Course Plan

CHITKARA UNIVERSITY

A. Course Handout | Prepared on 22nd December, 2022

Institute/School Name	Chitkara University Institute of Engineering & Technology		
Department Name	Computer Science & Engineering		
Programme Name	Bachelor of Engineering: Computer Science & Engineering		
Course Name	Problem Solving using C	Session	2022-2023
Course Code	CS153	Semester/Batch	4th/ 2021
L-T-P (Per Week)	4-0-2	Course Credits	05
Course Coordinator	Dr. Ravi Kumar Sachdeva		

1. Objectives of the Course

This course has been designed to provide students the practical ability in C language, which can be used for system programming and as an application language. By learning the basic programming constructs the students can easily switch over to any other language in future. This course is based on industrial programming experience and extensive study of the language. The objectives of the course are:

- To gain a thorough understanding of the fundamentals of C programming
- To code, compile and test C programs.
- To build the necessary foundation for taking up Systems programming or Advanced C programming course.
- To impart knowledge about the basic concepts of files in C programming.

2. Course Learning Outcomes

After completion of the course, students will be able to:

CLO1. Articulate foundation knowledge of basic construct of C programming language.

CLO2. Design the solution for the given problems and develop the same using C programming language.

CLO3. Apply the concepts of branching and decision-making statements for a given problem.

CLO4. Formulate the foundation of iterations and modular programming used in C programming language.

CLO5. Impart the knowledge to design software projects in C programming language.

CLO-PO mapping grid |Program outcomes (POs) are available as a part of Academic Program Guide (APG)

Course Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CLO01	H	H	H	L						L	L	H
CLO02	H	H	H	M							M	H
CLO03	H	H	H	L	L						M	M
CLO04	H	H	H	L					M		M	M
CLO05	H	H	H	H	H				M		H	H

3. Recommended Books (Reference Books/Text Books):

RB1: C-The Complete Reference, Herbert Schildt,4th edition, McGraw Hill Education, 2017

RB2: The C Programming Language, Brian W. Kernighan, and Dennis M. Ritchie, 2nd Edition, Pearson, 2015

RB3: Expert C Programming: Deep C Secrets, Peter van der Linden, 1st Edition, Pearson, 1994

RB4: C in a Nutshell, Peter Prinz and Tony Crawford, 2nd edition, O'Reilly Media, 2015

4. Other readings and relevant websites:

S. No.	Link of Journals, Magazines, websites, and Research Papers
1.	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/
2.	https://ocw.mit.edu/courses/6-s096-introduction-to-c-and-c-january-iap-2013/
3.	https://www.programiz.com/c-programming
4.	https://www.javatpoint.com/c-programming-language-tutorial
5.	https://www.tutorialspoint.com/cprogramming/
6.	https://www.w3schools.com/c/

5. Recommended Tools and Platforms:

- Code::Blocks
- VS Code
- CodeLite

6. Course Plan

Lecture Number	Topics	Recommended Book / Other reading material
1-3	The Problem-Solving aspect, Problem definition phase, Getting started on a problem, The use of specific examples, Similarities among problems	RB1, RB2, RB3, RB4
4-6	Working backward from the solution, General Problem-solving strategies, Introduction to programming in C, First Program in C, Variables and Identifiers, Data types	RB1, RB2, RB3, RB4
7-15	Basic Input Output in C, Formatted IO, Arithmetic Operators	RB1, RB2, RB3, RB4
16-18	Relational and Logical Operators	RB1, RB2, RB3, RB4
19- 24	Precedence and Associativity of operators	RB1, RB2, RB3, RB4
25-30	if statement, if-else statement, if statement mistakes, nested if statements, Conditional Operator, Switch statement	RB1, RB2, RB3, RB4
31-36	Looping - While loop, for loop, Control with break and continue, Variants of for loop, Nested loops, Printing patterns with loops, do-while loop	RB1, RB2, RB3, RB4
37-46	Functions in C, Definition and declaration of a function, Scope of a function, auto storage class, extern storage class, static storage class, register storage class	RB1, RB2, RB3, RB4
47-54	Introduction to Pointers in C, Parameter passing techniques, Pointer Arithmetic in C	RB1, RB2, RB3, RB4
55-59	Arrays, Searching an Element, Arrays and Memory in C, Pointers with Arrays, Functions and arrays, 2 Dimensional Arrays, Pointers and 2D Arrays, Array of Pointers	RB1, RB2, RB3, RB4
60-63	Strings in C, Strings and Pointers, Strings and Functions, String Functions Library	RB1, RB2, RB3, RB4
64-81	Recursion - An Introduction, Recursion Examples, Introduction to Structures, typedef, Structure Pointers and Nested Structures, Structures and Functions, Structure Assignments and Arrays, Union & Enumeration	RB1, RB2, RB3, RB4
82-90	File Handling	RB1, RB2, RB3, RB4

7. Delivery/Instructional Resources

Lecture Number	Topics	Web References	Audio-Video
1-3	The Problem-Solving aspect, Problem definition phase, Getting started on a problem, The use of specific examples, Similarities among problems	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec01/ https://www.w3schools.com/c/c	https://nptel.ac.in/courses/106104074

		_intro.php	
4-6	Working backwards from the solution, General Problem-solving strategies, Introduction to programming in C, First Program in C, Variables and Identifiers, Data types	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec02/ https://www.javatpoint.com/variables-in-c	https://nptel.ac.in/courses/106104128
7-15	Basic Input Output in C, Formatted IO, Arithmetic Operators	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec04/	https://nptel.ac.in/courses/106104128
16-18	Relational and Logical Operators	https://www.javatpoint.com/c-operators	https://nptel.ac.in/courses/106104128
19- 24	Precedence and Associativity of operators	https://www.javatpoint.com/c-operators	https://nptel.ac.in/courses/106104128
25-30	if statement, if-else statement, if statement mistakes, nested if statements, Conditional Operator, Switch statement	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec03/ https://www.javatpoint.com/c-if-else	https://nptel.ac.in/courses/106104128
31-36	Looping - While loop, for loop, Control with break and continue, Variants of for loop, Nested loops, Printing patterns with loops, do-while loop	https://ocw.mit.edu/courses/6-s096-introduction-to-c-and-c-january-iap-2013/resources/mit6_s096_iap13_lec2/ https://www.javatpoint.com/nested-loops-in-c	https://nptel.ac.in/courses/106104128
37-46	Functions in C, Definition and declaration of a function, Scope of a function, auto storage class, extern storage class, static storage class, register storage class	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec03/ https://www.w3schools.com/c/c_functions.php	https://nptel.ac.in/courses/106104128
47-54	Introduction to Pointers in C, Parameter passing techniques, Pointer Arithmetic in C	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec07/ https://www.javatpoint.com/pointer-arithmetic-in-c	https://nptel.ac.in/courses/106104128

55-59	Arrays, Searching an Element, Arrays and Memory in C, Pointers with Arrays, Functions and arrays, 2 Dimensional Arrays, Pointers and 2D Arrays, Array of Pointers	https://www.cs.uic.edu/~jbell/CourseNotes/C_Programming/Arrays.html	https://nptel.ac.in/courses/106104128
60-63	Strings in C, Strings and Pointers, Strings and Functions, String Functions Library	https://www.w3schools.com/c/c_strings.php https://www.javatpoint.com/c-strings	https://nptel.ac.in/courses/106104128
64-81	Recursion - An Introduction, Recursion Examples, Introduction to Structures, typedef, Structure Pointers and Nested Structures, Structures and Functions, Structure Assignments and Arrays, Union & Enumeration	https://www.w3schools.com/c/c_functions_recursion.php https://www.w3schools.com/c/c_structs.php	https://nptel.ac.in/courses/106104128
82-90	File Handling	https://old.amu.ac.in/emp/studym/99994623.pdf	https://nptel.ac.in/courses/106104128

8. Action plan for different types of learners

Slow Learners	Average Learners	Fast Learners
• Remedial Classes on Saturdays • Encouragement for improvement using Peer Tutoring • Use of Audio and Visual Materials • Use of Real-Life Examples	• Formative Exercises used to highlight concepts and • notions • Pre-coded algorithms to illustrate concepts and notions • E-notes and E-exercises to read ahead of the pedagogic material.	• Design solutions for complex problems • Presentation on topics beyond those covered in CHO • Engaging students to hold hands of slow learners by creating a Peer Tutoring Group

9. Evaluation Scheme & Components

Evaluation Component	Type of Component	No. of Assessments	Weightage of Component	Mode of Assessment
Component 01	Subjective Test/Sessional Tests (STs)	03*	40%	Offline
Component 02	End Term Examinations	01	60%	Offline
Total		100%		

* Out of 03 STs, the ERP system automatically picks the average of best 02 ST marks for evaluation of the STs as final marks.

10. Details of Evaluation Components

Evaluation Component	Description	Syllabus Covered (%)	Timeline of Examination	Weightage (%)
Component 01	ST 01	Upto 30%	Week 5	40%
	ST 02	31% - 70%	Week 10	
	ST 03	71%-100%	Week 15	
Component 02	End Term Examination*	100%	To be notified by Dean Examination	60%
Total				100%

* As per Academic Guidelines minimum 90% attendance is required to become eligible for appearing in the End Semester Examination.

11. Syllabus of the Course

S. No.	Topic	No. of Lectures	Weightage %
1	The Problem-Solving aspect, Problem definition phase, Getting started on a problem, The use of specific examples, Similarities among problems, Working backwards from the solution, General Problem-solving strategies, Introduction to programming in C. First Program in C, Variables and Identifiers, Data types, Basic Input Output in C, Formatted IO, Arithmetic Operators, Relational and Logical Operators	18	20%
2	Precedence and Associativity of operators, if statement, if-else statement, if statement mistakes, nested if statements, Conditional Operator, Switch statement, Looping - While loop, for loop, Control with break and continue, Variants of for loop, Nested loops, Printing patterns with loops, do-while loop	18	20%
3	Functions in C, Definition and declaration of a function, Scope of a function, auto storage class, extern storage class, static storage class, register storage class, Introduction to Pointers in C, Parameter passing techniques, Pointer Arithmetic in C	18	20%
4	Arrays, Searching an Element, Arrays and Memory in C, Pointers with Arrays, Functions and arrays, 2 Dimensional Arrays, Pointers and 2D Arrays, Array of Pointers, Strings and Pointers, Strings and Functions, String Functions Library	9	10%
5	Recursion - An Introduction, Recursion Examples, Introduction to Structures, typedef, Structure Pointers and Nested Structures, Structures and Functions, Structure Assignments and Arrays, Union & Enumeration	18	20%
6	File Handling	9	10%

This Document is designed and approved by:

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Date	**22.12.2022**	