Semester	1
Program	B.Sc. Computer Science (Hons.)
Course	PROBLEM SOLVING TECHNIQUES USING C
Paper Code	C1CS230122T
No. of Credits	4
Hours / week	Theory: 3, Practical: 2
Category: Core/MDC/SEC/VAC	Core
Theory/ Practical / Composite	Composite
Number of Modules	One

Course Overview: This course is an introductory programming course designed to develop logical thinking, analytical skills and structured problem-solving abilities using C programming language. The course provides a strong foundation in algorithm design and program development, preparing students for the subjects where computation is a requirement. The course also helps in analyzing problems and developing algorithms. After introducing the basics of C programming language, the course gives more emphasis on the structured programming principles and modular program design.

Course Outcomes	**CO1.** Understand the evolution of programming languages and the basic concepts of C programming **CO2.** Apply data types, operators, input-output statements to solve problems **CO3.** Implement different control structures to solve problems **CO4.** Develop modular programs using functions, arrays **CO5.** Analyze and apply pointers, structures, unions and macros **CO6.** Create file based applications

Syllabus

Unit/Module	Content	Hours	CO Mapping	Cognitive Level
1	**Generations of Programming Languages**: Machine Language, Assembly Language, Procedural Language, Object Oriented Language.	2	CO1	K1, K2, K4 (Remember, Understand, Analyze)
2	**Introduction to C Programming Language:**	2	CO1, CO2	K1, K2, K3, K4, K6 (Remember, Understand, Apply,

	Features and Structure of a C Program, Character Set, Identifiers and Keywords, Variables and Constants, Brief Idea about C Library.			Analyze, Create)
3	**Data Types in C:** Primitive, User-Defined, Enumerated, Type Casting, Declaration.	3	CO2	K1, K2, K3, K4, K6 (Remember, Understand, Apply, Analyze, Create)
4	**Operators in C:** Different Types, Precedence and Associativity, Expressions using Operators.	2	CO2	K1, K2, K3, K4, K6 (Remember, Understand, Apply, Analyze, Create)
5	**Input-Output Operations:** Standard Functions with Escape Sequences and Format Specifiers.	2	CO2	K1, K2, K3, K4, K6 (Remember, Understand, Apply, Analyze, Create)
6	**Decision Making Statement:** if-else, switch-case, Ternary Operator.	3	CO3	K1, K2, K3, K4, K5, K6 (Remember, Understand, Apply, Analyze, Evaluate, Create)
7	**Iterative Statements:** for, while and do-while with control statements like break and continue.	5	CO3	K1, K2, K3, K4, K5, K6 (Remember, Understand, Apply, Analyze, Evaluate, Create)
8	**Functions:** Declaration, Calling and Definition, Idea	4	CO4	K1, K2, K3, K4, K5, K6 (Remember, Understand, Apply,

	about Recursive Function.			Analyze, Evaluate, Create)
9	**Scope of Variables, Storage Classes.**	2	CO4	K1, K2, K3, K4, K6 (Remember, Understand, Apply, Analyze, Create)
10	**Array:** Declaration and Use-Both 1-D and 2-D, Idea about String, Passing Array to a Function.	4	CO4	K1, K2, K3, K4, K6 (Remember, Understand, Apply, Analyze, Create)
11	11. **Pointer:** A Brief Idea about Declaration and Use, Passing Pointer to a Function-Idea of Call-By-Value and Call-By-Address.	4	CO5	K1, K2, K3, K4, K5, K6 (Remember, Understand, Apply, Analyze, Evaluate, Create)
12	**Structure and Union:** Declaration and Use.	2	CO5	K1, K2, K3, K4, K5, K6 (Remember, Understand, Apply, Analyze, Evaluate, Create)
13	**Macro:** Different Types, Declaration and Use.	2	CO5	K1, K2, K3, K4, K5, K6 (Remember, Understand, Apply, Analyze, Evaluate, Create)
14	**File Handling:** Basic input and output operations on a disk file, sequential and random file access.	2	CO6	K1, K2, K3, K4, K5, K6 (Remember, Understand, Apply, Analyze, Evaluate, Create)
Text Books				
2. Programming with C, Gottfried, TMH Publications				
3. Programming in C, Dey and Ghosh, Oxford Publications				
4. Programming in ANSI C, Balaguruswamy, Mc Graw Hill				

Suggested Readings		
1. The C Programming Language, Kernighan and Ritchie, PHI Publications		
Web Resources		
1. NPTEL course on Introduction to Programming in C by Dr. Satyadev Nandakumar, IIT Kanpur; course link: https://youtu.be/XTiIiI-LOY8		
Evaluation	Theory CIA: 12 Attendance: 3 Semester Exam: 45	Practical CA: 38 Attendance: 2
Paper Structure for Theory Semester Exam Module: Answer 3 out of 5 of 15 marks each		

Course outcomes (COs) and Cognitive Level Mapping

COs	CO Description	Cognitive Levels
CO1	Understand the evolution of programming languages and the basic concepts of C programming	K1, K2, K4 (Remember, Understand, Analyze)
CO2	Apply data types, operators, input-output statements to solve problems	K1, K2, K3, K4, K6 (Remember, Understand, Apply, Analyze, Create)
CO3	Implement different control structures to solve problems	K1, K2, K3, K4, K5, K6 (Remember, Understand, Apply, Analyze, Evaluate, Create)
CO4	Develop modular programs using functions, arrays	K1, K2, K3, K4, K6 (Remember, Understand, Apply, Analyze, Create)
CO5	Analyze and apply pointers, structures, unions and macros	K1, K2, K3, K4, K5, K6 (Remember, Understand, Apply, Analyze, Evaluate, Create)
CO6	Create file based applications	K1, K2, K3, K4, K5, K6 (Remember, Understand, Apply, Analyze, Evaluate, Create)