

ANNA UNIVERSITY: COIMBATORE
CURRICULUM 2007 - FULL TIME
M.C.A (MASTER OF COMPUTER APPLICATIONS)

SEMESTER - I

Subject Code	Subject Name	Hours / Week			
		L	T	P	M
THEORY					
MCA 101	Digital Fundamentals and Computer Organization	3	1	0	100
MCA 102	Problem Solving Techniques	3	0	0	100
MCA 103	Business Processes	3	0	0	100
MCA 104	Data Structures	3	1	0	100
MCA 105	Programming in 'C'	3	0	0	100
PRACTICAL					
MCA 106	Office Automation Lab	0	0	3	100
MCA 107	Data Structures Lab	0	0	3	100
MCA 108	Programming in 'C' Lab	0	0	3	100

SEMESTER II

Subject Code	Subject Name	Hours / Week			
		L	T	P	M
THEORY					
MCA 201	Foundations of Computer Applications	3	1	0	100
MCA 202	System Software	3	0	0	100
MCA 203	Design and Analysis of Algorithms	3	0	0	100
MCA 204	Object Oriented Programming	3	1	0	100
MCA 205	Data Base Management Systems	3	0	0	100
PRACTICAL					
MCA 206	Algorithms Lab	0	0	3	100
MCA 207	Object Oriented Programming Lab	0	0	3	100
MCA 208	Data Base Management Systems Lab	0	0	3	100

SEMESTER - I

MCA 101 DIGITAL FUNDAMENTALS AND COMPUTER ORGANIZATION

L	T	P	M
3	1	0	100

UNIT - I INTRODUCTION TO DIGITAL DESIGN (12)

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 (12)

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 (12)

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 (12)

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

UNIT - V MEMORY ORGANIZATION AND CPU (12)

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.

Lecture 45 Tutorial 15 Total 60

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.

MCA 102 PROBLEM SOLVING TECHNIQUES

L	T	P	M
3	0	0	100

UNIT - I INTRODUCTION TO COMPUTER PROBLEM-SOLVING (9)

Introduction - The Problem-solving Aspect - Top-down Design-implementation of Algorithms- Program Verification - The Efficiency of Algorithms. Fundamental Algorithms - Exchanging the values of Two Variables - Counting - Summation of a set of Numbers - Factorial Computation-Sine function computation - Generation of the Fibonacci sequence - Reversing the Digits of an Integer - Base Conversion Character to Number Conversion.

UNIT - II FACTORING METHODS (9)

Finding the square Root of a number - The Smallest Divisor of an Integer - The Greatest Common Divisor of Two Integers - Generating Prime Numbers - Computing the Prime Factors of an Integer - Generation of Pseudo - random Numbers - Raising a Number to a Large Power - Computing the nth Fibonacci Number.

UNIT - III ARRAY TECHNIQUES (9)

Array Order Reversal-Array Counting or Histogramming - Finding the Maximum Number in a Set - Removal of Duplicates from an Ordered Array - Partitioning an Array – Finding the kth Smallest Element - Longest Monotone Subsequence.

UNIT - IV SORTING AND SEARCHING (9)

The Two-way Merge - Sorting by Selection - Sorting by Exchange-Sorting by Insertion - Sorting by Diminishing Increment - Sorting by Partitioning - Binary Search - Hash Searching.

UNIT - V TEXT PROCESSING AND PATTERN SEARCHING (9)

Text Line Length Adjustment - Left and Right Justification of Text - Keyword Searching in Text-Text Line editing - Linear Pattern Search - Sub linear Pattern Search.

Total 45

Reference Books

- 1 R.G.Dromey “ How to Solve it by Computer ”, Pearson Education, India, 2007.
- 2 Seymour Lipschutz, “Essentials computer Mathematics”, Schaums’ outlines series, Tata McGrawHill Edition, 2004.

UNIT - I INTRODUCTION (9)

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

UNIT - II GROUPS IN ORGANISATION (9)

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

UNIT - III ORGANISATION SYSTEM (9)

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

UNIT - IV BUSINESS PROCESS RE-ENGINEERING AND IT (9)

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

UNIT - V NETWORK ORGANIZATIONS (9)

Networked organization- virtual corporations.

Total 45**Reference Books**

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

UNIT - I LISTS, STACKS AND QUEUES (12)

Abstract data types- List ADT-Stack ADT-recursion-Queue ADT UNIT -

II TREES (12)

Trees - General, Binary trees- Search tree ADT- Binary Search Trees- AVL trees, Threaded trees- Splay Trees- B-Trees.

UNIT - III SORTING AND SEARCHING (12)

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 (12)

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 (12)

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

Lecture 45 Tutorial 15 Total 60

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.

UNIT - I INTRODUCTION TO C LANGUAGE (9)

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.

UNIT - II ARRAYS AND FUNCTIONS (9)

Arrays - dynamic and multi-dimensional arrays - Character arrays and Strings - String handling Functions - User defined Functions - Categories of Functions - Recursion.

UNIT - III STRUCTURES AND UNIONS (9)

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.

UNIT - IV POINTERS (9)

Pointers - Declaration, Accessing a variable, dynamic memory allocation, Pointers versus Arrays, Array of pointers, Pointers to functions and structure Pointers.

UNIT - V FILE MANAGEMENT (9)

File Management in C - Data hierarchy- Files and Streams - Sequential access file- Random access file - Preprocessors

Total 45

Reference Books

- 1 E.Balagurusamy " Programming in ANSI C " , Tata McGraw Hill, 2004
- 2 Yashavant P. Kanetkar "Understanding Pointers In C" , BPB Publications, NewDelhi, 2002
- 3 Byron C Gottfried, Programming with C, Schuams' outline series, 2nd edition, Tata McGraw Hill, 2006.

PRACTICALS

MCA 106 OFFICE AUTOMATION LAB

L	T	P	M
0	0	3	100

LIST OF EXPERIMENTS

WORD

- 1 Creating and Formatting a simple document (using bulleted and Numbered list, adding Headers, Footers and Page numbers)
- 2 Navigating Long document with the Document Map
- 3 Working with Tables (create tables, editing tables, formatting tables, converting tables, sorting table contents, etc.,)
- 4 Mail Merge
- 5 Creating a Birthday Card

EXCEL

- 6 Formatting the worksheets(Formatting the cell, rows and columns)
- 7 Working with functions and formulae.
- 8 Presenting Data with Charts
- 9 Performing What-If analysis with data table.
- 10 Summarize the data using pivot table

POWER POINT

- 11 Presentation using Text with animation
- 12 Presentation using images, media file
- 13 Creating a graph in a PowerPoint slides
- 14 Creating self running presentations
- 15 Hiding and showing the slides

ACCESS

- 16 Creating a database (create a table, setting field properties and setting the key)
- 17 Entering and editing data using forms
- 18 Retrieving data from more than one related table using queries (using Query Wizard)
- 19 Generating Report using Report Wizards.

TALLY

- 20 Creation of company, Accounts Configuration, Classification of Accounts using Tally.
- 21 Accounts Masters, Accounts Voucher - Voucher Entry, conversion, Interest Calculation, Printing of voucher using Tally.
- 22 Create a Contra Voucher, Payment and Receipt Voucher using Tally.
- 23 Create Sales and Purchase Voucher, Credit notes and Debit notes using Tally.
- 24 Create Trading Account, Profit / Loss Account, Balance Sheet using Tally.

Total 45

PRACTICALS

MCA 107	DATA STRUCTURES LABORATORY	L	T	P	M
		0	0	3	100

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

Total 45

PRACTICALS

MCA 108 PROGRAMMING IN 'C' LAB

L	T	P	M
0	0	3	100

LIST OF EXPERIMENTS

- 1 Display the following:
(i) Floyd's triangle (ii) Pascal Triangle
- 2 Generate the following series of numbers:
(i) Armstrong numbers between 1 to 100
(ii) Prime numbers between 1 to 50
(iii) Fibonacci series up to N numbers
- 3 Manipulate the strings with following operations.
(i) Concatenating two strings (ii) Reversing the string (iii) Finding the substring
(iv) Replacing a string (v) Finding length of the string
- 4 Find the summation of the following series:
(i) Sine (ii) Cosine (iii) Exponential
- 5 Create the sales report for M sales persons and N products using two dimensional array.
- 6 Simulate following Banking operations using functions.
(i) Deposit (ii) Withdrawal (iii) Balance Enquiry
- 7 Implement using recursion
(i) Find the solution of Towers of Hanoi problem using recursion.
(ii) Fibonacci number generation.
(iii) Factorial
- 8 Generate Student mark sheets using structures.
- 9 Create a collection of books using arrays of structures and do the following:
Search a book with title and author name (ii) Sorts the books on title.
- 10 Perform string operations using pointers.
- 11 Program to implement dynamic memory allocation.
- 12 Create, Reading and displaying a sequential and random access file.

Total 45

SEMESTER - II

MCA 201 FOUNDATIONS OF COMPUTER APPLICATIONS	L T P M
	3 1 0 100

UNIT - I PROBABILITY (12)

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 - II SOLUTION OF NON-LINEAR AND SIMULTANEOUS LINEAR EQUATION (12)

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

UNIT - III SCHEDULING BY PERT AND CPM (12)

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

UNIT - IV QUEUING MODELS (12)

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 - V FORMAL LANGUAGES & FINITE AUTOMATA (12)

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.

Lecture 45 Tutorial 15 Total 60

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)

MCA 202 SYSTEM SOFTWARE

L T P M
3 0 0 100

UNIT - I INTRODUCTION (9)

Basic concepts - Machine structure - Simplified Instructional Computer.

UNIT - II ASSEMBLERS (9)

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

UNIT - III LOADERS AND LINKERS (9)

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

UNIT - IV MACRO PROCESSORS (9)

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

UNIT - V COMPILERS AND UTILITIES (9)

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

Total 45

Reference Books

- 1 Leland L.Beck, System Software - An Introduction to Systems Programming, 3rd Edition, Addison Wesley,1999.
- 2 D.M.Dhamdhere, System Programming and Operating Systems, Tata Mc Graw 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 Mc Graw Hill Edition,1991.

UNIT - I INTRODUCTION

(9)

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 - II DIVIDE AND CONQUER METHOD AND GREEDY METHOD

(9)

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 - III DYNAMIC PROGRAMMING

(9)

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

UNIT - IV BACKTRACKING AND BRANCH AND BOUND

(9)

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

UNIT - V NP-HARD AND NP-COMPLETE PROBLEMS

(9)

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

Total 45**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 Hopenfit and J.D.Ullman, "The Design and Analysis of Computer algorithms" Pearson education Asia, 2003.

UNIT - I OOP PARADIGAM

(12)

Programming Paradigms-Procedural Programming-Modularity-Exception HandlingData
Abstraction-User Defined Types-Concrete Types-Abstract Types-Virtual Functions-Object
Oriented Programming-Generic Programming-ContainersAlgorithms.

UNIT - II INTRODUCTION TO C++

(12)

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

UNIT - III OVERLOADING

(12)

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

UNIT - IV INHERITANCE AND TEMPLATES

(12)

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

UNIT - V ERROR HANDLING AND FILES

(12)

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

Lecture 45 Tutorial 15 Total 60**Reference Books**

- 1 Herbert Schildt,"C++ The Complete Reference", Tata McGrawHill Edition, 2003 (unit 2, 3, 4)
- 2Bjanne 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

MCA 205 DATA BASE MANAGEMENT SYSTEMS

L T P M
3 0 0 100

UNIT - I INTRODUCTION

(9)

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 - II RELATIONAL DATABASES

(9)

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

UNIT - III DATA STORAGE AND INDEXING

(9)

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

UNIT - IV QUERY EVALUATION & OPTIMIZATION

(9)

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

UNIT - V TRANSACTION MANAGEMENT & RECENT TRENDS

(9)

Transaction Concept-Static Implementation-Concurrency Control-ProtocolsDeadlock Handling-Recovery Systems-Recovery with Concurrent TransactionsShadow Paging-Buffer Management - Basic concepts: Distributed Databases, Parallel Databases.

Total 45

Reference Books

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

PRACTICALS

MCA 206

ALGORITHMS LAB

L	T	P	M
0	0	3	100

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.

Total 45

PRACTICALS

	L	T	P	M
MCA 207 OBJECT ORIENTED PROGRAMMING LAB	0	0	3	100

LIST OF EXPERIMENTS

- 1 Programs using Constructor and Destructor.
- 2 Creation of classes and use of different types of functions.
- 3 Count the number of objects created for a class using static member function.
- 4 Write programs using function overloading and operator overloading.
- 5 Programs using inheritance.
- 6 Program using friend functions.
- 7 Program using virtual function.
- 8 Write a program using exception handling mechanism.
- 9 Programs using files.
- 10 Programs using function templates.

Total 45

PRACTICALS

MCA 208 DATABASE MANAGEMENT SYSTEMS LAB	L	T	P	M
	0	0	3	100

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.)

Total 45