

**II/IV B. TECH. FIRST SEMESTER  
PROGRAM DESIGN  
(Required)**

**Course Code : CS 3T3**

**Credits: 3**

**Lecture: 3 periods/ week**

**Internal assessment: 30 Marks**

**Tutorial: 1period/week**

**Semester end examination: 70 Marks**

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**Prerequisites:** C Programming

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**Course Objectives:**

1. Problem Solving and Program design in C teaches a disciplined approach to problem solving and to applying widely accepted software engineering methods to design program solutions as coupling, cohesion, modular programming and debugging.

**Course Outcomes:**

At the end of this course student will:

CO1) Demonstrate the step by step notation to solve simple mathematical and logical problems

CO2) Implement the 'C' programs for solutions of mathematical and logical problems

CO3) Apply code reading and debugging techniques to analyze and interpret and describe the purpose of program code

CO4) Apply the modular programming techniques to simplify the programs

CO5) Implement the simple programs using derived and user defined data types to organize the data items

**Syllabus:**

**UNIT 1**

Top-down Design with Functions: Building programs from existing information- case studies, library functions, top down design and structure charts - case study, functions without arguments, functions with input arguments, Case Study.

**UNIT 2**

Functions with simple output parameters, Multiple calls to a function with input/output parameters, Scope of names, Formal output parameters as Actual Arguments, A program with multiple functions-Case study, Debugging and testing a program system , Recursion: The nature of recursion, Tracing a recursive function, Recursive Mathematical functions

**UNIT 3**

Array arguments, Parallel Arrays and Enumerated Types, Multidimensional arrays, Strings: string library functions, Array of pointers, Structures and Union types: User-defined structure types, structure type data as input and output parameters, functions whose result values are structured, Problem Solving with Structured Types, Case Study, Introduction to Union.

**UNIT 4**

Pointers, Dynamic Memory Allocation, Text input/output files, Binary files, searching a database- Case study

**UNIT 5**

Programming in the Large : Using Abstraction to Manage Complexity, Personal Libraries: Header Files, Implementation Files, Storage Classes, Modifying functions for inclusion in a Library, Arguments to Function Main, Defining Macros with Parameters, Common Programming Errors.

**Learning Resource****Text Books**

1. Problem Solving and Program Design in C, Jeri R. Hanly, Elliot B. Koffman, 7th Edition, Pearson.

**References**

1. Programming in C, Pradip Dey, Manas Ghosh, 2nd Edition, Oxford University Press.
2. How to Solve it by Computer- R.G.Dromey, PHI.
3. A First Book of ANSI C, Gary J.Bronson, 3rd Edition, Cengage.
4. A Book on C, AL KELLY and IRA POHL, 4th Edition, Pearson.
5. The C Programming Language, Brain W.Kernighan & Dennis Ritchie, 2nd Edition, PHI.