Name of the Department/Centre: Computer Science

Discipline Centric Course

Course Type (Please tick the appropriate box):

Major	☐	Discipline Specific Core	√	Ability Enhancement	☐
Minor	☐	Multidisciplinary	☐	Skill Enhancement	☐
Value Added	☐	Any other	☐		

Course Title: Programming with C

Semester: I

Total Credits: 4   **Lecture-Tutorial-Practicals (LTP):** (3-0-2)

Maximum Marks: 100   **No of seats:** 50

Course Advisor Name: NA

Course Advisor's Email: computerscience@jmi.ac.in

Prerequisites: Nil

Special Requirements (if any): Nil

Expected Learning Outcomes:

- Understanding of problem-solving approach & program logic design using flowcharting
- Understanding the basic constructs of C language such as data types, expressions, Arrays, and user-defined functions.
- Understanding of pointers, data handling with pointers, string manipulation
- Understanding of derived data types with struct & union, creating and storing data using file handling functions

Course Syllabus (Unit wise):

1. **Problem-Solving aspect:** Algorithm Design (Top-down Design); Program Verification, Fundamental of Algorithms & Flowcharting–Exchanging the values of two variables, Counting, Summation of a Set of Numbers, Factorial Computation, Infinite series sum, Sine Function Computation, Generation of the Fibonacci Sequence, Reversing the Digits of an Integer, Base Conversion, etc. Basics of C: Character Set; Keywords; Identifier, Constants, and Variables; Constant Types–Numeric and Character Constants; Data Types and Range of Values–Character, Integer and Floating Point; Signed, Unsigned, Short, and Long Integers; Data Declaration and Definition, Various Operators & Expression–Arithmetic. Managing Console I/O – Reading and. Writing Characters, Integers, Floating Point Numbers and Strings; Formatted I/O.

2. **Control Structures & User-defined Functions:** Decision Making (Branching) Structures–If Statement, If-Else Statement, Nested If-Else Statement, Else-If Ladder, Switch Statement, Goto Statement; Looping Structures; Functions: Library Functions; User-Defined Functions; Function Declaration (Prototype) and Definition; Function Arguments – Dummy, Actual and Formal Arguments; Local and Global Variables; Function Calls; Recursion and Recursive Functions, Linkage of variables, Storage Class, & Scope of Variables.

3. **Arrays and Strings:** Single Dimensional Arrays; Accessing Array Elements; Initializing an Array; Multidimensional Arrays; Initializing Multidimensional Arrays; Memory Representation; Accessing Multidimensional Array Elements; Array of Characters; String Manipulation Functions; Introduction to Pointers.

4. **Structure and File Handing:** Structure Declaration and Initialization; Accessing Structure Members, Structure Assignments; Array of Structures and Arrays within Structures, Nested Structures; Structure as Function Arguments; Structure Pointer; Unions; Opening and Closing Files; I/O Operations on Files, Error Handling During I/O Operations, Command Line Arguments.

Text Book:

- E. Balagrusamy: Programming in ANSI C, 7th Ed., Tata McGraw Hill

References Books:

- Programming in C – Schaum Series by Gottfried, 3rd edition, TMH publication (2nd ed. downloadable)
- R. G. Dromey: How to Solve it by Computer, 2nd Ed., Pearson Education (downloadable)

C-Lab(Generic Practical Assignments Set):

1. Swapping of 2, 3, and n integer variables.
2. Simple problems based on simple decisions.
3. Counting, factorial, square root, reversing digits of an integer, and sum of integer digits.
4. Base conversions, gcd, hcf, prime number generator, and generation of pseudo-random number.
5. Array counting, finding a set's max and min number.
6. Any three searching and sorting algorithms.
7. String handling functions using arrays.
8. String handling functions using pointers.
9. Problems with structure and union.
10. File-handling problems

Approved by the Board of Studies held on August 27, 2024