Adikavi Nannaya University

Branch/Course: Master of Computer Applications

Code	Course Title	Max Marks		Total	Hours per week		Credits
		External	Internal	Marks	Theory	Practical	
MCA-19101	Discrete Mathematical Structures	75	25	100	4	-	4
MCA-19102	Management Accountancy	75	25	100	4	-	4
MCA-19103	C Programming & Data Structures	75	25	100	4	-	4
MCA-19104	Computer Organization	75	25	100	4	-	4
MCA-19105	Operating Systems	75	25	100	4	-	4
MCA-19106	C Programming & Data Structures Lab	50	50	100	-	3	2
MCA-19107	Operating Systems Lab	50	50	100	-	3	2
	Total Credits				24		

Semester I (First Year) Curriculum

MCA-19101 DISCRETE MATHEMATICAL STRUCTURESInstruction: 4 Periods/weekTime: 3 HoursCredits: 4Internal: 25 MarksExternal: 75 MarksTotal: 100 Marks

UNIT I

Introduction: Logic-Prepositional Equivalences-Truth tables-Totalogies-Predicates and Quantifiers-Sets-Operations on sets-Sequences and Summations -Growth functions - relations and their properties- n-ary relations and their applications - Representation of relations-Closures of relations-Equivalence relations-Partial Orderings.

UNIT II

Counting Techniques: Basics of Counting- Pigeonhole Principle- Combinations and Permutations-Generalized Permutations and Combinations

Recurrence relations: Solving Recurrence Relations-Divide and Conquer relations-Inclusion and Exclusion-Applications of Inclusion-Exclusion.

UNIT III

Graphs: Introduction to Graphs-Terminology-Relations and Directed Graphs Representations of Graphs- Isomorphism-Connectivity- Euler and Hamiltonian Paths- Shortest Path problems-Planar Graphs- Graph Coloring.

Trees: Introduction to trees- Applications of trees- Traversals-Trees and sorting Spanning Trees-Minimum Spanning Trees.

UNIT IV

Boolean Algebra and Models of Computation: Boolean Functions- Representing Boolean Functions -Logic Gates-Minimizations of Circuits-Languages and Grammars- Finite State Machines with and with no output.

Text Book:

Discrete mathematics and its applications, Keneth. H. Rosen, Tata McGraw-Hill Publishing Company, New Delhi

Reference Books:

1) Discrete Mathematics for computer scientists & Mathematicians, Joe L.Mott, Abraham Kandel & T. P. Baker,Prentice Hall of India Ltd, New Delhi

2) Discrete mathematics, Richard Johnsonbaug, Pearson Education, New Delhi

MCA-19102 MANAGEMENT ACCOUNTANCY

Instruction: 4 Periods/week	Time: 3 Hours	Credits: 4
Internal: 25 Marks	External: 75 Marks	Total: 100 Marks

UNIT I

Principles Of Accounting: Nature And Scope Of Accounting, Double Entry SystemOf accounting introduction To Basic Books Of Accounts Of Sole Proprietary Concern, closing of books of accounts and Preparation Of Trial Balance.

FinalAccounts: Trading,Profit And Loss Accounts And Balance Sheet Of Sole Proprietary Concern with Normal Closing Entries.(With numerical problems)

UNIT II

Ratio Analysis:Meaning, Advantages, Limitations, Types of Ratio and Their Usefulness. (Theory only)Fund Flow Statement: Meaning Of The Term Fund, Flow Of Fund, Working Capital Cycle, Preparation and Inter-preparation Of Statement.

UNIT III

Costing:Nature, Importance And Basic Principles. Budget and Budgetary Control: Nature And Scope, Importance, Method Of Finalization And Master Budget, Functional Budgets.

Marginal Costing:Nature,Scope, Importance,Construction Of Break Even Chart, Limitations And Uses Of Break Even Chart, Practical Applications Of Marginal Costing.(with numerical problems)

UNIT IV

Introduction To Computerized Accounting System: Coding Logic And Codes Required, Master Files, Transaction Files, Introduction To DocumentsUsed ForData Collection, Processing Of Different Files And Outputs Obtained.

TEXTBOOKS:

Introduction to Accountancy.T.S. Grewal.
Management Accountancy, S.P.Jain.
REFERENCE BOOK:
Introduction To Accounting, G.Agarwal.

MCA-19103: C PROGRAMMING AND DATA STRUCTURES Theory : 4 Hrs Credits : 4

Int Marks : 25 Ext Marks : 75

UNIT-I

Introduction to Computers, Algorithm, flowchart, program development steps, Structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation. Control structures such as if, go to, labels, and switch statements. Loops- while, do-while and for statements, break, continue.

UNIT-II

Arrays - declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1- D arrays, 2-D arrays – 2-D and character arrays – Multidimensional arrays. **Functions:** basics, parameter passing, storage classes- scope rules, user defined functions, standard library functions, recursive functions, header files, C pre processor. **Pointers:** Concepts, initialization of pointer variables, pointers and Function arguments, passing by address –dangling memory, Character pointer s and functions, pointer s to pointer s, pointer s and multidimensional arrays, dynamic memory managements functions, command line arguments.

UNIT-III

Derived types: structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typed of, bit-fields, Input and output – concept of a file, text files and binary files, Formatted I/o, file I/o operations.

Data Structures: Introduction to Data Structures – Time Complexity –Space Complexity – Pattern matching – naive method – Robin Karp Algorithm .

UNIT-IV

Searching – Linear and binary search methods, sorting –Bubble sort, selection sort, Insertion sort, Quick sort, merge sort. Single linked lists, doubly linked lists, circular list, representing stacks and queues in C using arrays and linked lists, infix to post fix conversion, postfix expression evaluation. Trees- Binary tress, terminology, representation, traversals, Graphs - terminology, representation, graph versals (dfs & bfs) –Warshalls – Dijkstra – Kruskal – Prims Algorithms.

TEXT BOOKS:

1.C and Data Structures: A snapshot oriented treatise using live engineering examples, N B Venkateswarlu, E. V Prasad, S Chand & Co.

2. Let Us C, YashwantKanetkar, BPB Publications, 5th Edition.

3. Computer science, A structured programming approach using C, B.A. Forouzan and R.F.Gilberg, Third edition, Thomson.

REFERENCE BOOKS:

1. Fundamentals of Data Structures in C, Horowitz, Sahni, Anderson-Freed, 2nd ed, 2008.

2. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/ Pearson.

MCA-19104 COMPUTER ORGANIZATION

Instruction: 4 Periods/week	Time: 3 Hours	Credits: 4
Internal: 25 Marks	External: 75 Marks	Total: 100 Marks

UNIT-I

Digital Logic Circuits:

Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuit, Flip-flops Sequential Circuits.

Digital Components:

Integrated Circuits, Decoders, Multiplexes, Registers, Shift Registers, counters, Memory Unit.

UNIT-II

Data Representation:

Data Types, Complements, Fixed-point Representation, Floating point Representation.

Register Transfer and Micro Operations:

Register Transfer Language, Register Transfer, Bus and Memory Transfer, Arithmetic Micro Operations, Assembly language Instructions, 8085 Microprocessor Instruction Set Architecture.

UNIT-III

Basic Computer Organization and Design:

Instruction Codes, Computer Register, Computer Instructions, Timing and Control, Instruction Cycle memory reference Instructions, Input-Output, Interrupt.

Central Processing Unit:

Introduction, General Register Organization, Stack Organization, Instruction formats, addressing modes.

UNIT-IV

Input /Output Organization:

Peripherals Devices, I/O Interface, Asynchronous Data Transfer, Mode of Transfer, Priority Interrupt, Direct memory access, Input – Output Processor(IOP).

Memory Organization:

Memory Hierarchy, Main memory, Auxiliary Memory, Associate Memory, Cache Memory and Virtual Memory.

Text Books:

1. Computer System Architecture, M.Morris Mano, Prentice Hall of India Pvt.ltd. Third Edition, Sept. 2008.

Reference Books:

1. Computer Architecture and Organization, William Stallings, PHI Pvt. Ltd. Eastern Economy Edition, Sixth Edition, 2003.

2. Computer System Architecture John P. Hayes.

3.Computer Architecture A Quantitative approach 3rd Edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elseveir)

MCA-19105 OPERATING SYSTEMS			
Instruction: 4 Periods/week	Time: 3 Hours	Credits: 4	
Internal: 25 Marks	External: 75 Marks	Total: 100 Marks	

UNIT I

Introduction: Definition of Operating System, Types Of Operating Systems, Operating System Structures, Operating-System Services, System Calls, Virtual Machines, Operating System Design and Implementation.

Process Management: Process Concepts, Operations on Processes, Cooperating Processes, Threads, Inter Process Communication, Process Scheduling, Scheduling Algorithms, Multiple - Processor Scheduling. Thread Scheduling.

UNIT II

Process Synchronization: The Critical Section Problem, Semaphores, And Classical Problems of Synchronization, Critical Regions, Monitors, Synchronization examples.

Deadlocks: Principles of Deadlocks, System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance, Detection & Recovery from Deadlocks.

UNIT III

Memory Management: Logical Versus Physical Address, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Thrashing

File System Implementation: Concept of a file, Access Methods, Directory Structure, File System Structure, Allocation Methods, Free Space Management, Directory Management, Device Drivers.

Mass-storage structure: overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management.

UNIT IV

Protection: Goals and Principles of Protection, Access matrix implementation, Access control, Revocation of access rights.

Case study: LINUX, Windows Operating Systems.

Text Book:

1. Operating System Principles by Abraham Silberschatz, Peter Galvin, Greg Gagne. Seventh Edition, Wiley Publication

Reference Books:

- 1. Operating Systems, William Stallings 5th Edition PHI
- 2. Modern Operating Systems, Andrew S.Tanenbaum, , 2nd edition, 1995, PHI.
- 3. Operating Systems A concept based approach, Dhamdhere, 2nd Edition, TMH, 2006.
- 4. Understanding the Linux Kernel, Daniel P Bovet and Marco Cesati, 3rd Edition,' Reilly, 2005.

MCA-19106: C PROGRAMMING AND DATA STRUCTURES LAB Lab: 3 Hrs. Credits : 2 Int Marks :50 Ext Marks: 50

1. Write a C program to read x, y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line.

2. Write a C program which generates 100 random numbers in the range of 1 to 100. Store them in an array and then print the array. Write 3 versions of the program using different loop constructs (eg. for, while and do-while).

3. Write a program which determines the largest and the smallest number that can be stored in different data types like short, int, long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?

4. Write a C program which generates 100 random real numbers in the range of 10.0 to 20.0 and sort them in descending order.

5. Write a C function for transporting a square matrix in place (in place means that you are not allowed to have full temporary matrix).

6. Write a C function which will invert a matrix.

7. Write a set of string manipulation functions eg. for getting a sub-string from a given position, copying one string to another, reversing a string and adding one string to another.

8. Write a C program for sorting a list using Bubble sort and then apply binary search.

9. Write a C program to implement the operations on stacks.

10. Write a C program to implement the operations on circular queues.

11. Write a C program for the representation of polynomials using circular linked list and for the addition of two such polynomials.

12. Write a C program for quick sort.

13. Write a C program for Merge sort.

14. Write a C program to create a binary search tree and for implementing the in order, preorder, Post order traversal using recursion.

15. Write a C program for finding the Depth First Search of a graph.

16. Write a C program for finding the Breadth First Search of a graph.

REFERENCE BOOKS:

1. Let Us C, YashwantKanetkar, BPB Publications, 5th Edition.

- 2. Computer Science, A structured programming approach using C", B.A.Forouzan and R.F.Gilberg, " 3rd Edition, Thomson, 2007.
- 3. The C Programming Language' B.W. Kernighan, Dennis M. Ritchie, PHI
- 4. Data Structures and Algorithms, 2008, G.A.V.Pai, TMH
- 5. Classic Data Structures, 2/e, Debasis ,Samanta,PHI,2009
- 6. Fundamentals of Data Structure in C, 2/e, Horowitz, Sahni, Anderson Freed, University

MCA-19107 OPERATING SYSTEMS LAB

Practical: 3 Periods /week Internal: 50 Marks

Time: 3 Hours External: 50 Marks Credits: 2 Total: 100 Marks

List of Experiments:

1. Basic UNIX commands

Implement the following using Shell Programming

- 2. Input number even or odd
- 3. Count the number of lines in the input text

4. Print the pattern

*		
*	*	*

5. File encryption

Implement the following using C/C++/JAVA

- 6. FCFS CPU scheduling algorithm
- 7. SJF CPU scheduling algorithm
- 8. Round Robin CPU scheduling algorithm
- 9. Priority CPU scheduling algorithm
- 10. Implement Semaphores
- 11. Sequential file allocation strategy
- 12. Indexed file allocation strategy
- 13. Bankers Algorithm for Dead Lock Avoidance
- 14. Algorithm for Dead Lock Detection
- 15. FIFO Page Replacement Algorithm
- 16. LRU Page Replacement Algorithm
- 17. LFU Page Replacement Algorithm

REFERENCE BOOKS:

1. Operating System Principles by Abraham Silberschatz, Peter Galvin, Greg Gagne. Seventh Edition, Wiley Publication

2. Understanding the Linux Kernel, Daniel P Bovet and Marco Cesati, 3rd Edition, Reilly, 2005.

- 3. Unix programming, Stevens, Pearson Education.
- 4. Shell programming, Yashwanth Kanetkar.