

Problem Solving With C

(Common to all branches)

Course Code - Category : CSE 115 - ES

Credits: 3

L T P E O
3 0 0 1 3

Sessional Marks:40

End Exam: 3 Hours

End Exam Marks:60

Prerequisite: No specific prerequisites are needed

Course Objectives:

- This course aims to provide exposure to problem-solving through programming in C. It aims to train the student, the concepts of C-Programming Language. This course involves a lab component which is designed to give the student hands-on experience with the concepts.

Course Outcomes:

After completion of this course, a student will be able to:	
CO 1	Gain knowledge in problem solving and steps in Program development.
CO2	Apply the basic concepts of C
CO 3	Implement different operations on arrays and string to solve any given problem.
CO 4	Demonstrate pointers and modularization
CO 5	Apply structures and unions and Implement file Operations in C programming for any given application

SYLLABUS

UNIT I

10 Periods

Introduction to Computer Problem-solving : Introduction ,The Problem-solving Aspect, Top-Down Design, Implementation of Algorithms, Program Verification **(Text Book 3 Page 1-29 or Reference material 1)**
Computer Science as a Career Path : Why Computer Science May be the Right Field for You, The College Experience: Computer Disciplines and Majors to Choose From Career Opportunities.
Electronic Computers Then and Now, Computer Hardware, Computer Software, The Software Development Method, Applying the Software Development Method, Professional Ethics for Computer Programmers. **(Text Book 2 Page 1-39)**
Computer Languages, Writing Editing compiling and linking programs, Program Execution, System Development, Flowcharting, Introduction to C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Coding Constants, Formatted Input / Output. **(Text Book 1)**

Learning Outcomes : At the end of this Unit the student will be able

- To gain knowledge in the concepts of problem solving
- Identify the steps in Program development
- Learn number system.

UNIT II

10 Periods

Number systems-Binary, Decimal, Hexadecimal and Transformations, storing integers and floats. Program – expressions, precedence and Associativity, Side effects, evaluating expressions, mixed type expressions, statements.

Selection –Making Decisions – Logical data and operators, Bitwise Operators- logical bitwise operators, shift operators, bitwise use, Two way selection, Multi way selection

Repetition – concept of a loop, pretest and posttest loops, initialization and updating, event controlled and counter controlled loops, loops in C, loop examples, other statements related to looping, looping applications
(Text Book 1)

Learning Outcomes : At the end of this Unit the student will be able to

- Apply decision making in c programming for problem solving
- Apply controlled structures in c programming for problem solving

UNIT III

10 Periods

Arrays – Concepts, using arrays in C, array applications, linear search, and Bubble sort, two – dimensional arrays, multidimensional arrays .

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions
(Text Book 1)

Learning Outcomes : At the end of this Unit the student will be able to

- Implement different operations on arrays
- Use string functions
- Apply string manipulation operations for problem solving.

UNIT IV

10 Periods

Functions-Designing Structured Programs, Functions in C, user defined functions, standard library functions, scope, Recursion

Storage classes-auto, register, static, extern

Pointers – Pointer Applications – Arrays and Pointers, pointer arithmetic and arrays, passing an array to a function, understanding complex declarations, memory allocation functions, array of pointers, programming application selection sort.
(Text Book 1)

Learning Outcome : At the end of this Unit the student will be able to

- Know what a pointer is
- How to modularize a program
- Parameter passing techniques
- Write a recursive functions

UNIT V

10 Periods

Derived Types Enumerated, Structure and Union Types – The Type Definition (typedef), Enumerated types, Structures, accessing structures, Complex structures, arrays of structures, structures and functions, unions

Text Files – Concept of a file, files and streams, input / output functions, formatting input/output functions, character input/output functions, character input/output examples

Binary files – classification of files, using binary files, standard library functions for files, converting file type, file program examples.
(Text Book 1)

Learning Outcome : At the end of this Unit the student will be able to

- Write a structure and union
- Create and manage a file
- Use structure and union in files

Text Books:

- (1) **B. A. Forouzan and R. F. Gilberg** “*Cengage Learning , Computer Science: A Structured Programming Approach Using C*” Third Edition.
- (2) **Jeri R. Hanly , Elliot B .Koffman** , “*Problem solving and program Design in C*” , 7th Edition
- (3) **R.G.Dromey** , “*How to solve it by computer, Prentice-Hall International Series in Computer Science*” C.A.R. Hoare Series Editor

Reference Books:

- (1) “*An Introduction to Computer Science and problem solving*” - IT Department Material
- (2) “**Dietal & Deital**” , “*C How to Program 7/E*” ,PHI Publications
- (3) **Yashavant Kanetkar** , “*Let Us C*”, 16th Edition
- (4) **Brian W. Kernighan and Dennis M.Ritchie**, “*The C Programming Language*”, Prentice Hall of India