

GUJARAT TECHNOLOGICAL UNIVERSITY

MASTERS IN COMPUTER APPLICATION (Integrated MCA)

Year – I (Semester – II) (W.E.F. JAN 2014)

Subject Name: Fundamentals of Programming – 2

Subject Code: (4420602)

Learning Objectives:

- To be able to understand and use pointers in C programs.
- To be able to create user defined data types in C
- To be able to write C application which can do input/output on files.
- To be able to write programs for various data structures like stack, queue, tree, graphs, etc.

Prerequisites: Basic knowledge of C programming

Course Contents:

Sr. No.	Course Content	No. of Sessions
1	Pointers Understanding the Computer's Memory, Introduction to Pointers, Declaring Pointer Variables, Pointer Expressions and Pointer Arithmetic, Null Pointers, Generic Pointers, Passing Arguments to Function Using Pointers, Pointers and Arrays, Passing an Array to a Function, Difference Between Array Name and Pointer, Pointers and Strings, Array of Pointers, Pointers and 2-D Arrays, Pointers and 3-D array, Function Pointers, Array of Function Pointers, Pointers to Pointers, Memory Allocation in C Programs, Memory Usage, Dynamic Memory Allocation, Drawback of Pointers	(10 Lect.)
2	Structure, Union and Enumerated Data Types Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Union, Arrays of Union Variables, Unions Inside Structures, Enumerated Data Types	(8 Lect.)
3	Files Introduction to Files, Using Files in C, Read Data from Files, Writing Data to Files, Detecting the End-of-File, Error Handling During File Operations, Accepting Command Line Arguments, Functions for Selecting a Record Randomly, remove(), Renaming the File, Creating a Temporary File	(8 Lect.)
4	Preprocessor Directives Introduction, Types of Preprocessor Directives, #define, #include, #undef, #line, Pragma Directives, Conditional Directives, #error Directive, Predefined Macro Names	(3 Lect.)
5	Linked Lists Introduction, Linked Lists Versus Arrays, Memory Allocation and Deallocation for a Linked List, Different Types of Linked Lists,	(6 Lect.)

	Singly Linked List, Circular Linked List, Doubly Linked List, Circular Doubly Linked List, Header Linked List	
6	Stacks and Queues Stacks, Array Representation of Stacks, Operations on a Stack, Infix, Postfix, and Prefix Notations, Evaluation of an Infix Expression, Convert Infix Expression to Prefix Expression, Applications of Stack, Queues, Operations on a Queue	(5 Lect.)
7	Trees Binary Trees, Expression Trees, Traversing a Binary Tree	(4 Lect.)
8	Graphs Introduction, Representation of Graphs, Graph Traversal Algorithms, Applications of Graphs	(4 Lect.)

Main Reference Book(s):

- 1) Reema Thareja. "Programming in C", Oxford University Press.

Suggested Additional Reading:

- 1) R G Dromey. "How to solve it by Computer", Pearson Education.
- 2) Donald Knuth. "The art of computer programming Vol-1", Pearson Education

Chapter wise Coverage from Main Reference Book(s):

Book #1 ->	Chapter 7
Book #1 ->	Chapter 8
Book #1 ->	Chapter 9
Book #1 ->	Chapter 10
Book #1 ->	Chapter 11
Book #1 ->	Chapter 12
Book #1 ->	Chapter 13
Book #1 ->	Chapter 14

PS: Practical work is to be performed as per exercises given in the main reference book.