UNIVERSITY OF MADRAS

B.Sc. DEGREE PROGRAMME IN MATHEMATICS

SYLLABUS WITH EFFECT FROM 2023-2024

<table>
<tr><td>Title of the Course</td><td colspan="6">PROGRAMMING IN C THEORY AND PRACTICAL</td></tr>
<tr><td>Paper Number</td><td colspan="6">ELECTIVE COURSE VI</td></tr>
<tr><td>Category Elective</td><td>Year III
Semester V</td><td>Credits</td><td>3</td><td>Course Code</td><td colspan="2">334E5B</td></tr>
<tr><td>Instructional Hours per week</td><td>Lecture
3</td><td>Tutorial
--</td><td>Lab Practice
1</td><td colspan="3">Total
4</td></tr>
<tr><td>Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td>Objectives of the Course</td><td colspan="6">• About the basic concepts and structure of C Program
• To write simple programs with Mathematical Applications</td></tr>
<tr><td>Course Outline</td><td colspan="6">Unit I: Introduction: Importance of C – Programming Style Character Set – C Tokens – Keywords and Identifiers – Constants – Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants. Hours: 15</td></tr>
<tr><td></td><td colspan="6">Unit II: Operators and expressions – arithmetic, relational, logical, assignment, increment and decrement, bitwise, conditional, special operators – arithmetic expressions – evaluation of expressions – precedence of arithmetic expressions. Hours: 15</td></tr>
<tr><td></td><td colspan="6">Unit III: Managing Input and Output Operations – Reading a character – writing a character – formatted input – formatted output – decision making with if – simple if, if else, nesting of if else, else if, switch, goto, while do while, for statements – jumps in loops.
Hours: 15</td></tr>
<tr><td></td><td colspan="6">Unit IV: Arrays – One dimensional arrays – declaration of one dimension arrays – initialization of one dimensional arrays – two dimensional arrays – initializing two dimensional arrays – multi dimensional arrays – dynamic arrays Hours: 15</td></tr>
<tr><td></td><td colspan="6">Unit V: Structure definition – declaring structure variables – accessing structure members – structure initialization – pointer – expressions – pointer increment and scale factor – pointer and arrays – array of pointers – pointers as function arguments – function returning pointer – pointer to functions. Hours: 15</td></tr>
<tr><td>Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)</td><td colspan="6">Total Hours: 75

Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved

(To be discussed during the Tutorial hour)</td></tr>
<tr><td>Skills acquired from this course</td><td colspan="6">Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill</td></tr>
<tr><td>Recommended Text</td><td colspan="6">Programming in ANSI C, E. Balagurusamy, McGraw Hill Education India Pvt. Ltd.</td></tr>
</table>

Reference Books	1. "Programming with C, Byron Gottried, Schaum's outline Fourth Edition, Tata Mcraw Hill, 2018 2. C Programming Language, Darrel L. Graham, Createspace Independent Publishing Company, 2016 Yashvant Kanetkar, Let us C, 18th Edition, BPB Publications, 2021
Website and e-Learning Source	1. The C Book – a free online book on C Programming: https://publications.gbdirect.co.uk//c_book/ 2. C Programming Wikibook – a free online wikibook on C Programming: https://en.wikibooks.org/wiki/C_Programming 3. https://www.learn-c.org/ 4 . https://www.geeksforgeeks.org/c-programming-language/ 5.https://www.cprogramming.com/tutorials/c-tutorial.html

PROGRAMMING IN C PRACTICAL LIST SEMESTER V

1. Create a one dimensional array of characters and store a string inside it by reading from standard input.
2. Write a program to input 20 arbitrary numbers in one dimensional array, Calculate the frequency of each number. Print the number and its frequency in a tabular form.
3. Write a C function to remove duplicates from an ordered array
4. Write a program which will arrange the positive and negative numbers in one dimensional array in such a way that all negative numbers should come first and then all the positive numbers will come without changing the original sequence of numbers.
5. Write a program to perform the following operations on a 2D array a. Addition, b. Multiplication, c. Transpose
6. Write a program to find the GCD and LCM of two numbers
7. Implement a swap () function which exchanges the values of two integers. Call the function from the main to test the function with different values.
8. Write a program to remove duplicates from an ordered array
9. Write a function to generate the Fibonacci series using recursion.
10. Write a recursive function that adds first 'n' natural numbers.
11. Write a recursive function that finds factorial of a number.
12. Write a program to demonstrate the use of recursion in Tower of Hanoi Problem

Course Learning Outcome (for Mapping with POs and PSOs)
Students will be able to

CLO 1: Remember the program structure of C with its syntax and semantics

CLO 2: Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files

CLO 3: Apply the programming principles learnt in real-time problems

CLO 4: Analyze the various methods of solving a problem and choose the best method

CLO 5: Code, debug and test the programs with appropriate test cases.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO 1	3	3	1	3	1	--	3	1	1
CLO 2	3	3	1	3	1	--	3	1	1
CLO 3	3	3	1	3	1	--	3	1	1
CLO 4	3	3	1	3	1	--	3	1	1
CLO 5	3	3	1	3	1	--	3	1	1