CS-01: PROBLEM SOLVING METHODOLOGIS AND PROGRAMMING IN C

Objectives:

- To develop basic programming skill and logic, concept of memory management and file handling.
- To be able to understand preprogramming techniques
- To become familiar with programming concepts
- To become familiar with different problem-solving methodologies

Prerequisites:

- Basic Computer Skills and Command-line knowledge

Unit No.	Topic	Detail
1	**Introduction of C Language**	• Introduction of Computer Languages • Introduction of Programming Concept • Introduction of C Language (History & Overview) • Difference between traditional and modern c. • C character set • C tokens ▪ Keywords ▪ Constants ▪ Strings ▪ Identifiers and variables ▪ Operators (all 8 operators) • Hierarchy of operators • Type casting • Data types in c • PRE-PROCESSORS IN C
	Introduction of Logic Development Tools	• Introduction of Logic. • Necessary Instructions for Developing Logic • Basics of Flow Chart • Dry-run and its Use. • Other Logic development techniques
2	**Control Structures**	• Selective control structure ▪ If statements ▪ Switch statement • Conditional ternary operator • Iterative (looping) control statements ▪ For loop ▪ Do…while loop ▪ While loop • Nesting of loops

		• Jumping statements ▪ Break, Continue and Goto statements
3	**Functions (Inbuilt and User Defined)**	• Types of library functions ▪ String Function: strcpy, strncpy, strcat, strncat, strchr, strrchr, strcmp, strncmp, strspn, strcspn, strlen, strpbrk, strstr, strtok ▪ Mathematical Functions: acos, asin, atan, ceil, cos, div, exp, fabs, floor, fmod, log, modf, pow, sin, sqrt ▪ I/O Formatting Functions: printf, scanf, getc, getchar, gets, putc, putchar, puts, ungetc ▪ Miscellaneous Functions: delay, clrscr, clearer, errno, isalnum, isalpha, isdigit, islower, isspace, isupper, isxdigit, toupper, tolower ▪ Standard Library functions: abs , atof , atol , exit , free, labs , rand , strtoul , srand ▪ Memory Allocation Functions: malloc , realloc , calloc • Types of user defined functions • Function call by value • Function call by reference • Recursion • Storage classes • Passing and returning values
4	**Array**	• Types of arrays ▪ Single dimensional array ▪ Two dimensional array ▪ Multi-dimensional array ▪ String arrays • Use of Arrays in Programming • Arrays and Matrices
	Pointers	• Introduction of Pointers • Use of pointers in Dynamic Programming • Pointer to Variables • Pointer to Array • Pointer within Array • Array of Pointer • Pointer To Structure • Pointers within structure • Pointer to Pointer • Dangling Pointer Problem
5	**User Defined Data Type – Structure, Union & enum**	• What is structure • Initializations and declarations • Memory allocation functions • Pointers with structures • Array with structures

		• User defined function with structures • Nested structures • Introduction to union • Difference between Structure & Union • Enumerated Type

Seminar - 5 Lectures
Expert Talk - 5 Lectures
Test - 5 Lectures

Total Lectures 60 + 15 = 75

Reference Books:

1. Programming in C, by Pradip Dey & Manas Ghosh, Publisher – Oxford
2. C: The Complete Reference, by Herbert Schildt, Publisher – Tata McGraw Hill.
3. Programming in ANSI C Author : E. Balaguruswami.
4. Schaum's Outline of Programming with C, By: Byron Gottfried, Publisher Shaum Series
5. Programming with ANSI and Turbo C, by Ashok N Kamthane, Publisher – Pearson Education
6. Let Us C Author : Yashwant Kanetkar.
7. Working with C Author: Yashwant Kanitkar.

Course Outcome:

- ✓ Able to illustrate and explain basic concepts of programming
- ✓ Able to understand the concept of control statements.
- ✓ Able to translate the real-life situations in programming form and solve them using some fundamentals of Programming.
- ✓ Able to translate the real-life situations in programming form and solve them by storing data into files and analysed user defined data types and test and detect that it is optimized applications.