

# GUJARAT TECHNOLOGICAL UNIVERSITY

**COMPUTER PROGRAMMING AND UTILIZATION (Modified on 4<sup>th</sup> Feb 2014)**

**SUBJECT CODE: 2110003**

**B.E. 1<sup>st</sup> YEAR**

**Type of course:** Basic

**Prerequisite:** N.A.

**Rationale:** N.A.

### Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
3	1	2	6	70	30*	30#	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

### Content:

Sr No	Topic	Teaching Hrs.	Module Weightage
1	Introduction to computer and programming: Introduction ,Basic block diagram and functions of various components of computer,Concepts of Hardware and software,Types of softwares,Compiler and interpreter, Concepts of Machine level, Assembly level and high level programming ,Flow charts and Algorithms.	05	10%
2	Fundamentals of 'C' Features of C language, structure of C Program, comments, header files,data types, constants and variables, operators, expressions, evaluation of expressions, type conversion, precedence and associativity, I/O functions	05	15%
3	Control structure in 'c' Simple statements, Decision making statements, Looping statements, Nesting of control structures, break and continue , goto statement	06	15%
4	Array & String Concepts of array , one and two dimensional arrays,declaration and initialization of arrays ,string , string storage , Built-in-string functions	05	15%
5	Functions Concepts of user defined functions, prototypes, definition of function , parameters, parameter passing , calling a function, recursive function ,Macros , Pre-processing	05	15%
6	Pointers Basics of pointers, pointer to pointer , pointer and array , pointer	03	10%

	to array, array of pointers , functions returning a pointer		
7	Structure Basics of structure , structure members, accessing structure members ,nested structures , array of structures, structure and functions, structures and pointers	02	10%
8	Dynamic memory allocation Introduction to Dynamic memory allocation, malloc, Calloc,	02	5%
9	File management Introduction to file management and its functions	03	5%

### Reference Books:

1. Programming in ANSI C by Balaguruswamy
2. C Programming: Test Your Skills, 1/e by Ashok Kamthane
3. Programming With Ansi And Turbo C book : Ashok Kamthane ...
4. Programming in C Ansi standard, by Yashwant Kanetkar
5. Programming with C, Gottfried, McGraw-Hill.

### Course Outcome:

At the end of this subject, students should be able to:

1. Apply fundamental principles of problem solving in software engineering.
2. Apply basic programming principles using C language.
3. Apply basic C program structure in software development
4. Prepare graduates for professional careers in roles including, but not limited to, the following: computer programmer, software engineer, software systems designer, software applications developer, technical software project lead, computer systems analyst, computer systems programmer, software applications tester and maintainer.
5. To prepare graduates with the knowledge and skills to do advanced studies and research in computer science and related engineering and scientific disciplines
6. To equip graduates with the communication skills, both oral and written, to become an effective team-oriented problem solver as well as an effective communicator with non-technical stakeholders in computer and software systems development, maintenance and administration.

### List of Experiments:

#### PRACTICAL-SET—1

- a. Write a program to print “HELLO FRIENDS”.
- b. Write a program that reads two nos. from key board and gives their addition, subtraction, multiplication, division and modulo.
- c. Write a program to convert days into months and days.
- d. Write a program to solve Quadratic Equation.
- e. Write a program to select & print the largest of the three nos. using Nested-If-Else statement.

#### PRACTICAL-SET—2

1. Write a program to display multiplication table.

2. Write a program to print  $1+1/2+1/3+1/4+\dots+1/N$  series.
3. Write a program to find sum of all integers greater than 100 & less than 200 and are divisible by 5.
4. The distance between two cities (In KM) is input through key board. Write a program to convert and print this distance in meters, feet, inches & centimeters.
5. Write a program to find sum of first N odd numbers.  
Ex.  $1+3+5+7+\dots+N$ .

### PRACTICAL-SET-3

1. Write a program for use of putchar( ) and getchar( ) function.
2. Program to print Patterns.

```

*
* *
* * *
* * * *

```

3. 

```

1 2 3 4 5
  2 3 4 5
    3 4 5
      4 5
        5

```

4. 

```

AAAAA
BBBBB
CCCCC
DDDDD
EEEEEE

```

5. 

```

1
0 1
1 0 1
0 1 0 1

```

### PRACTICAL-SET-4

1. Write a program to print Fibonacci series. 1,1,2,3,5,.....N
2. Write a program to reverse the digit.
3. Add, subtract and multiply two nos. using switch statement.
4. Write a program to add two matrixes.
5. Write a program to given no in ascending order.
6. W.A.P to read array of integers and print it in reverse order

### PRACTICAL-SET-5

1. Write a program to count total words in text.
2. Find length of string using strlen( ) function,
3. Write a program to copy one string to another string.
4. Write a program to join two strings.
5. Write a program convert character into TOgGLe character.
6. Find given string is palingrom or not using string library function.

## PRACTICAL-SET-6

1. Write a function program to add first N numbers.
2. Write a function find out maximum out of three numbers.
3. Write a function power that computes x raised to the power y for integer x and y and returns double type value.
4. Write a program to find factorial of a number using recursion.
5. Write a program that used user defined function Swap ( ) and interchange the value of two variable.
6. Write a function prime that return 1 if it's argument is prime and return 0 otherwise.
7. Write a calculator program(add,subtract,multiply,divide). Prepare user defined function for each functionality.

## PRACTICAL-SET-7

1. Define a structure type, personal, that would contain person name, date of joining and salary. Using this structure, write a program to read this information for one person from the key board and print the same on the screen.
2. Define a structure called cricket that will describe the following information:
  - a. Player name
  - b. Team name
  - c. Batting average
3. Write a function to enter rollno, marks of the three subject for 3 student and find total obtained by each student

## PRACTICAL-SET-8

- f. Write a program using pointer and function to determine the length of string.
- g. Write a program using pointer to compare two strings.
- h. Write a program using pointer to concate two strings.
- i. Write a program using pointer to copy one string to another string.
- j. Write a program using pointer to read an array if integer and print element in reverse order.

## PRACTICAL-SET-9

1. Write a program that uses a table of integers whose size will be specified interactively at run time.
2. Write a program to store a character string in block of memory space created by malloc and then modify the same to store a large string.

## PRACTICAL-SET-10

1. A program to illustrate reading files contents.
2. A program to illustrate the use of fgets( ).
3. A program to illustrate the use of fputc ( ) and fputs( ).

Open Ended Problems: Apart from above experiments a group of students has to undertake open ended problem/design problem. Few examples of the same are given below.

Part-I Computer Programming & Utilization Basic Programming Fundamental Developments

- A. Design Basic Algorithm and Flow Chart Diagrams for Various Computer based Calculation Operations and show the Elementary Operational Blocks in Pseudo terms and Visual Blocks
- B. Develop Small CPU subject's Practical Instruction Manual for Each Chapter which can be helpful for Laboratory for at least 5 Experiments
- C. Develop the Basic Debugging plan using any of IDE you have learnt during CPU practical's and Open-ended Experiments You are going to perform in Part-II

Part-II Open Ended Programming Problems ( For each Programming Problem Student has to define his Minor Project Definition in details.

- i. Develop module you should be able to manipulate character strings in C programs which should have all String Operations usually available in standard "strings.h". student has to develop all string manipulation operation library in his "myown-strings.h" file. And all string manipulation operations are in mode of subroutine form such as combine-strings, merge-strings, search-string like etc.
- ii. Develop simple character-based Chess-game supporting standard partial chess moves. Chess board should be 8x8 Cell Board having each Cell of 4 characters. Basic chess board with empty shell should have W... Cell and B... For Black Cell. Wherever any players Game elements such as Rook or Camel or King or Queen is on board Cell then it. Then it should be displayed such as BQN2 or WQN1 which indicated such as Queen of player-2 on black cell or queen of player-1 on white cell. Or Student can use his own conventions. Student should be able to demonstrate 5 moves for each player minimum.
- iii. Develop simple Pointer simulation minor C programming explaining the pointer explanation in C such as while declaring pointer how memory look in simple memory table showing and while allocating memory by pointing pointer pointing to any basic primitive data type variable.
- iv. Develop C program for simulating the demonstration of Explaining the differences between analog and digital systems and show examples of each type of system
- v. Generate one SUDOKU game for 8 \* 8 squares.
  - a. Conditions: a number in a one square should not be repeated in its vertical line, horizontal line and diagonal line.
  - b. When all the squares are fill-up by numbers and there is no repeating number as describe above the SUDOKU is done.
- vi. Develop a small editor which has utilities for alignment of content. User can select left alignment, right alignment or central alignment.
  - a. Condition: while trying to align the content in a page, a word should not be broken into two lines.
  - b. While selecting the above given options, content of a page should
- vii. Develop small simulated C Programming demonstrating the basic Binary math fundamentals using fundamental union and structure basics and show binary operations such as binary addition, binary multiplications

\*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Computer Programming and Utilization is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty,

Department and College on the first slide. The best three works should be sent to [achievements@gtu.edu.in](mailto:achievements@gtu.edu.in).

# **ESE Pr (V)**:10 marks for Open Ended Problems, 20 marks for VIVA.

**Note: Passing marks for PA (M) will be 12 out of 30.**

**Passing marks for ESE Pract(V) will be 15 out of 30.**