Kadi Sarva Vishwavidyalaya, Gandhinagar

MASTERS OF COMPUTER APPLICATION (MCA)
Semester – I (First Year)
Subject: MCA-101 – Programming for Logic Building (LDPL)

SUB Total CREDIT	Teaching scheme		Examination scheme				Total Marks
	(per week)		MID	CEC	External		
	Th.	Pr.	Th.	Th.	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Description:
This course introduces computer programming and problem solving in a structured program logic environment. It introduces the basic flow and construction of algorithm for given problem. Course includes language syntax, data types, program organization, problem-solving methods, algorithm design, and logic control structures.

Objectives:
1. Upon successful completion of this course, the students will be able to create flowcharts and pseudocodes to illustrate program algorithm or process and apply top-down concepts in algorithm design.
2. Student will able to: Describe the major components in problem solving for a computer program, concept of data storage and named memory locations, Apply decision and repetition structures in program design, Write and incorporate methods and functions to demonstrate program competence.
3. Students will also be able to implement input and output to access and process files.

Prerequisites: None

Course Contents:

UNIT – I: Introduction to Programming and Basics of C [20%]
Introduction to programs, Types of Programming Languages, Introduction to compiler, interpreter, loader and linker, Algorithms : different ways of stating algorithms, An overview of C – variables, Data types, Token, Operators and Expressions, Type conversion, formatted and non-formatted Input/Output

UNIT – II: Control statements, Arrays and strings [20%]
Selection statements, Conditional operator, Switch statement, Looping statements: while, for and do-while, goto statement, Special control statements: break and continue, Nested loops, Arrays-One Dimensional Array, Strings: String Handling Functions, Multidimensional arrays, Arrays of strings

UNIT – III: User-Defined Functions and User Defined Data types   **[20%]**

Concept of Function, Using Functions: Function prototype, Function Definition and Function Calling, Passing arrays to functions, Storage classes, Recursion, Structures: Declaring Structures, Initialization, Copying and Comparing Structures, Arrays of Structure, Arrays within Structures, Nesting of Structures, Structures and functions, Union , Enumeration Types, Bit fields

UNIT – IV: Pointers   **[20%]**

Pointers-Fundamentals, Arrays and Pointers, Pointers and Strings, Pointer Arithmetic, Pointers to Pointers, Array of Pointers, Pointers to Functions, Pointer and Structures ,Dynamic memory allocation

UNIT – V: File Management in C and Preprocessor   **[20%]**

Introduction to File, Defining and Opening File, Closing a File, Working with Text and Binary Files, Direct File Input and Output, Random Access to Files, Bitwise operators, Command Line Arguments, C Preprocessor

Text Book(s):

1. Programming in C By Pradip Dey, Manas Ghosh, Second Edition, Oxford Publication

Other Reference Books:

1. Programming in Ansi C by E Balagurusamy, TMH
2. Let Us C by Yashavant Kanetkar, BPB Publication.
3. The C Programming Language ANSI C Version by Brian W. Kerninghan & Dennis M. Ritchie
4. Programming with C by Byron Gottfried, Schaums Outline,Tata McGraw Hill

Practical List:

1. Draw Flow Charts for following problem statements :

    a. Draw a flowchart which will accept two numbers from user and will display values of variables after swapping them with each other.

    b. Draw a flowchart to find out simple interest and compound interest.

    c. Draw a flowchart to read a 3-digit integer and print its reverse number.

    d. Draw a flowchart to read a number in seconds and display that in the form Hour: Min: Seconds.

    e. A cashier has currency notes of denominations 10, 50 and 100. Draw a flowchart to read the amount in hundreds and find the total no. of currency notes of each denomination the cashier will have to give to customer.

2. Write any five programs based on mathematical formulas. (for example, area of the triangle)

3. Write a Program to rotate the values of x, y and z such that x has the value of y, y has the value of z and z has the value of x.

4. Write a Program that reads a floating-point number and then displays the right-most digit of the integral part of the number.

5. Write a Program to check whether the entered number is odd or even.
    a. without using else option
    b. with using else option.
6. Write a Program to read three values using scanf and print the following results:
    a. Sum of the values
    b. Average of the three values
    c. Largest of the three values
7. Write a program to read three values from the user and print the smallest value without using if statement. (Hint: Use conditional operator)
8. An electric power distribution company charges its consumers as follows:

Consumption Units	Rate of Charge
For First 50 Units	Rs. 2.30
Next 50 Units	Rs. 2.60
Next 150 Units	Rs. 3.25
More than 250 Units	Rs. 4.35

Write a Program to take number of units consumed from user and calculate the bill amount.
9. Write a program to convert a decimal number into any base.
10. Write a Program to accept numbers from the user till their sum exceeds 50.
11. Write a program to print Pascal triangle.
12. A company insures its drivers in the following cases:
    a. If the driver is married.
    b. If the driver is unmarried, male and above 30 years of age.
    c. If the driver is unmarried, female and above 25 years of age.
    Write a Program which takes age, sex and marital status and check whether that person will be insured or not. (Use logical operators)
13. Write a program to find the number of and sum of all integers greater than 100 and less than 200 that are divisible by 7.

14. Write program to accept 4-digit number from keyboard, and display it on screen in words.

    (i.e. 4238 => Four Two Three Eight) (Use switch statement)

15. Write a program to find the sum of all elements of one-dimensional array.
16. Write a program for multiplication of two matrices.

17. The annual examination results of 10 students are tabulated as follows:

Roll No.	Subject1	Subject2	Subject3

Write a program to read the data and determine the following:

    a. Total marks obtained by each student

    b. The highest marks in each subject and the roll no. of the student who secured it

    c. The student who obtained the highest total marks.

18. Write a program to extract a portion of a character string and print the extracted string. Assume that m characters are extracted, starting with the nth character.

19. Write a program to replace a particular word by another word in a given string.

20. Write a function palindrome that returns 1 if its argument is palindrome and returns 0 otherwise.
21. Write a function to sort the elements of an array in descending order.
22. Write a program to develop your own functions for performing following operations on strings:

    a. To copy one string to another

    b. To concatenate two strings

    c. To compare two strings

23. Write a program that defines a structure that can describe a student. It should have members that include student id, name, mark1, mark2, total, percentage. Ask 10 students details from user and calculate total marks, percentage for each subject. Write a function that will display the detail of all students in descending order of their percentage in following format.
ID   Name   Mark1 Mark2 Mark3   Total Percentage

24. Define a structure that can describe a hotel. It should have members that include the name, address, grade, average room charge, and number or rooms. Write functions to perform the following operations:
    (i)   To print out hotels of a given grade in order of charges.
    (ii)   To print out hotels with room charges less than a given value.
25. Write a program using pointer to read an array of integers and print its elements in reverse order.
26. Write a function (using a pointer parameter) that finds the average of all the elements of a given array.
27. Using pointers, write a function that receives a character string and a character as argument and deletes all occurrences of this character in the string. The function should return the corrected string with no holes.
28. Write a program to copy contents of one file to another. Use command line argument to specify file names.
29. Write a program that opens an existing text file and copies it to a new text file with all lowercase letters changed to capital letters and all other characters unchanged.

30. Write a program to read integers from one file. Make two files named ODD and EVEN. ODD file will contain all odd integers from first file and EVEN file will contain all even integers from first file.