PROGRAMMING FOR PROBLEM SOLVING

Common to ECE, CSE, IT, CSE(AI&ML) & CSE(DS) Branches

21CS103ES/21CS203ES

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Pre-requisites: Nil

Course Objectives:

1.To learn the fundamentals of computers.

2.To understand the various steps in program development.

3.To learn the syntax and semantics of C programming language.

4.To learn the usage of structured programming approach in solving problems.

Course Outcomes: The student able

CO 1: To write algorithms and to draw flowcharts for solving problems.

CO 2: To test a given logic and arrays in C programming language.

CO 3: To decompose a problem into functions and to develop modular reusable code.

CO 4: To use strings and structures to write C programs.

CO 5: To Develop programs for files and Preprocessor

UNIT – I

Introduction to Computers – Computer Systems, Functional units of Computer, Computer Languages, operating system, compilers, Software - types of software, SDLC, Applications of programming languages, Creating, compiling and running programs, Program Development, Algorithm, flow chart/Pseudo code with example, Number Systems

Introduction to the C Language – Background, Structure of C Program, Tokens – Identifiers, data types, Variables, Strings, Constants, Keywords, Operators (Arithmetic, relational, logical, bitwise etc.), Expression Evaluation - Precedence and Associativity, Type conversions,

UNIT – II

Control Statements - Decision making statements, Selection statements, Iteration statements(loops) - while, for, do-while statements, Loop examples, other statements related to looping –break, continue, goto, Simple C Program examples.

I/O - Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

Arrays – Declaration and definition, applications, types of arrays, creating, accessing and manipulating elements of arrays, C program examples.

UNIT – III

Functions- concept, built-in functions and libraries, user defined functions, inter function communication, Storage classes, type qualifiers, passing parameters to functions, call by value, passing arrays to functions, passing pointers to functions, idea of call by reference. Command – line arguments.

Recursion- recursive functions, Limitations of recursion, example C programs.

Pointers – Introduction (Basic Concepts), types of pointer, pointers to pointers, compatibility, Pointer Arithmetic, array of pointers, pointers to functions.

UNIT – IV

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, C program examples.

Structures - Declaration, initialization, accessing structures, operations on structures, Complex structures, passing structure to function, array of structure, passing structures through pointers, self-referential structures, **Union**, Enumeration data type, bit fields, C programming examples.

Memory allocation - Static and dynamic memory allocation

UNIT – V

Preprocessor - Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef, macro definition

Files - Concept of a file, Text and Binary files – Standard library functions for files – Opening and closing binary files – File status functions: feof, ferror, clearer – Positioning Functions: rewind, ftell, fseek – System file operations: remove, rename, tmpfile – File program examples

TEXTBOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh, Oxford University Press.

REFERENCES:

1.The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2.C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.
3.Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition,Pearson education.
4.Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
5.Programming with C, R.S.Bickar, Universities Press.
6.Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.
7.Programming in C – Stephen G. Kochan, III Edition, Pearson Eucation.