

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT**COURSE CURRICULUM****Course Title: Advanced Computer Programming
(Code: 3320702)**

Diploma Programmes in which this course is offered	Semester in which offered
Computer Engineering, Information Technology,	Second Semester

1. RATIONALE

The students of this course are able to perform system programming, application programming, modular software development and interfacing various devices.

2. LIST OF COMPETENCIES

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies

- Specify the elements of one, two and three or multi dimensional array and Implement different operations using array of various data types
- Perform modular and memory efficient programming using functions and pointers
- Able to handle basic and derived data from secondary storage devices

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
3	0	4	7	70	30	40	60	

Legends: L-Lecture; T ó Tutorial/Teacher Guided Student Activity; P - Practical; C ó Credit;; ESE - End Semester Examination; PA - Progressive Assessment.

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit – I Data Structure : Array	1a. Write, test and execute programs which use read, write and manipulate single dimensional and multidimensional arrays.	1.1 One-Dimensional Array and its Operations i. Insertion ii. Searching iii. Merging iv. Sorting v. Deletion 1.2 Two-Dimensional Array and its Operations i. Insertion ii. Deletion 1.3 Three or Multi-Dimensional Arrays 1.4 scanf() and printf() Functions 1.5 Drawbacks of Linear Arrays
Unit– II Strings and Standard Functions	2a. Write, test and execute programs which manipulate strings by using various string Functions	2.1 Introduction of String 2.2 Declaration and Initialization of String 2.3 Displaying Strings with Different Formats 2.4 Standard String Functions i. strlen() ii. strcpy() iii. strcmp() iv. strlwr() v.strupr() vi. strchr() vii. strcat()
Unit– III Pointers	3a. Write, test and execute programs to perform memory access using Pointers	3.1 Introduction and Features of Pointers 3.2 Declaration of Pointer 3.3 Void Pointers 3.4 Array of Pointers 3.5 Pointers to Pointers
Unit– IV Functions	4a. Write, test and execute modular programs through Functions	4.1 Basics of a Function 4.2 Why use Functions? 4.3 How a Function Works? 4.4 Declaring, Defining and calling Function 4.5 The return Statement 4.6 Call by Value and Reference 4.7 Function as an Argument 4.8 Recursion 4.9 Advantages and Disadvantages of Recursion
Unit– V Preprocessor Directives	5a. List various header files 5b. Define constant and	5.1 Introduction 5.2 #define and #undef Directives 5.3 #include, #line Directive

Unit	Major Learning Outcomes	Topics and Sub-topics
	Macro also implement and test it	5.4 Predefined macros in ANSI C 5.5 Standard I/O Predefined Streams in stdio.h 5.6 Predefined macros in ctype.h
Unit– VI Structure and Union	6a.Implement and test various data formats under a single structure 6b.Effective memory utilization using Union	6.1 Introduction and Features of Structures 6.2 Declaration and Initialization of Structures 6.3 Array of Structures 6.4 Pointers to Structure 6.5 typedef 6.6 Enumerated Data Type 6.7 Union 6.8 Union of Structures
Unit– VII Files	7a. Write, test and execute programs to read and write data from secondary storage devices	7.1 Introduction 7.2 File Operations i. Opening a File ii. Reading a File iii. Closing a File 7.3 Text Modes 7.4 Binary Modes 7.5 File Functions i. fprintf() ii. fscanf() iii. getc() iv. putc() v. fgetc() vi. fputc() vii. fseek() viii. feof() 7.6 Command Line Arguments

5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks (Duration –Hours)			
			R Level	U Level	A Level	Total
1.	Data Structure : Array	8	3	4	5	12
2.	Strings and Standard Functions	6	2	3	4	9
3.	Pointers	8	4	4	4	12
4.	Functions	8	3	4	5	12
5.	Preprocessor Directives	4	1	2	2	5
6.	Structure and Union	6	2	3	3	8
7.	Files	8	3	4	5	12
	Total	48	18	24	28	70

Legends:

R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

6. SUGGESTED LIST OF EXPERIMENTS

Write, test, debug and execute following programs to develop different types of skills leading to the achievement of various competencies.

S. No.	Unit No.	Experiment	Hrs.
1	1	Minimum 5 programs explaining the array operations like insertion, searching, merging, sorting and deletion.	5
2	1	Minimum 5 programs using Two Dimensional and Multi-Dimensional arrays.	6
3	2	Programs using strlen(), strcpy, strcmp(), strlen() functions.	4
4	2	Programs usingstrupr(), strchr(), strcat() functions.	4
5	3	Basic programs explaining the use of Pointers.	5
6	3	Programs using array of Pointers and pointers of pointers.	6
7	4	Programs explaining the basic use of functions and passing function arguments.	7
8	4	Programs using recursive functions.	4
9	5	Programs explaining various features of Structures	8
10	5	Programs using Union and Union of structures	3
11	6	Basic programs explaining basic read/write file operations.	6
12	6	Programs explaining use of fprintf(), fscanf(), getc(), putc(), fgetc(), fputc(), fseek(), feof() functions.	8

7. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the list of proposed student activities:

Prepare seminar on various topics like String functions, Pointers, Arrays, File Functions, Structures etc., and develop a program with real life application example of particular topic.

8. SUGGESTED LEARNING RESOURCES**A. List of Books**

S.No.	Author	Title of Books	Publication
1	Kamthane,A.N.	Programming in C	Pearson,2012
2	Balaguruswami,E.	Programming in ANSI C	TMH,2012
3	Kanetkar, Yashavant	Let us 'C'	BPB publications,2010

B. List of Major Equipment/ Instrument

Computer System with latest configuration and memory

C. List of Software/Learning Websites

<http://www.learnonline.com/>

<http://www.c-faq.com>

<http://www.cprogramming.com>

<http://aelinik.free.fr/c/>

9. COURSE CURRICULUM DEVELOPMENT COMMITTEE

1. Dr. P.P.Kotak Head Computer Engg. Dept. í í ..AVPTI, Rajkot
2. K. N. Raval Head Computer Engg. Dept. í í RCTI , Ahmedabad
3. R. M Shaikh Head Computer Engg. Dept. í í KD Polytechnic, Patan.
4. S. D. Shah Lect. Computer Engg. Dept. í í RCTI, Ahmedabad