



SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

Scheme of Examination

First Semester-Master of Computer Application

S.No	Subject Code	Subject Name	Periods per week			Credits	Maximum Marks (Theory Slot)			Maximum Marks (Practical Slot)		Total Marks
			L	T	P		End Sem. Exam	Tests (Two)	Assignments/Quiz	End Sem. Practical/Viva	Practical Record/Assignment/Quiz/Presentation	
1	MCA 101	Mathematical Foundation of Comp. Science	3	1	-	4	70	20	10	-	-	100
2	MCA 102	Prog. and problem solving in C	3	1	-	4	70	20	10	-	-	100
3	MCA 103	Data Structure Using C	3	1	-	4	70	20	10	-	-	100
4	MCA 104	Digital Electronics Design	3	1	-	4	70	20	10	-	-	100
5	MCA 105	Communication Skills	3	1	-	4	70	20	10	-	-	100
6	MCA 106	Programming Lab In C	-	-	8	8	-	-	-	120	80	200
7	MCA 107	Data Structure Prog. Lab	-	-	2	2	-	-	-	30	20	50
		Total	15	5	10	30	350	100	50	150	100	750

L: Lecture - T: Tutorial - P: Practical



SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MCA-101 Mathematical Foundation of Computer Science

Unit-I

Sets, Relations and Functions

Sets, Subsets, Power Sets, Complement, Union and Intersection, De Morgan's Law, Cartesian Products
Relations, relational matrices, Properties of Relations, Equivalence relation, Functions, Injection, Surjection
And Bijective mapping composition of functions and Mathematical Induction

Unit-II

Lattices & Boolean Algebra

Lattices: Introduction, Partial ordered sets, combination of partial ordered sets, Hasse diagram, Introduction of Lattices, properties of lattices-Bounded, Complemented, Modular and complete lattice

Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra, Boolean functions simplification of Boolean functions and Boolean Algebra

Unit-III

Propositional & Predicate logic

Propositions, Truth tables Tautology, Contradiction, Algebra of propositions Theory of Inference and natural deduction, Theory of predicates, first order predicate, predicate formulas Quantifiers, inference theory of predicate logic

Unit-IV

Trees & Graphs:

Finite graphs, incidence and degree, isomorphism, sub graphs and union of graphs, connectedness, walk, paths and circuits Eulerian graphs, tree properties of trees, pendant vertices in tree Centre of tree, spanning trees and cut vertices, binary tree, matrix representation of graph, incidence and Adjacency matrix and their properties, applications of graph in computer science

Unit-V

Discrete Numeric function and Recurrence Relation

Introduction to discrete numeric functions and generating functions introduction to recurrence relations and Recursive algorithms, linear recurrence relations with constant coefficients, homogeneous solutions, particular Solutions and total solutions

Books

- 1 J.P. Trembley & R.P. Manohar "Discrete Mathematical Structure with applications to computer Science"
- 2 Kenneth H Rosen-203 "Discrete Math & Its Applications" 5^{ed}
- 3 Bernard Kolman & Robert C. Busby "Discrete Mathematical Structure for computer Science"



SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MCA-102 Programming & Problem Solving in C

UNIT-I

An overview: Problem identification, analysis, design, coding, testing & debugging, implementation, modification & maintenance; algorithms & flowcharts; Characteristics of a good program - accuracy, simplicity, robustness, portability, minimum resource & time requirement, modularization; Rules/conventions of coding, documentation, naming variables; Top down design; Bottom-up design.

UNIT-II

Fundamentals of C Programming: History of C; Structure of a C Program; Data types; Constant & Variable, naming variables; Operators & expressions; Control Constructs – if-else, for, while, do-while; Case switch statement; Arrays; Formatted & unformatted I/O; Type modifiers & storage classes; Ternary Operator; Type conversion & type casting; Priority & associativity of operators.

UNIT-III

Modular Programming: Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variable, static variable; Calling a function; Recursion – basics, comparison with iteration, types of recursion- direct, indirect, tree and tail recursion, when to avoid recursion, examples.

UNIT-IV

Advanced Programming Techniques: Special constructs – Break, continue, exit(), goto & labels; Pointers - & and * operators, pointer expression, pointer arithmetic, dynamic memory management functions like malloc(), calloc(), free(); String; Pointer v/s array; Pointer to pointer; Array of pointer & its limitation; Function returning pointers; Pointer to function, Function as parameter; Structure – basic, declaration, membership operator, pointer to structure, referential operator, self referential structures, structure within structure, array in structure, array of structures; Union – basic, declaration; Enumerated data type; Typedef; command line arguments.

UNIT-V

Miscellaneous Features: File handling and related functions; printf & scanf family; C preprocessor – basics, #Include, #define, #undef, conditional compilation directive like #if, #else, #elif, #endif, #ifdef and #ifndef; Variable argument list functions.

BOOKS:

1. Kanetkar Y. “Let us C”, BPB.
2. Kanetkar Y.: “Pointers in C” , BPB



SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MCA-103 Data Structure using C

UNIT-I

Stack and Queue: contiguous implementations of stack, various operations on stack, various polish Notations-infix, prefix, postfix, conversion from one to another-using stack; evaluation of post and prefix Expressions. Contiguous implementation of queue: Linear queue, its drawback; circular queue; various Operations on queue; linked implementation of stack and queue- operations

UNIT-II

General List: list and it's contiguous implementation, it's drawback; singly linked list-operations on it; doubly linked list-operations on it; circular linked list; linked list using arrays.

UNIT-III

Trees: definitions-height, depth, order, degree, parent and child relationship etc;
Binary Trees- various theorems, complete binary tree, almost complete binary tree;
Tree traversals-preorder, in order and post order traversals, their recursive and non recursive Implementations; expression tree- evaluation; linked representation of binary tree-operations. Threaded binary trees; forests, conversion of forest into tree. Heap-definition.

UNIT-IV

Searching, Hashing and Sorting: requirements of a search algorithm; sequential search, binary search, Indexed sequential search, interpolation search; hashing-basics, methods, collision, resolution of collision, Chaining; Internal sorting- Bubble sort, selection sort, insertion sort, quick sort, merge sort on linked and Contiguous list, shell sort, heap sort, tree sort.

UNIT-V

Graphs: related definitions: graph representations- adjacency matrix, adjacency lists, adjacency multilist; traversal schemes- depth first search, breadth first search; Minimum spanning tree; shortest path algorithm; kruskals & dijkstras algorithm.
Miscellaneous features Basic idea of AVL tree- definition, insertion & deletion operations; basic idea of B-tree- definition, order, degree, insertion & deletion operations;
B+-Tree- definitions, comparison with B-tree; basic idea of string processing.

BOOKS

1. Trembly "Introduction to Data Structure with Applications".
2. Tennenbaum A.M. & others: Data Structures using C & C++; PHI
3. Horowitz & Sawhaney: Fundamentals of Data Structures, Galgotia Publishers.
4. Yashwant Kanetkar, Understanding Pointers in C, BPB.



SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MCA-104 Digital Electronics Design

Unit-I

Data representation Data types and Number systems, Binary Number System, Octal and Hexadecimal Number system, Fixed point Representation, 1's & 2's complement, Binary Fixed point Representation, Arithmetic operation on Binary Numbers, Overflow and Under flow, Floating point representation, Codes, ASCII, EBCDIC codes, Gray Code, Excess-3 & BCD, Error detection & correction codes

Unit-II

Boolean algebra and digital logic circuits- Logic gates, AND, OR, NOT Gates and their truth tables, NOR, NAND & XOR Gates, Boolean Algebra, Basic Definition and properties, Basic Boolean Law's, Demorgan's Law, Minimization Techniques Map-Two, Three and more variables maps, SOP & POS, Don't care conditions

Unit-III

Combination Circuits-Half adder, Full adder, Full subtractor and decimal adder, Multi level NAND and NOR Circuits, decoders, Multiplexers and Demultiplexers

Unit-IV

Sequential logic-Flip-Flops-RS,D,JK & T Flip-Flop, Triggering in Flip flops, flip flop excitation tables, Design

Procedure and design of counters

Unit-V

Memory organization: Secondary memory, Primary memory: RAM, ROM basic cell of static and dynamic RAM, concept of segmentation and paging, Associative memory, cache memory organization, virtual memory organization

Books

- 1 Digital Logice and Computer Design By Morris Mano
- 2 Computer System Architecture By Morris Mano
- 3 Digital computer Electronics By Malvino



SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL (M.P.)

MCA-105 Communication Skills

Unit-I

Communication: Meaning and process of communication, importance of effective communication, communication situation, barriers to communication objectives of communication, types of communication, principles Of communication essentials of effective communication

Unit-II

Media of communication: Written, oral, face to face, visual, audio-visual, merits and demerits of written and oral communication

Unit-III

Communication Skills: Developing Communication Skills, Listening, Speaking, Reading-writing (Oral & Written)
Body language, Utility of aids in communication.

Unit-IV

Spoken Skills: Preparing for oral presentation, conducting presentation, Debates, Seminar, speeches, Lectures
Interviews, Telephonic Conversation, Group Discussions

Unit-V

Written Skills: Preparing of Bio-Data, seminar, paper, bibliography and official correspondence, Mechanics Of writing Formal and Informal writings, letters, paragraphing, precise, report writing, technical reports, length Of written reports, organizing reports, writing technical reports, creative writing, common errors in Language

Books

- 1 Rajendra Pal and J.S. Korlahalli "Essentials of Business communication", Sultan chand and sons publishers, New Delhi.
- 2 U.S. Rai and S.M. Rai "Business Communication" Himalaya publishing House
- 3 Menzal and D.H. Jones "writing a technical paper" Mc Graw Hill 1961