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.