

## 110MCP02: OPEARATING SYSTEM LABORATORY

1. Implement the following CPU Scheduling Algorithms.  
i) FCFS ii) Round Robin iii) Shortest Job First .
2. Implement the Mutual Exclusion Problem Using Dekker's Algorithm.
3. Implement Inter Process Communication Problem (Producer-Consumer / Reader- Writer Problem ) Using Semaphores.
4. Implement Best fit, First Fit Algorithm for Memory Management.
5. Implement Memory Allocation with Pages.
6. Implement FIFO page Replacement Algorithm.
7. Implement LRU page Replacement Algorithm.
8. Implement the creation of Shared memory Segment.
9. Implement File Locking.  
Implement Banker's algorithm

## II SEMESTER

### 210MCT01: FOUNDATIONS OF COMPUTER APPLICATIONS

#### UNIT – 1: PROBABILITY

Probability models-Sample space-Events-Algebra of Events-Graphical Methods of representing events-Probability Axioms-Combinational Problems-Conditional Probability-Independence of Events-Bayes's Rule-Bernoulli Trials

#### UNIT – 2: SOLUTION OF NON-LINEAR AND SIMULTANEOUS LINEAR EQUATION

Method of Bisection-Method of false position-Fixed point iteration method-Newton's method. Gauss method-Gauss Jordan method-Triangularization method-Jacobi method-Gauss Seidal method.

#### UNIT – 3: SCHEDULING BY PERT AND CPM

Network construction-Critical path method-project evaluation and review technique- resource analysis in network scheduling

#### UNIT – 4: QUEUING MODELS

Characterization of Queuing models - Poisson Queues - (M/M/1): (FIFO/∞/∞), (M/M/1): (FIFO/N/∞) , ( M/M/C): (FIFO/∞/∞) , (M/M/C): (FIFO/N/∞) models.

#### UNIT – 5: FORMAL LANGUAGES & FINITE AUTOMATA

Formal Languages: Four classes of grammars (Phrase Structure, context sensitive, context free, regular)-Finite State Automata- Non-Deterministic Finite State Automata (NFSA), conversion of NDFSFA to DFSFA- acceptance of regular set by an FSA- construction of a right linear grammar from a finite automata.

#### REFERENCE BOOKS

1. Kishore. S, Trivedi, "Probability and statistics with reliability, queuing and computer Science applications, PHI Edition, 2000, (UNIT-1).
2. Kandasamy. P, Thilagavathy. K and Gunavathi. K, "Numerical methods (revised edition) S. Chand company, New Delhi, 2003, (UNIT 2).
3. Taha H.A., "Operations Research: An Introduction "7th Edition, Pearson Education, 2004. (UNIT-3, 4).
4. Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, Delhi, 2002. (Unit 5).

## **210MCT02: SYSTEM SOFTWARE**

### **UNIT – 1: INTRODUCTION**

Basic concepts - Machine structure - Simplified Instructional Computer.

### **UNIT – 2: ASSEMBLERS**

Functions - Machine dependent and Machine independent assembler  
Features - Design options - Implementation - Example - MASM Assembler

### **UNIT – 3: LOADERS AND LINKERS**

Functions - Machine dependent and Machine independent loader features -  
Design options - Implementation - Example - MSDOS Linker.

### **UNIT – 4: MACRO PROCESSORS**

Functions - M/C independent macro processor features - Macro processor  
design options - Implementation - Example - MASM Macro processor

### **UNIT – 5: COMPILERS AND UTILITIES**

Introduction to compilers - Different phases of compiler - System software  
tools - Text editors - Interactive debugging systems.

### **REFERENCE BOOKS**

1. Leland L. Beck, System Software - An Introduction to Systems Programming, 3<sup>rd</sup> Edition, Addison Wesley, 1999.
2. D.M. Dhamdhare, System Programming and Operating Systems, Tata McGraw Hill Company, 1993.
3. A.U. Aho, Ravi Sethi and J.D. Ullman, Compilers Principles Techniques and Tools, Addison Wesley, 1988.
4. John J. Donovan, systems Programming, Tata McGraw Hill Edition, 1991.

# **210MCT03: DESIGN AND ANALYSIS OF ALGORITHMS**

## **UNIT – 1: INTRODUCTION**

Introduction - Notion of Algorithm - Fundamentals of algorithmic problem solving – Important problem types - Fundamentals of the analysis of algorithm efficiency - analysis frame work - Asymptotic notations - Mathematical analysis for recursive and non-recursive algorithms.

## **UNIT – 2: DIVIDE AND CONQUER METHOD AND GREEDY METHOD**

Divide and conquer methodology - Merge sort - Quick sort - Binary search - Binary tree traversal - Multiplication of large integers - Strassen's matrix multiplication – Greedy method - Prim's algorithm - Kruskal's algorithm - Dijkstra's algorithm.

## **UNIT – 3: DYNAMIC PROGRAMMING**

Computing a binomial coefficient - Warshall's and Floyd' algorithm - Optimal binary search tree - Knapsack problem - Memory functions.

## **UNIT – 4: BACKTRACKING AND BRANCH AND BOUND**

Backtracking - N-Queens problem - Hamiltonian circuit problem - Subset sum problem – Branch and bound - Assignment problem - Knapsack problem Traveling salesman problem.

## **UNIT – 5: NP-HARD AND NP-COMPLETE PROBLEMS**

P & NP problems - NP-complete problems - Approximation algorithms for NP-hard problems - Traveling salesman problem - Knapsack problem.

## **REFERENCE BOOKS**

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms" Pearson Education, 2003.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, "Introduction to algorithms", Prentice Hall, 1990.
3. SaraBaase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson education, 2003.
4. A.V. Aho, J.E Hopcroft and J.D. Ullman, "The Design and Analysis of Computer algorithms", Pearson education Asia, 2003.

## **209MCT04: OBJECT ORIENTED PROGRAMMING USING 'C++'**

### **UNIT – 1: OOP PARADIGAM**

Programming Paradigms-Procedural Programming-Modularity-Exception Handling Data Abstraction-User Defined Types-Concrete Types-Abstract Types-Virtual Functions-Object Oriented Programming-Generic Programming-Containers Algorithms.

### **UNIT – 2: INTRODUCTION TO C++**

Overview of C++-Classes and Objects- constructor and destructor – Friend Functions – Friend Classes- Inline Function – Static Members – Arrays – Pointers - References-Dynamic Allocation.

### **UNIT – 3: OVERLOADING**

Function Overloading-Overloading Constructor Functions-Copy Constructors-Default Argument- Operator Overloading-Member Operator Overloading-Overloading new and delete.

### **UNIT – 4: INHERITANCE AND TEMPLATES**

Inheritance-Base Class-Access Control-Virtual Functions-Pure Virtual Functions Templates-Generic Functions-Applying Generic Functions-Generic Classes

### **UNIT – 5: ERROR HANDLING AND FILES**

Exception Handling-C++ I/O Streams-File I/O-STL-Overview-Container Classes Lists-Maps - Algorithms Using Functions and Objects-String Class.

### **REFERENCE BOOKS**

1. Herbert Schildt, "C++ The Complete Reference", Tata McGraw-Hill Edition, 2003 (unit 2, 3, 4).
2. Bjanne Stroustrup, "The C++ Programming Language", 3rd Edition, Addison Wesley, 2000, (Unit 1 & 5).
3. Robert Lafore. "Waite Groups OOP in Turbo C++", Galgotia Publications, 2001.
4. Stanley, B. Lippman, Jove Lagrie, "C++Primer", 3rd Edition, Addison Wesley, 1998.

# **210MCT05 - RELATIONAL DATA BASE MANAGEMENT SYSTEMS**

## **UNIT – 1: INTRODUCTION**

Database Systems vs. File Systems-View of Data- Data Models-Database Languages-Transaction Management-Database Systems Structure-History of Database Systems-Database Systems Applications-Entity Relationship Model

## **UNIT – 2: RELATIONAL DATABASES**

SQL-Basic Structure-Set Operations-Complex Queries-Joined Queries-DDLEmbedded SQLDynamic SQL-Other SQL Functions-Query by Example-Integrity and Security of searching- Relational Database Design - Normalization - 1NF,2NF,BCNF,3NF

## **UNIT – 3: DATA STORAGE AND INDEXING**

Storage & File Structure-Disks-RAID-File Organization-Indexing &Hashing-B+ TREE-B Tree - Static Hashing-Dynamic Hashing-Multiple Key Access

## **UNIT – 4: QUERY EVALUATION & OPTIMIZATION**

Query Processing-Selection Operation-Sorting-Join Operation-Evaluation of Expressions-Query Optimization

## **UNIT – 5: TRANSACTION MANAGEMENT & RECENT TRENDS**

Transaction Concept-Static Implementation-Concurrency Control-Protocols Deadlock Handling- Recovery Systems-Recovery with Concurrent Transactions Shadow Paging-Buffer Management - Basic concepts: Distributed Databases, Parallel Databases.

## **REFERENCE BOOKS**

1. Abraham Silberschatz, Henry F. Korth and S. Sudharssan, "Database System Concepts", 4th Edition, Tata McGraw Hill, 2002.
2. Ragu Ramakrishnan & Johannesgerhrke, "Data Base Management Systems", McGraw Hill International Edition, 2000.
3. Ramez Elmasri and Shamkant B. Navathe, "Fundamental Database Systems", Third Edition, Pearson Education, 2003.

# **PRACTICALS**

## **210MCP01: ALGORITHMS LAB USING C++**

### **LIST OF EXPERIMENTS**

1. Apply the divide and Conquer technique to arrange a set of numbers using merge sort method.
2. Perform Strassen's matrix multiplication using divide and conquer method.
3. Solve the knapsack problem using greedy method.
4. Construct a minimum spanning tree using greedy method.
5. Construct optimal binary search trees using dynamic programming method of problem solving.
6. Find the solution for traveling salesperson problem using dynamic programming approach.
7. Perform graph traversals.
8. Implement the 8-Queens Problem using backtracking.
9. Implement knapsack problem using backtracking.
10. Find the solution of traveling salesperson problem using branch and bound technique.

## **210MCP02: DATABASE MANAGEMENT SYSTEMS LAB**

### **LIST OF EXPERIMENTS**

1. Execute a single line and group functions for a table.
2. Execute DCL and TCL Commands.
3. Create and manipulate various DB objects for a table.
4. Create views, partitions and locks for a particular DB.
5. Write PL/SQL procedure for an application using exception handling.
6. Write PL/SQL procedure for an application using cursors.
7. Write a DBMS program to prepare reports for an application using functions.
8. Write a PL/SQL block for transaction operations of a typical application using triggers.
9. Write a PL/SQL block for transaction operations of a typical application using package.
10. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).  
(Typical Applications - Banking, Electricity Billing, Library Operation, Pay roll, Insurance, Inventory, etc.)

# **310MCT01: DATA COMMUNICATION AND COMPUTER NETWORKS**

## **UNIT – 1:**

Data communication-components-protocols and standards –like configuration-topologies-Transmission mode-Categories of network-OSI model-TCP/IP protocol Model –Application Protocol and TCP/IP utilities –Error detection and correction.

## **UNIT – 2:**

Encoding and Decoding techniques-Transmission media- Performance – Channelization-FDMA-TDMA-CDMA- Peer to peer protocol and TCP/IP utilities-ARQ protocols-Other adaptation function-Data link controls

## **UNIT – 3:**

LAN standards- Ethernet and IEEE802.3 LAN standards-Token Ring and IEEE802.5 Standards –FDDI- Wireless LAN and IEEE 802.11 Standards-LAN bridges –Packet Network Topology-Routing and packet networks-Shortest path algorithm

## **UNIT – 4:**

ATM network –Traffic Management and QOS –Congestion Control-TCP/IP architecture-The internet protocols-Ipv6-UDP-TCP-DHCP and mobile IP –internet Routing protocol-Multicasting routing

## **UNIT – 5:**

Advance network architecture-IP forwarding Architecture-Overlay Models-MPLS-RVSP-Differentiated services –Security Protocols –Security and Cryptographic Algorithm-Security Protocols Cryptography Algorithms

## **REFERENCE BOOKS:**

1. Communication Network- Fundamental Concepts and key Architecture BY Leon Garcia and Widjaja.
2. Data Communication and Networking Behrouz A. Forouzan –Second Edition.

# **310MCT02: UNIX AND NETWORK PROGRAMMING**

## **1. INTRODUCTION & FILE SYSTEM**

Overview of UNIX OS - File I/O - File Descriptors - File sharing - Files and directories - File types - File access permissions - File systems - Symbolic links - Standard I/O library - Streams and file objects - Buffering - System data files and information - Password file - Group file - Login accounting - system identification.

## **2. PROCESSES**

Environment of a UNIX process - Process termination - command line arguments - Process control - Process identifiers - Process relationships terminal logins - Signals - threads.

## **3. INTERPROCESS COMMUNICATION**

Introduction - Message passing (SVR4)- pipes - FIFO - message queues - Synchronization (SVR4) - Mutexes - condition variables - read - write locks - file locking - record locking - semaphores - Shared memory(SVR4).

## **4. SOCKETS**

Introduction - transport layer - socket introduction - TCP sockets - UDP sockets - raw sockets - Socket options - I/O multiplexing - Name and address conversions.

## **5. APPLICATIONS**

Debugging techniques - TCP echo client server - UDP echo client server - Ping - Trace route - Client server applications like file transfer and chat.

## **TEXT BOOKS**

1. W. Richard Stevens, Advanced programming in the UNIX environment, Addison Wesley, 1999. (Unit 1,2 &3).
2. W. Stevens, Bill Fenner, Andrew Rudoff, "Unix Network Programming", Volume 1, The Sockets Networking API, 3<sup>rd</sup> Edition, Pearson education, Nov 2003. (unit 4 & 5).

## **REFERENCE BOOKS**

1. Meeta Gandhi, Tilak Shetty and Rajiv Shah - The 'C' Odyssey Unix -The open Boundless C ,1<sup>st</sup> Edition, BPB Publications, 1992.

## **310MCT03: MICROPROCESSOR AND ITS APPLCATONS**

### **UNIT – 1:**

Basic Concepts: Microprocessor, Microcomputer - Registers and Instruction Memory Addressing Architecture - Internal Architecture of 8085, Z80 and Motorola.

**Introduction to 8086 Processor:** 8086 Processor-Introduction, 8086 architecture, Pin configuration, 8086 in min/max mode, Addressing modes, Instruction set of 8086, Assembler directives, Assembly language programming.

### **UNIT – 2:**

**Peripherals & Interfacing With 8086:** Serial & parallel I/O (8251A and 8255), Programmable interval timer 8253, Programmable DMA controller 8257, programmable interrupt controller 8259A, Keyboard and display controller 8279, ADC / DAC interfacing.

### **UNIT – 3:**

**80286 Processor:** Features of 80286, internal architecture of 80286, real addressing mode, virtual addressing mode, privilege, protection, basic bus operation of 80286, fetch cycles of 80286.

### **UNIT – 4:**

**80386 and 80486 Processor:** Features of 80386Dx, internal architecture of 80386Dx, pin configuration of 80386, register organization of 80386Dx, features of 80486, register organization of 80486.

### **UNIT – 5:**

**Advance In Microprocessors:** Features of Pentium processor, Pentium – I, Pentium – II, Pentium – III, Pentium – IV, Introduction to microcontroller 8051, architecture of 8051, Register set of 8051.

### **TEXT BOOK:**

1. A.K. Ray and K.M. Bhurchandi, "Advanced Microprocessors and Peripherals", First Edition, Tata McGraw Hill, 2000.

### **REFERENCE BOOKS:**

1. Douglas V. Hall, "Microprocessors and Interfacing Programming and Hardware". Tata McGraw Hill, 1999.
2. Goankar, "Microprocessor Architecture Programming and Applications with 8085", Wiley Eastern, 2000.

## **310MCT04: PROGRAMMING IN JAVA**

### **UNIT – 1: INTRODUCTION**

Introduction to Java - Features of Java - Object Oriented Concepts - Lexical Issues - Data Types - Variables - Arrays Operators - Control Statements.

### **UNIT – 2: CLASSES AND OBJECTS**

Classes - Objects - Constructors - Overloading method and Control - Static and fixed methods - Inner Classes - String Class - Inheritance - Overriding methods - Using super-Abstract class.

### **UNIT – 3: PACKAGES AND EXCEPTION HANDLING**

Packages - Access Protection - Importing Packages - Interfaces - Exception Handling - Throw and Throws - I/O Streams - File Streams - Applets - String Objects - String Buffer - Char Array

### **UNIT – 4: THREADS**

The Java Thread Model- Creating a Thread and Multiple Threads - Thread Priorities-Synchronization--Inter thread Communication - Deadlock - Suspending, Resuming and stopping threads - Multithreading.

### **UNIT – 5: JAVA BEANS AND SWING**

Bean concepts - Events in bean box - Bean customization - persistence - application session beans - entity beans - Programming and deploying enterprise Java beans - deployment using swing - advanced swing techniques - JAR File handling - JNI - Servlets - Java Server Pages - JDBC - RMI.

### **REFERENCE BOOKS:**

1. Patrick Naughton and Herbert Schildt- JAVA 2 (The Complete Reference), Third Edition-TMH - 1999.
2. K. Arnold and J. Gosling - The Java Programming Language - Second Edition - Sun Microsystems-1999

# **310MCT05: ADVANCED SOFTWARE ENGINEERING**

## **UNIT 1: INTRODUCTION**

A Generic View Of Processes – Process Maturity – Process Models – Agile Process And Models – Software Cost Estimation – Risk Analysis – Software Project Planning & Scheduling.

## **UNIT 2: REQUIREMENT ANALYSIS**

System Engineering Hierarchy – Requirement Engineering: Tasks, Initiating The Process, Eliciting Requirements, Developing Use Cases – Negotiating Requirements – Validating Requirements – Building The Analysis Models: Concepts – Object Oriented Analysis – Scenario Based Modeling – Data & Control Flow Oriented Model – Class Based Model – Behavioral Model.

## **UNIT 3: SOFTWARE DESIGN**

Design Concepts – Design Models – Pattern Based Design – Architectural Design – Component Level Design – Class Based And Conventional Components Design – Real-time System Design - User Interface : Analysis And Design.

## **UNIT 4: SOFTWARE TESTING**

Software Testing – Strategies – Issues – Test Strategies For Conventional And Object Oriented Software – Validation And System Testing - Testing Tactics: White Box Testing, Basis Path Testing – Control Structure Testing – Black Box Testing - Object Oriented Testing – Testing GUI – Testing Client/Server – Test Documentation.

Study of testing tools for function testing, performance testing, load testing, web testing, web services testing - load runner, win runner, Qengine webload, silk performer, rational.etc

## **UNIT 5: SOFTWARE QUALITY ASSURANCE**

Software Quality Concepts – Quality Assurance – Software Technical Reviews – Formal Approach To Software Quality Assurance - Reliability – Quality Standards – Software Quality Assurance Plan – Software Maintenance - Software Configuration Management –

### **TEXTBOOKS**

1. Roger S. Pressman., Software Engineering: A Practitioner's Approach (Sixth Edition), McGraw Hill, 2005.
2. I. Sommerville, Software Engineering, V Edition: Addison Wesley, 1996.

### **REFERNCES**

1. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
2. James F Peters and Witold Pedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
3. Fairely, "Software Engineering Concepts", McGraw Hill, 1995.

## 310MCP01: MICRO PROCESSOR LAB

1. Study Experiments
  - i) Study of 8086 Architecture
  - ii) Study of 8255 – PPI
  - iii) Study of 8253 – PIT
  - iv) Study of 8279 – PKI
  - v) Study of 8259 – PIC
2. Write an ALP to find out factorial of a given hexadecimal number using 8086 MP  
Data: 0AH, 0FH, 10H
3. Write an ALP to perform 16 bit arithmetic operations (ADD, SUB, MUL, DIV)
4. Write an ALP to generate the sum of first 'N' natural numbers using 8086 MP
5. Write an ALP to convert given hexadecimal number to binary using 8086 MP  
Data: ABH, CDH, 101H
6. Write an ALP to convert given binary number to hexadecimal number using 8086 MP  
Data: 10101010<sub>2</sub>, 11111111<sub>2</sub>, 1100<sub>2</sub>, 1111<sub>2</sub>
7. Write an ALP to order give set of hexadecimal numbers in ascending and descending order  
Data: 0AH, 0FH, 0DH, 10H, 02H
8. Write an ALP to move block of data from locations 1200H-1205H to 2200H – 2205H
9. Write an ALP to reverse the given string  
Data: WELCOME
10. Write an ALP to generate the following series  $1+1/x+1/x^3+1/x^5+ \dots$

## **310MCP02: PROGRAMMING IN JAVA LAB**

1. Finding area and Perimeter of a circle. Use Buffered Reader class.
2. Substring Removal from a String. Use String Buffer Class.
3. Generate the Random numbers using random ( ) method and Random Class.
4. String Manipulation using Char Array.
5. Usage of Vector Classes.
6. Application using Inheritance.
7. Application using Abstract class
8. Application using Interface.
9. Application using Package.
10. Implementing Thread based applications & Exception Handling.

### **APPLETS**

11. Working with Frames and various controls.
12. Working with Dialogs and Menus.
13. Working with Panel and Layout.
14. Incorporating Graphics.
15. Working with Colors and Font

### **310MCP03: UNIX AND NETWORK PROGRAMMING LAB**

1. Program using basic network commands
2. Program using system calls : create, open, read, write, close, stat, fstat, lseek
3. Program to implement inter process communication using pipes
4. Program to perform inter process communication using message queues
5. Program to perform inter process communication using shared memory
6. Program to perform synchronization using semaphores
7. Program to capture packets : sniffer
8. Program using TCP sockets (Client and Server)
9. Program using UDP sockets (Client and Server)
10. Program using URL class to download webpages

**IV SEMESTER**  
**410MCT01: MIDDLEWARE TECHNOLOGIES**

**1. CLIENT / SERVER CONCEPTS**

Client – Server – File Server, Database server, Group server, Object server, Web server .Middleware – General middleware – Service specific middleware. Client / Server Building blocks – RPC – Messaging – Peer – to- Peer.

**2. EJB ARCHITECTURE**

EJB – EJB Architecture – Overview of EJB software architecture – View of EJB – Conversation – Building and Deploying EJBs – Roles in EJB.

**3. EJB APPLICATIONS**

EJB Session Beans – EJB entity beans – EJB clients – EJB Deployment – Building an application with EJB.

**4. CORBA**

CORBA – Distributed Systems – Purpose - Exploring CORBA alternatives – Architecture overview – CORBA and networking model – CORBA object model – IDL – ORB - Building an application with CORBA.

**5. COM**

COM – Data types – Interfaces – Proxy and Stub – Marshalling – Implementing Server / Client – Interface Pointers – Object Creation, Invocation , Destruction – Comparison COM and CORBA – Introduction to .NET – Overview of .NET architecture – Marshalling - Remoting.

**TEXT BOOKS**

1. Robert Orfali, Dan Harkey and Jeri Edwards, "The Essential Client/Server Survival Guide", Galgotia Publications Pvt. Ltd., 2002. (Unit 1)
2. Tom Valesky, "Enterprise Java Beans", Pearson Education, 2002.(Unit 2 & 3)
3. Jason Pritchard, "COM and CORBA side by side", Addison Wesley,2000 (Unit 4 & 5)
4. Jesse Liberty, "Programming C#", 2<sup>nd</sup> Edition, O'Reilly Press, 2002. (Unit 5)

**REFERNCES**

1. Mowbray, "Inside CORBA", Pearson Education, 2002.
2. Jeremy Rosenberger, "Teach yourself CORBA in 14 days", Tec media, 2000.

## **410MCT02: OBJECT ORIENTED SYSTEM ANALYSIS AND DESIGN**

### **1. OBJECT ORIENTED DESIGN FUNDAMENTALS**

The Object Model – Classes And Objects - Complexity Of Software – Classification – Notation – Process – Pragmatics – Binary And Entity Relationship – Object Types – Object State – OOSD Life Cycle.

### **2. OBJECT ORIENTED METHODOLOGIES AND UML**

Object Oriented Methodology: Rumbaugh, Booch, Jacobson, Shaler/Mellor, Coad/Yardon – Patterns – Frame Works – The Unified Approach – UML

### **3. OBJECT ORIENTED ANALYSIS**

Identify Use Cases – Use Case Model – Documentation – Classification – Identifying Classes – Noun Phrases Approach – Common Class Pattern Approach – Use Case Driven Approach – Identifying Object Relationship, Attributes And Models.

### **4. OBJECT ORIENTED DESIGN**

Design Process – Design Axioms – Designing Classes – Access Layer Design – View Layer Design.

### **5. MANAGING OBJECT ORIENTED DEVELOPMENT**

Managing Analysis And Design – Evaluation Testing – Coding – Maintenance – Metrics – Case Study: Foundation Class Library – Client/Server Computing.

### **REFERENCES:**

1. Ali Bahrami, Object Oriented System Development, McGraw Hill International Edition, 1999.
2. Larman, Applying UML & Patterns: An Introduction to Object Oriented Analysis and Design, Pearson Education, 2<sup>nd</sup> Edition, 2003.
3. Bernd Bruegge, Allen H. Dutoit, "Object Oriented Software Engineering using UML, Patterns and Java", Pearson Education 2<sup>nd</sup> Edition 2004.

# **410MCT03: COMPUTER GRAPHICS AND MULTIMEDIA SYSTEMS**

## **UNIT I: INTRODUCTION**

Overview of Graphics System - Bresenham technique - Line Drawing and Circle Drawing Algorithms - DDA - Line Clipping - Text Clipping.

## **UNIT 2: 2D TRANSFORMATIONS**

Two dimensional transformations - Scaling and Rotations - Interactive Input methods - Polygons - Splines - Bezier Curves - Window view port mapping transformation.

## **UNIT 3: 3D TRANSFORMATIONS**

3D Concepts - Projections - Parallel Projection - Perspective Projection - Visible Surface Detection Methods - Visualization and polygon rendering - Color models - XYZ-RGB-YIQ-CMY-HSV Models - animation - Key Frame systems - General animation functions - morphing.

## **UNIT 4: OVERVIEW OF MULTIMEDIA**

Multimedia hardware & software - Components of multimedia - Text, Image - Graphics - Audio - Video - Animation - Authoring.

## **UNIT 5: MULTIMEDIA SYSTEMS AND APPLICATIONS**

Multimedia communication systems - Data base systems - Synchronization Issues - Presentation requirements - Applications - Video conferencing - Virtual reality - Interactive video - video on demand

## **TEXT BOOKS**

1. Hearn D and Baker M.P, "Computer graphics - C Version", 2<sup>nd</sup> Edition, Pearson Education, 2004, (unit 1, 2 &3).
2. Ralf Steinmetz, Klara Steinmetz, "Multimedia Computing, Communications and Applications", Pearson Education, 2004 (unit 4 & 5).

## **REFERENCES**

1. Siamon J. Gibbs and Dionysios C. Tsichritzis, "Multimedia programming", Addison Wesley, 1995.
2. John Villamil, Casanova and Leony Fernandez, Eliar, "Multimedia Graphics", PHI, 1998.

## **410MCT04: NETWORK SECURITY**

### **UNIT I- INTRODUCTION**

Introduction – Primer on a Networking – Active and Passive Attacks – Layers and Cryptography – authorization – Viruses, worms. The Multi level Model of Security – Cryptography – Breaking an Encryption Scheme – Types of Cryptographic functions – secret key Cryptography – Public key Cryptography – Hash algorithms. Secret key cryptography – Data encryption standard – International Data Encryption Algorithm (IDEA) Modes 4 Operations – Encrypting a Large message – Electronic code book, cipher block chaining, OFB, CFB, CTR – Generating MACs – Multiple Encryption DES.

### **UNIT II- INTRODUCTION TO SECURITY ALGORITHMS**

Introduction to public key algorithms – Model of arithmetic – Modular addition, Multiplication, Exponentiation. RSA – RSA Algorithm – RSA Security – Efficiency of RSA – Public Key cryptography Standard (PKCS) - Digital Signature Standard – DSS Algorithm – Working of Verification procedure – Security and DSS – DSS controversy – Zero Knowledge proof systems.

### **UNIT III- AUTHENTICATION**

Overview of authentication systems – password based authentication – Add nets based authentication – cryptographic authentication protocols – who is seeing authenticate – passwords as cryptographic keys – Eaves dropping and server database reading – Trusted intermediaries – Session key establishment.

Authentication of people – passwords – online – off line password of using – Eavesdropping – passwords and careless users – Initial Password distribution – Authentication tokens.

### **UNIT IV -STANDARDS AND IP SECURITY**

Standards and IP security – Introduction to Kerberos – Tickets and Ticket granting tickets. Configuration - logging into the network – replicated KDCs. Overview of IP security – security associations – security association database - security policy database, AH and ESP – Tunnel Transport mode why protect - IP Header IPV4 and IPV6, NAT, Firewalls, IPV4, IPV6 Authentication Header – ESP - reason for having Authentication Header.

## **UNIT V- NETWORK SECURITY APPLICATION**

Network Security Application – Email Security – distribution lists – store and forward – security services for email – establishing keys privacy – authentication of the source – message Integrity – Non-Repudiation – Proof of submission – Proof of delivery. Message flow confidentially – Anonymity – Names and Addresses.

Firewalls – packet filters – application level gateway – encrypted tunnels – comparisons why firewalls don't work – denial of service attacks. Web security – Introduction – URLs/URIs – HTTP – HTTP digest authentication. Cookies – other web security problems.

### **TEXT BOOK**

1. Charlie Kaufman, Radia Perlman and Mike Speciner "Network Security : Private Communication in a Public Work", Second Edition, Pearson Education, 2002.

### **REFERENCES**

1. William Stallings, "Network Security : Essentials Applications and Standards", Pearson Education, 2002.
2. Hans, "Information and Communication Security", Springer Verlag, 1998.
3. Derek Atkins, "Internet Security", Tech media, 1998.

## **410MCP01: MIDDLEWARE TECHNOLOGIES LAB**

1. Create a distributed application to download various files from various servers using RMI
2. Create a Java Bean to draw various graphical shapes and display it using or without using JDK
3. Develop an Enterprise Java Bean for Banking operations
4. Develop an Enterprise Java Bean for Library operations
5. Create an Active-X control for File operations
6. Develop a component for converting the currency values using COM / .NET
7. Develop a component for encryption and decryption using COM / .NET
8. Develop a component for retrieving information from message box using DCOM / .NET
9. Develop a middleware component for retrieving Stock Market Exchange information using CORBA
10. Develop a middleware component for retrieving Weather Forecast information using CORBA

## **410MCP02: COMPUTER GRAPHICS AND MULTIMEDIA LAB**

1. Write a C program with Fundamental Graphics Function
2. Write a C program for Line drawing using Bresenham, DDA Line Drawing Algorithms.
3. Write a C program for Circle Drawing using Bresenham Circle Drawing Algorithms.
4. Write a C program for Clipping Algorithm using Line Clipping.
5. Write a C program for 2D Transformations like Translations and Scaling and Rotations.
6. Write a C program for 3D Transformations like Translations and Scaling and Rotations.
7. Create Frame by Frame Animations using multimedia authoring tools.
8. Develop a presentation for a product using techniques like Guide Layer, masking and onion Skin using authoring tools.
9. Create a Jpeg image which demonstrates the various features of an image editing tool.
10. Demonstrate Rasterization and filtering of layers and give blending effects for a logo.

## **410MCP03: MINI PROJECT**

Develop a Mini Software project in a company or any implementation of papers published and Submit the Report .

## **410MCT05: HUMAN RESOURCE MANAGEMENT**

### **1. LEADERSHIP**

Technical Leadership - Leader's Goal, Conviction, Vision - Transformational and Transactional Leadership - Leader's Vision - Professionalism : Importance, Elements - Managing Awareness - Performance - Manager's Role in Professionalism.

### **2. MANAGING TECHNICAL AND PROFESSIONAL PEOPLE**

Goals of Engineers and Scientists - Work Assignment - Need for Influence - Professional Career and Goals - Age and Creativity - Performance - Motivation - Employee Partnership - Career Risks - Technical Competence - Professional Discipline - Manager's Role in Professional Discipline - Guidelines.

### **3. IDENTIFICATION AND DEVELOPMENT OF TALENTED PEOPLE**

Talented Professionals - Importance - Characterization - Identification - Assessment and Recognizing Talent - Development - Development Needs - Counseling.

### **4. INNOVATION**

The Importance of Innovation - Risk of Failure - Nature of Creativity - Imagination - Managing Innovative Teams - Needs of Creative Teams - Team Dynamics - A Software Development Example - Manager's Responsibility - Team's Personal Needs - Political versus Technical Solutions - Team Synergism.

### **5. TEAM ENVIRONMENT AND RECOGNITION**

Innovative Team Environment -Award Programs - Recognition Programs - An Example Award Plan - Industry Award Plans - Award Guidelines - Incentive Plans - A Caution on Recognition Programs

### **TEXT BOOKS**

1. Watts S. Humphrey, "Managing Technical People: Innovation, Teamwork, and the Software Process", Addison-Wesley, 1996.

### **REFERENCES**

1. Biswajeet Pattanayak, "Human Resource Management", Prentice Hall of India, 2002.
2. K. Aswathappa, Human Resource and Personnel Management text and cases, Tata McGraw Hill publishing Co. Ltd., 2002.

## 1. INTRODUCTION

Networks and Commercial Transactions - Internet and Other Novelties - Electronic Transactions Today - Commercial Transactions - Establishing Trust - Internet Environment - Internet Advantage - World Wide Web.

## 2. SECURITY TECHNOLOGIES

Why Internet Is Unsecure - Internet Security Holes - Cryptography : Objective - Codes and Ciphers - Breaking Encryption Schemes - Data Encryption Standard - Trusted Key Distribution and Verification - Cryptographic Applications - Encryption - Digital Signature - Nonrepudiation and Message Integrity.

## 3. ELECTRONIC PAYMENT METHODS

Traditional Transactions : Updating - Offline and Online Transactions - Secure Web Servers - Required Facilities - Digital Currencies and Payment Systems - Protocols for the Public Transport - Security Protocols - SET - Credit Card Business Basics.

## 4. ELECTRONIC COMMERCE PROVIDERS

Online Commerce Options - Functions and Features - Payment Systems : Electronic, Digital and Virtual Internet Payment System - Account Setup and Costs - Virtual Transaction Process - InfoHaus - Security Considerations - Cyber Cash: Model - Security - Customer Protection - Client Application - Selling through Cyber Cash.

## 5. ONLINE COMMERCE ENVIRONMENTS

Servers and Commercial Environments - Payment Methods - Server Market Orientation - Netscape Commerce Server - Microsoft Internet Servers - Digital Currencies - DigiCash - Using Ecash - Ecash Client Software and Implementation - Smart Cards - The Chip - Electronic Data Interchange - Internet Strategies, Techniques and Tools.

## TEXT BOOKS

1. Pete Loshin, "Electronic Commerce", 4<sup>th</sup> Edition, Firewall media, An imprint of laxmi publications Pvt. Ltd., New Delhi, 2004.

## REFERENCES

1. Jeffrey F. Rayport and Bernard J. Jaworski, "Introduction to E-Commerce", 2<sup>nd</sup> Edition, Tata Mc-Graw Hill Pvt., Ltd., 2003.
2. Greenstein, "Electronic Commerce", Tata McGraw Hill Pvt., Ltd., 2000.

# **410MCT07 - ENTERPRISE RESOURCE PLANNING – (ERP)**

## **Unit I -INTRODUCTION TO ERP**

Integrated Management Information Seamless Integration – Supply Chain Management – Integrated Data Model – Benefits of ERP – Business Engineering and ERP – Definition of Business Engineering – Principle of Business Engineering – Business Engineering with Information Technology.

## **Unit II -BUSINESS MODELLING FOR ERP**

Building the Business Model – ERP Implementation – An Overview – Role of Consultant, Vendors and Users, Customization – Precautions – ERP Post Implementation Options-ERP Implementation Technology –Guidelines for ERP Implementation.

## **Unit III -ERP AND THE COMPETITIVE ADVANTAGE**

ERP domain MPGPRO – IFS/Avalon – Industrial and Financial Systems – Baan IV SAP-Market Dynamics and Dynamic Strategy.

## **Unit IV -COMMERCIAL ERP PACKAGE**

Description – Multi-Client Server Solution – Open Technology – User Interface- Application Integration.

## **Unit V –ARCHITECTURE**

Basic Architectural Concepts – The System Control Interfaces – Services – Presentation Interface – Database Interface.

### **TEXT BOOK:**

1. Vinod Kumar Garg and N.K.Venkita Krishnan, "Enterprise Resource Planning – Concepts and Practice", PHI, 1998.

### **REFERENCE:**

1. Jose Antonio Fernandez, The SAP R/3 Handbook, TMH, 1998.

## **V SEMESTER 510MCT01 – WEB TECHNOLOGY**

### **1. INTRODUCTION:**

Role of XML – XML and the Web – XML Language Basics – SOAP – Web services – Revolutions of XML – Service Oriented Architecture (SOA) – SOAP – Overview of SOAP – HTTP – XML – RPC – SOAP: Protocol – Message Structure – Intermediaries – Actors – Design Patterns and Faults – SOAP with attachments.

### **2. XML TECHNOLOGY:**

XML – Name Spaces – Structuring with schemes and DTD – Presentation Techniques – Transformation – XML Infrastructure.

### **3. INTRODUCTION TO PEARL:**

Introduction to Perl Interpolation Context Operators File/Directory Access Built-In Functions Command Line Arguments Control Structures External Programs Regular Expressions More Regular Expressions More Built-In functions References Subroutines Object – Oriented Programming More Object – Oriented Programming Perl/TK (GUI with Perl).

### **4. INTRODUCTION PYTHON:**

Python Review – Idiomatic Data Handling – Classes and Objects – Inside the Python Object Model – Iterators, Generators, Coroutines – Functional Programming.

### **5. WEB SERVICES:**

Overview – Architecture – Key Technologies – UDDI – WSDL – ebXML – SOAP and Web Services in E-Com – Overview of .Net and J2EE.

#### **Text Books:**

1. Frank. P. Coyle, XML, Web Services and the Data Revolution, Pearson Education, 2002.

#### **Reference Books:**

1. Rames Nagappan, Robert Skoczylas and Rima Patel Sriganesh, "Developing Java Web Services", Wiley Publishing Inc., 2004.
2. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers, 2005.
4. Python Essential Reference (4<sup>th</sup> Edition) David M. Beazley.
5. Erric Hermann Mastering PEARL.

# **510MCT02 - MOBILE COMPUTING**

## **1. INTRODUCTION**

Medium Access Control : Motivation for Specialized MAC- SDMA- FDMA- TDMA- CDMA- Comparison of Access mechanisms – Tele communications : GSM- DECT- TETRA – UMTS- IMT-200 – Satellite Systems: Basics- Routing- Localization- Handover- Broadcast Systems: Overview – Cyclic Repetition of Data- Digital Audio Broadcasting – Digital Video Broadcasting

## **2. WIRELESS NETWORKS**

Wireless LAN: Infrared Vs Radio Transmission – Infrastructure Networks- Ad hoc Networks- IEEE 802.11 – HIPERLAN – Bluetooth- Wireless ATM: Working Group- Services- Reference Model – Functions – Radio Access Layer – Handover- Location Management- Addressing Mobile Quality of Service- Access Point Control Protocol

## **3. MOBILE NETWORK LAYER**

Mobile IP : Goals – Assumptions and Requirement – Entities – IP packet Delivery- Agent Advertisement and Discovery – Registration – Tunneling and Encapsulation – Optimization – Reverse Tunneling – IPv6 – DHCP- Ad hoc Networks

## **4. MOBILE TRANSPORT LAYER**

Traditional TCP- Indirect TCP- Snooping TCP- Mobile TCP- Fast retransmit/ Fast Recovery- Transmission/ Timeout Freezing – Selective Retransmission- Transaction Oriented TCP

## **5. WAP**

Architecture – Datagram Protocol- Transport Layer Security- Transaction Protocol- Session Protocol- Application Environment-Wireless Telephony Application

## **TEXT BOOKS:**

1. J.Schiller, Mobile Communication, Addison Wesley, 2000.

## **REFERENCE BOOKS:**

1. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003.
3. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.

## **UNIT - 1. INTRODUCTION**

Relation To Statistics, Databases- Data Mining Functionalities-Steps In Data Mining Process-Architecture Of A Typical Data Mining Systems- Classification Of Data Mining Systems - Overview Of Data Mining Techniques.

## **UNIT - 2. DATA PREPROCESSING AND ASSOCIATION RULES**

Data Preprocessing-Data Cleaning, Integration, Transformation, Reduction, Discretization Concept Hierarchies-Concept Description: Data Generalization And Summarization Based Characterization- Mining Association Rules In Large Databases.

## **UNIT - 3. PREDICTIVE MODELING**

Classification And Prediction: Issues Regarding Classification And Prediction- Classification By Decision Tree Induction-Bayesian Classification-Other Classification Methods-Prediction-Clusters Analysis: Types Of Data In Cluster Analysis- Categorization Of Major Clustering Methods: Partitioning Methods - Hierarchical Methods

## **UNIT - 4. DATA WAREHOUSING**

Data Warehousing Components -Multi Dimensional Data Model- Data Warehouse Architecture-Data Warehouse Implementation- -Mapping the Data Warehouse to Multiprocessor Architecture- OLAP.-Need- Categorization of OLAP Tools.

## **UNIT - 5. APPLICATIONS**

Applications of Data Mining-Social Impacts Of Data Mining-Tools-An Introduction To DB Miner-Case Studies-Mining WWW-Mining Text Database-Mining Spatial Databases.

### **TEXT BOOKS:**

1.Jiawei Han, Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, 2002.

### **REFERENCES:**

1. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining, & OLAP", Tata Mcgraw- Hill, 2004.
2. Usama M.Fayyad, Gregory Piatetsky - Shapiro, Padhraí Smyth And Ramasamy Uthurusamy, "Advances In Knowledge Discovery And Data Mining", The M.I.T Press, 1996.
3. Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.
4. Sean Kelly, "Data Warehousing In Action", John Wiley & Sons Inc., 1997.

# **510MCT04 C# AND DOT NET PROGRAMMING**

## **UNIT 1 – INTRODUCTION**

Introduction to C# - understanding .Net – Overview of C# -Literals, variables, data types, operators, expressions, branching, looping, methods, arrays, strings, structures, enumerations

## **UNIT 2 – OBJECT ORIENTED ASPECT OF C#**

Classes – objects- inheritance – poly morphism – interfaces – operator overloading- delegates- events- errors and exceptions

## **UNIT 3 – APPLICATION DEVELOPMENT ON .NET**

Building Windows applications- accessing data with ADO.Net

## **UNIT 4 – WEB BASED APPLICATION DEVELOPMENT ON .NET**

Programming web applications with web form, programming web services

## **UNIT 5 – CLR AND THE .NET FRAMEWORK**

Assemblies – versioning – attributes – reflection – viewing meta data – type discovery – reflecting on a type – marshalling – remoting – understanding server object types- specifying a server with an interface – building a server – building the client using single call – threads.

## **TEXT BOOK**

1. E.Balagurusamy `Programming in C# ` Tata Mcgraw Hill – 2004 edition(Unit 1,2)
2. J. Liberty `Programming C#' 2<sup>nd</sup> edition O'Reilly-2002(Unit3, 4, 5)

## **REFERENCES**

1. Herbert Schildt –“The Complete Reference C#' Tata Mcgraw Hill – 2004 edition(Unit 1,2)
2. Andrew Troelson `C# and .Net platform'A! Press, 2003.

## **PRACTICAL**

### **510MCP01 - WEB TECHNOLOGIES LAB**

1. Create an XML document to store an address book.
2. Create an XML document to store information about books and create the DTD files.
3. Create an XML schema for the book's XML document from exercise 2.
4. Create an XML document to store resumes for a job web site and create the DTD file
5. Present the book's XML document using cascading style sheets (CSS).
6. Write an XSLT program to extract book titles, authors, publications, book rating from the book's XML document and use formatting.
7. Use Microsoft DOM to navigate and extract information from the book's XML document.
8. Use Microsoft DSO to connect HTML form or VB form to the book's XML document and display the information.
9. Create a web service for temperature conversion with appropriate client program.(use PEARL)
10. Create a web service for currency conversion (at five currencies) with appropriate client program.(use PYTHON)

## 510MCP02 – C# and .NET LAB

### C# programs

1. Develop a conversion table of Fahrenheit to Celsius .
2. Write a C# program to display date and time using class
3. Write a program which uses inheritance
4. Write a program to demonstrate Exception
5. Create a ADO.net application for database.

### .Net lab

6. Create a simple windows Form using .Net
7. Design an Analog Clock drawn on GDI
8. Design a ASP.Net web Form Calculator
9. Design a ASP.Net web Form Calendar
10. Create a Smart Quotation Web Application

## **510MCT05 – FREE OPEN SOURCE SOFTWARE**

### **1. UNIT-1 INTRODUCTION**

Overview of Free/Open Source Software-Definition of FOSS & GNU, History of GNU/Linux and the Free Software Movement , Advantages of Free Software and GNU/Linux, FOSS usage , trends and Potential-global and Indian.GNU/Linux OS installation-detect hardware, configure disk partitions & file systems and install a GNU/Linux distribution ; Basic shell commands - logging in, listing files, editing files, copying/moving files, viewing file contents, changing file modes and permissions, process management ; User and group management, file ownerships and permissions, PAM authentication ; Introduction to common system configuration files & log files ; Configuring networking, basics of TCP/IP networking and routing, connecting to the Internet (through dialup, DSL, Ethernet, leased line).

### **2. UNIT –2 CONFIGURING ADDITIONAL HARDWARE**

Configuring additional hardware - sound cards, displays & display cards, network cards, modems, USB drives, CD writers ; Understanding the OS boot up process ; Performing every day tasks using gnu/Linux --accessing the Internet, playing music, editing documents and spreadsheets, sending and receiving email, copy files from disks and over the network, playing games, writing CDs ; X Windows system configuration and utilities - configure X windows, detect display devices ; Installing software from source code as well as using binary packages. Setting up email servers-- using postfix ( SMTP services), courier ( IMAP & POP3 services), squirrel mail ( web mail services) ; Setting up web servers - using apache ( HTTP services), php (server-side scripting), perl ( CGI support) ; Setting up file services - using samba ( file and authentication services for windows networks), using NFS ( file services for gnu/Linux / Unix networks) ; Setting up proxy services -- using squid ( http / ftp / httpsproxy services) ; Setting up printer services - using CUPS (print spooler), foomatic (printer database)

### **3. UNIT-3 SETTING UP A FIREWALL**

Setting up a firewall - Using net filter and ip tables; Using the GNU Compiler Collection –GNU compiler tools ; the C preprocessor (cpp), the C compiler (gcc) and the C++ compiler (g++), assembler (gas) ; Understanding build systems - constructing make files and using make, using autoconf and autogen to automatically generate make files tailored for different development environments ; Using source code versioning and management tools - using CVS to manage source code revisions, patch & diff.

### **4. UNIT- 4 FOSS LIBRARIES**

Understanding the GNU Libc libraries and linker - linking against object archives (.a libraries) and dynamic shared object libraries (.so libraries), generating statically linked binaries and libraries, generating dynamically linked libraries ; Using the GNU debugging tools -- gdb to debug programs, graphical debuggers like ddd, memory debugging / profiling libraries mpatrol and valgrind ; Review of common programming practices and guidelines for GNU/Linux and FOSS ; Introduction to Bash, sed& awk scripting. Basics of the X Windows server architecture.

## 5. UNIT-5 FOSS PROGRAMMING

Qt Programming ; Gtk+ Programming ; Python Programming ; Programming GUI applications with localization support.

### Text Book :

1. Introduction to Linux: Installation and Programming N. B. Venkateshwarlu (Ed); B S Publishers; 2005. (An NRCFOSS Publication)

### Reference Books :

2. Running Linux, Fourth Edition, Matt Welsh, Matthias Kalle Dalheimer, Terry Dawson, and Lar Kaufman, O'Reilly Publishers, December 2002, ISBN: 0-596-00272-6.

3. Linux Cookbook, First Edition, Carla Schroder, O'Reilly Cookbooks Series, November 2004, ISBN: 0-596-00640-3.

### On-line materials

1. Open Sources: Voices from the Open Source Revolution, First Edition, January 1999, ISBN: 1-56592-582-3. URL: <http://www.oreilly.com/catalog/opensources/book/toc.html>

2. The Linux Cookbook: Tips and Techniques for Everyday Use, First Edition, Michael Stutz, 2001. URL: [http://dsl.org/cookbook/cookbook\\_toc.html](http://dsl.org/cookbook/cookbook_toc.html)

3. The Linux System Administrators' Guide, Lars Wirzenius, Joanna Oja, Stephen Stafford, and Alex Weeks, December 2003. URL: <http://www.tldp.org/guides.html>

4. Using GCC, Richard Stallman et al. URL: <http://www.gnu.org/doc/using.html>

5. An Introduction to GCC, Brian Gough. URL: <http://www.network-theory.co.uk/docs/gccintro/>

6. GNU Autoconf, Automake and Libtool, Gary V. Vaughan, Ben Elliston, Tom Tromey and Ian Lance Taylor. URL: <http://sources.redhat.com/autobook/>

7. Open Source Development with CVS, Third Edition, Karl Fogel and Moshe Bar. URL: <http://cvsbook.red-bean.com/>

8. Advanced Bash Scripting Guide, Mendel Cooper, June 2005. URL: <http://www.tldp.org/guides.html>

# **510MCT06 – NETWORK MANAGEMENT AND ADMINISTRATION**

## **UNIT I-INTRODUCTION**

Network services – Names and Addresses – The Host Table – DNS – Mail services – File and Print servers – configuration servers – summary - Getting started – connected and Non-connected Networks – Basic information – planning Routing – Planning Naming Service – Other services – Informing the Users – summary - Basic Configuration – Kernel – configuration – Using Dynamically Loadable Modules – Recompiling the Kernel – Linux Kernel configuration – Startup Files – The Internet Daemon – The Extended Internet Daemon.

## **UNIT II- CONFIGURING THE INTERFACE**

Configuring the Interface – The ifconfig command – TCP / IP over a Serial Line – Installing PPP - Configuring Routing – common routing configuration – The minimal routing table – Building a static routing table – configuring DNS – BIND : Unix name service – configuring the Resolver – configuring named – using ns lookup

## **UNIT III- NETWORK SERVICES**

Local Network Services – the Network File system – Sharing Unix printers – using samba to share resources with windows – Network Information – service – DHCP – Managing Distributed servers – Post office servers – send mail – sendmail's function – running sendmail as a Daemon – Sendmail Aliases – Modifying a sendmail of File – Testing Sendmail.

## **UNIT IV- CONFIGURING OF SERVERS**

Configuring Apache – Installing Apache software – configuring the Apache server – understanding an Ltpd. Conf File – Web server security - Managing your web server – Network Security – Security planning – user Authentication – Application security – Security Monitoring – Access control – Encryption – Firewalls.

## **UNIT V- TROUBLE SHOOTING**

Trouble shooting TCP / IP Applications a problem – Diagnostic Tools – Testing Basic connectivity – Troubleshooting Network Access – Checking Routing – Checking Name Service – Analyzing Protocol problems – Protocol case study - Applications : Internet Management – Introduction – The level of Management Protocols – Architectural Model – Protocol Framework – Examples of MIB variables – The structure of Management Information – Formal Definitions using ASN 1 – Structure and Representation of MIB object names – Simple Network Management Protocol – SNMP message format – Example encoded SNMP message – New features in SNMPv3 - Summary.

## **TEXT BOOK**

1. Craig Hunt, "TCP / IP Network Administration", 3<sup>rd</sup> Edition, O'Reilly Networking, 2002.
2. Douglas E Comer, "Internetworking with TCP / IP – Principles, Protocols and Architectures", Fourth Edition, Prentice – Hall of India Pvt. Ltd., 2002.

## **REFERENCES**

1. Steven Graham, Steve Shah, "LINUX Administration A beginner's Guide", 3<sup>rd</sup> Edition, McGraw Hill, 2002.
2. Nicholas wells, "Guide to Linux Installation and administration", Vikas Publishing house, 2000.
3. Red Hat, "Official Red Hat Linux 8 Administrator's Guide", Wiley – Dreamtech India Pvt. Ltd., 2002.
4. Steve Maxwell, "UNIX system Administration, A beginner's Guide", Tata McGraw Hill Edition, 2002.

## **510MCT07 - GRID COMPUTING**

### **UNIT I- GRID COMPUTING**

Introduction-Definition and Scope of grid computing

### **UNIT II - GRID COMPUTING INITIALIVES**

Grid Computing Organizations and their roles – Grid Computing analog – Grid Computing road map.

### **UNIT III - GRID COMPUTING APPLICATIONS**

Merging the Grid sources – Architecture with the Web Devices Architecture.

### **UNIT IV - TECHNOLOGIES**

OGSA – Sample use cases – OGSA platform components – OGSI – OGSA Basic Services.

### **UNIT V -GRID COMPUTING TOOL KITS**

Globus GT 3 Toolkit – Architecture, Programming model, High level services – OGSI .Net -middleware Solutions.

### **TEXTBOOK**

1.Joshy Joseph & Craig Fellenstein, "Grid Computing", Pearson/PHI PTR-2003.

### **REFERENCE BOOK**

1.Ahmar Abbas, "Grid Computing: A Practical Guide to technology and Applications", Charles River media – 2003.

# 510MCT08 - DIGITAL IMAGE PROCESSING

## UNIT - 1. DIGITAL IMAGE FUNDAMENTALS

Image formation, Image transforms – Fourier transforms, Walsh, Hadamard, Discrete cosine, Hotelling transforms.

## UNIT - 2. IMAGE ENHANCEMENT & RESTORATION

Histogram modification techniques - Image smoothening - Image Sharpening - Image Restoration - Degradation Model – Noise models - Spatial filtering – Frequency domain filtering.

## UNIT - 3. IMAGE COMPRESSION & SEGMENTATION

Compression Models - Elements of information theory - Error free Compression - Image segmentation –Detection of discontinuities - Edge linking and boundary detection - Thresholding – Region based segmentation - Morphology.

## UNIT - 4. REPRESENTATION AND DESCRIPTION

Representation schemes- Boundary descriptors- Regional descriptors - Relational Descriptors

## UNIT - 5. OBJECT RECOGNITION AND INTERPRETATION

Patterns and pattern classes - Decision-Theoretic methods - Structural methods.

### TEXTBOOK:

1. Gonzalez.R.C & Woods. R.E., Digital Image Processing, II Ed., Pearson Education, 2002.

### REFERENCES:

1. Anil Jain.K, Fundamentals of Digital image Processing, Prentice Hall of India, 1989.
2. Sid Ahmed, Image Processing, McGraw Hill, New York, 1995.