

PROBLEM SOLVING AND COMPUTER PROGRAMMING

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Objective of the Course :

Aim of this course is to introduce the techniques of problem solving and concepts of programming language to the students. Because of its popularity and suitability to develop different types of applications, 'C' language has become the de-facto programming language to engineers. A comprehensive introduction of C language is offered through this course to enable the students to write diversified programs.

UNIT - I

Introduction to basic functional units and discrete components of a computer, computer networks, networking components. Number systems, Binary representation of integers and real numbers, Character codes- ASCII, EBCDIC and Unicode and Generations of computer languages.

UNIT - II

Problem Solving Steps - Problem understanding, Formulating a mathematical model, Development of an algorithm, Representation of an algorithm – Flow chart and Pseudo code, Coding, Testing and Debugging.

Form of a C Program – Comments, Processor statement, Function header statement, Variable declaration statement and Executable statement.

C Character Set, C Tokens – constants, identifiers, operators, punctuations and keywords. Basic data types, modifiers, identifiers, variables, C scopes, type qualifiers, storage class specifiers, variable initializations, and constants. Console I/O – reading and writing characters, and formatted I/O.

UNIT - III

Operators – Assignment, arithmetic, relational, logical, bitwise, ternary, address, indirection, sizeof, dot, arrow, and parentheses.

Expressions – Precedence of operators and associativity.

Category of Statements - Selection, Iteration, jump, label, expression and block.

Functions – declaration, prototype, definition, calling by value and address, standard library functions and recursive functions.

UNIT - IV

Arrays and Strings- Declaration, initialization, reading, writing, accessing and passing as a parameter to functions, Multidimensional arrays and String functions.

Pointers – pointer expressions, pointer and arrays, multiple indirection, initializing pointers, pointer to functions. Dynamic memory allocation functions.

UNIT - V

Structures- declaration, initialization and accessing, array of structures and passing structures to functions, structure pointers, arrays and structures within structures, unions, bit-fields, typedef and enumerations.

File Processing – I/O and processing operations on text and binary files. Pre-processor directives.

TEXT BOOKS :

1. R G Dromey, How to Solve it by Computer, Pearson Education India 2008
2. Herbert Schildt, C: The Complete Reference, 4th Edition, Tata McGraw-Hill, 2000.
3. Peter Norton, Introduction to Computers, Sixth Edition, Tata McGraw-Hill, 2006.
4. Carl Hamacher, Zvonko Vranesic and Safat Zaky, Computer Organization, Fifth Edition, McGraw-Hill International Edition, 2002.

REFERENCE BOOKS :

1. E. Balagurusamy, “ Programming in ANSI C”, 4TH Edition, Tata McGraw-Hill, 2008.
2. B.A.Forouzan and R.F.Gilberg, “ Computer Science, A structured programming approach using C”, 3rd Edition, Thomson, 2007.
3. B.W. Kernighan, Dennis M. Ritchie, “The C Programmin Language” 2nd Edition, PHI/Pearson Education, 2009.