

**ADIKAVI NANNAYA UNIVERSITY:RAJAMAHENDRAVARAM**  
**UNIVERSITY COLLEGE OF ENGINEERING**

Department Of Computer Science & Engineering



**Master of Computer Applications(MCA)**

**Course Structure and Scheme of Valuation w.e.f. 2016-17**

**ADIKAVI NANNAYA UNIVERSITY**  
**Master of Computer Applications(MCA)**  
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**I Semester**

Code	Name of the subject	Periods/week		Max Marks		Total Marks	Credits
		Theory	Practical	External	Internal		
MCA 1.1	Computer Fundamentals and Programming in C	4	-	75	25	100	4
MCA 1.2	Data Structures	4	-	75	25	100	4
MCA 1.3	Discrete Mathematical Structures	4	-	75	25	100	4
MCA 1.4	Computer Organization	4	-	75	25	100	4
MCA 1.5	Management Accountancy	4	-	75	25	100	4
MCA 1.6	C and Data Structures Programming Lab	-	3	50	50	100	2
MCA 1.7	Computer Organization Lab	-	3	50	50	100	2
<b>Total</b>						<b>700</b>	<b>24</b>

## MCA 1.1 Computer Fundamentals and Programming in C

**Instruction:**4 Periods/week

**Time:** 3 Hours

**Credits:**4

**Internal:**25 Marks,

**External:** 75 Marks

**Total:** 100 Marks

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### Unit-I

**Fundamentals of Computers:** Computers, Computer generations and Classification, Moore's law, Data Representation: Representation of Characters, Integers and Fractions, Algorithms, Flowcharts, Input Units: Keyboard, Mouse, MICR and OMR; Output Units: Flat Panel Display, Printers and Plotters, Programming Languages: Assembly Language, Higher Level Programming Languages, Compiling a High Level Language Program, Some High Level Languages, Need of Operating Systems, Evolution of OS, Functions of OS.

### Unit-II

**Introduction to C Programming:** C Character Set, Identifiers, Keywords, Variables, Constants, Type Conversion, Operators and Expressions, Operator Precedence and Associativity, Basic Input Output Types: Single Character and String, General; Formatted Input and Output, Running a Simple C Program Using gcc, tc++ Compilers.

**Control Structures:** Sequence, Selection Using Simple if, if..else and switch, Iteration using while, do..while and for Statements. Counter Controlled and Sentinel Controlled Repetition, Break and Continue, Unconditional goto, Conditional Operator, null Statement.

### Unit-III

**Functions:** Uses, User Defined and Library Functions, Calling Functions by Value and Reference, Storage Classes, Recursion, Macros vs Functions.

**C Library Functions:** stdio.h, stdlib.h, math.h, string.h, ctype.h, alloc.h, graphics.h.

**Arrays and Strings:** Array Uses and Operations, One and Two Dimensional Arrays, Array of Strings

**Pointers:** Uses of Pointers, Pointer Variables, Dereferencing Pointers, Void Pointers, Pointer Arithmetic, Pointers to Pointers, Pointers and One Dimensional, Two Dimensional Arrays, Pointers and Functions, Array of Pointers, Pointer Constants, Pointers and Strings, Constant Pointers

### Unit-IV

**Structures and Unions:** Declaring and Using Structures, Operations on Structures, Array of Structures, Pointers to Structures, Structures and Functions, Unions, Bitwise Operators, Bit Fields.

**Files:** File Structure, File Handling Functions, Create, Read and Write of Sequential and Random Access Files.

**Dynamic Memory Allocation:** Library Functions for Dynamic Memory Allocation, Dynamic Multi Dimensional Arrays, Self Referential Structures.

**Other Topics:** Conditional Compilation, Command Line Arguments, Comma Operator, Enumeration Constants, Type Qualifiers: const and volatile

### Text Books:

1. Fundamentals of Computers. V Rajaraman, Neeharika Adabala, Fourth Edition PHI
2. Mastering C. K R Venugopal S R Prasad. Tata Mc Graw Hill.
3. C How to Program. Paul Dietel, Harvey Dietel. Sixth Edition. PHI.

### Reference Books:

1. C The Complete Reference. Herbert Schildt, Fourth Edition. Mc Graw Hill.
2. Programming in C. Stephen G Kochan. Third Edition. Sams Publishing.
3. The C Programming Language. Brian W Kernighan, Dennis M Ritchie. Second Edition. Prentice Hall.

## MCA 1.2 Data Structures

**Instruction:4 Periods/week**  
**Internal:25 Marks,**

**Time: 3 Hours**  
**External: 75 Marks**

**Credits:4**  
**Total: 100 Marks**

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### Unit I

The Stack: Primitive operations – stack as an ADT–Implementing the Stack operations using Arrays and Structures, Queue as Abstract Data Type–Sequential Representation, Types of Queues – Operations – Implementation using Arrays and Structures, Linked List:Operations, Implementation of Stacks, Queues and priority Queues,insertion, deletion and concatenation operations on circular lists, Stacks and Queues as circular lists, doubly linked lists-applications.

### Unit II

Trees: Binary Trees Operations and Applications. Binary Tree Representation: Node Representation–Implicit array Representation–Choice of Representation–Binary Tree Traversal–Threaded Binary Trees and their Traversal- Huffman Algorithm-Representing Lists as Binary Trees–Trees and their Applications.

Binary Search Tree: Insertion in to a Binary Search Tree–Deleting from a Binary Search Tree– Efficiency of Binary Search Tree operation

### Unit III

Sorting: General Background-Exchange sorts-Selection and Tree Sorting-Insertion sorts-Merge and Radix Sort

Searching: Basic Search Techniques- Tree Searching-General Search Trees:B Trees and B<sup>+</sup> Trees.

### Unit IV

Hashing: Open Addressing-deleting items-Binary Tree hashing-Dynamic Hashing and Extendible Hashing-Choosing a hash function

Graphs: Graphs-Linked Representation of Graphs-Graph Traversals: BFS and DFS.

### Text Books:

- 1.Data Structures Using C and C++ Yedidyah Langsam, Moshe J.Augenstein and Aaron M. Tanenbaum, Prentice Hall of India (2ndEdition)
2. Data Structures, Algorithms and Applications with C++, SahaniMc-GrawHill.
3. File Structures – An Object Oriented Approach with C++ by Michael J. Folk, Bill Zoellick and Greg Riccardi,, Pearson

## MCA 1.3 Discrete Mathematical Structures

**Instruction: 4 Periods/week**  
**Internal: 25 Marks,**

**Time: 3 Hours**  
**External: 75 Marks**

**Credits: 4**  
**Total: 100 Marks**

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### Unit I

**Introduction:** Logic-Propositional 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 1.4 Computer Organization

**Instruction:4 Periods/week**  
**Internal:25 Marks**

**Time: 3 Hours**  
**External: 75 Marks**

**Credits:4**  
**Total: 100 Marks**

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### UNIT-1

#### **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-2

#### **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-3

#### **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-4

#### **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 3<sup>rd</sup> Edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elseveir)

## MCA 1.5 Management Accountancy

**Instruction:4 Periods/week**  
**Internal:25 Marks**

**Time: 3 Hours**  
**External: 75 Marks**

**Credits:4**  
**Total: 100 Marks**

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### 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:

- 1.Introduction to Accountancy.T.S. Grewal.
- 2.Management Accountancy, S.P.Jain.

### ReferenceBook:

Introduction To Accounting,G.Agarwal.

## **MCA1.6 Data Structures and Programming Lab**

**Instruction:3 Periods/week**  
**Internal:50 Marks**

**Time: 3 Hours**  
**External: 50 Marks**

**Credits:2**  
**Total: 100 Marks**

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### **Cycle-I :**

Write programs in C to implement the following concepts / solve the problems.

1. Type Conversion
2. Operator Precedence and Associativity
3. Basic and Formatted Input Output
4. Control Structures
5. Counter and Sentinel Controlled Repetition
6. Break and Continue Statements
7. Functions: Call by Value and Reference
8. Storage Classes
9. C Library Functions
10. Array Operations
11. Array of Strings and Pointers
12. Structures and Unions
13. Sequential and Random Access Files
14. Dynamic Memory Allocation
15. Any other concepts

### **Cycle-II**

1. Implementation of ADT Linked list.
2. Implementation of Stack using arrays and Linked Lists
3. Implementation of Queue using arrays and Linked Lists
4. Write Programs to implement Conversion of prefix expression into post-fix form using stacks.
5. Implementation of Binary tree and its Traversals  
a)Preorder b)In order c)Post order.
6. Write a C Programming to implement the Sorting techniques
7. Write a C Programming to implement the Searching techniques
8. Write C Programs to implement B Trees and B+ Trees
9. Implement BFS and DFS in Graphs
10. Write Program to implement hashing techniques.



## MCA 1.7 Computer Organization Lab

**Instruction:3 Periods/week**  
**Internal:50 Marks,**

**Time: 3 Hours**  
**External: 50 Marks**

**Credits:3**  
**Total: 100 Marks**

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### **CYCLE-I:**Digital Logic Design Experiments

1. TTL Characteristics and TTL IC Gates
2. Multiplexers&Decoders
3. Flip-Flops
4. Counters
5. Shift Registers
6. Binary Adders & Subtractors
7. ALU

Text Book1 : Computer System Architecture, M.Morris Mano, Preintice Hall of India Pvt.Ltd. Third Edition.

### **CYCLE-II:**8085Assembly Language Programming:

1. 8085Assembly Language Programming according to theory course microprocessors using the following trainers:  
Keyboard Monitor of 8085 $\mu$ P Trainer.  
Serial Monitor of 8085  $\mu$ P Trainer with Terminal  
8085 Line Assembler of 8085 $\mu$ P Trainer with PC as Terminal  
8085Cross Assembler using In-Circuit Emulator(ICE)with 8085 $\mu$ P Trainer and PC as Terminal  
Graded Problems are to be used according to the syllabus
2. Pentium class pc architecture familiarization hardware & software parts demonstration.

Text Book2 : Fundamentals of Micro Processor and Micro Controllers by B.RAM B.Ram