Course Plan

A. Course Handout

Institute/School Name	Chitkara University Institute of Engineering and Technology		
Department Name	Department of Computer Science & Engineering		
Programme Name	Bachelor of Engineering (B.E.), Computer Science & Engineering		
Course Name	Fundamentals of C Programming	Session	2022-2023
Course Code		Semester/Batch	2nd/2022
L-T-P (Per Week)	4-0-4	Course Credits	06
Course Coordinator	Dr. Mandeep Kaur (k.mandeep@chitkara.edu.in) /Dr. Gurpreet Singh (gurpreet.1082@chitkara.edu.in)		

1. Objectives of the Course

The course provides a wide scope of learning & understanding of the subject. The main objectives of the course are :

- To impart knowledge about the different problem solving aspects including general problem solving strategies and working backwards from solution.
- To expose students to the concepts like variables, identifiers, data types, basic input/output, operators etc. for C-Language
- To provide skills to use different control statement (sequential, conditional and iterative), the concepts of pointers and functions for logic building.
- To enable learners to assess the lifecycles of different identifiers by providing the knowledge about different storage structures and array implimentations.
- To create efficient programming solutions in common engineering design situations.

2. Course Learning Outcomes

After completion of the course, student should be able to:

	Course Outcome	*POs	**CL	***KC	Sessions
CLO01	Understand C-Language features and basics of problem solving aspects for logic building.	PO1,PO2,PO3,PO5, PO12	K2	Factual Conceptual	**08**
CLO02	Use of variables, data types, identifiers, different operators and expressions	PO1,PO3,PO4,PO5	K3	Conceptual Procedural	**04**
CLO03	Apply conditional statements, switch case statements and iterative statements as flow controls in C-Language to solve complex problems.	PO1, PO2,PO3,PO4, PO5,PO7, PO11	K3	Conceptual Procedural	**12**
CLO04	Implement functions and observe the use of storage classes in C-language.	PO3,PO4,PO5	K4	Procedural	**08**
CLO05	Use pointers and one/two dimensional arrays to store and retreive data items in C-language.	PO4, PO5	K3	Conceptual Procedural	**08**
CLO06	Apply the concept of recursion to solve complex problems required iterative function calls in C-language.	PO1,PO3,PO4, PO5,PO7, PO11	K3	Procedural	**08**
Total Contact Hours					**48**

Revised Bloom's Taxonomy Terminology
* PO's available at (shorturl.at/cryzF)
**Cognitive Level =CL
***Knowledge Categories = KC

Course Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CLO01	H	M	M		H							M
CLO02	M		M	H	M							
CLO03	L	M	H	M	M		L				L	
CLO04			L	M	H							
CLO05				L	H							
CLO06	L		H	M	M		L				L	

H=High, M=Medium, L=Low

3. ERISE Grid Mapping

Feature Enablement	Level(1-5, 5 being highest)
Entrepreneurship	1
Research	1
Innovation	1
Skills	5
Employability	4

4. Recommended Books:

Text Books:

B01: Kanetkar, Yashwant, "Let us C", New Delhi BPB Publication 2019. 17th Edition.

B02: E. Balagurusamy,"Programming in ANSI C", McGraw Hill Education India, 2019, Edition-8

B03: Reema Thareja, " Computer Fundamentals and Programming in C", Oxford University Press, 2016, 2nd Edition

B04: Subburaj, R., "Programming in C", Vikas Publication House Pvt. Ltd. (New Delhi), 2001, 2nd Edition.

Reference Books:

B05: Schildt, Herbert, "C: The Complete Reference", McGraw Hill Education (New Delhi), 2018, 4th Edition

B06: Kernighan,Brian W.and Ritchie,Dennis M, "The C Programming Language", Pearson Education (New Delhi), 2007, 2nd Edition

E-Resourses:

- https://library.chitkara.edu.in/subscribed-books.php
- http://164.100.247.26/Record/38449930

- https://www.sciencedirect.com/science/article/pii/B9780123507723500069?via%3Dihub

5. Other readings and relevant websites:

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	https://nptel.ac.in/courses/106106210
2.	https://www.coursera.org/specializations/c-programming
3.	https://www.coursera.org/learn/c-for-everyone
4.	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/
5.	https://ocw.mit.edu/courses/6-s096-introduction-to-c-and-c-january-iap-2013/
6.	https://catalogue.library.cern/literature/t50vw-6at59

6. Recommended Tools and Platforms

Code Blocks, GCC Compiler

7. Course Plan:

LectureNumber	Topics	Text Book
1-4	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	B01-Chpater-1
5	Introduction to programming in C, First Program in C	B01-Chapter-2
6-8	Variables and Identifiers, Data types, Basic Input Output in C - Characters, Basic Input Output in C - Formatted IO	B01-Chapter-1
9-10	Arithmetic Operators, Relational and Logical Operators, More Operators, Precedence and Associativity of operators	B01-Chapter-2
11-14	If statement, if-else statement, if statement mistakes, nested if statements	B01-Chapter-3
15-16	Conditional Operator, Switch statement	B01-Chapter-4 B01-Chapter-7
ST-1 (Syllabus = (Lecture number 1-16) (Online on MapIT)		
17-20	While loop, Looping - For loop, Control with break and continue, Variants of for loop	B01-Chapter-5 B01-Chapter-6
21-24	Nested for loops , Printing patterns with loops, do-while loop	B01-Chapter-6
25-29	Functions in C, Definition and declaration of a function, Scope of a function	B01-Chapter-8
30-33	auto storage class, extern storage class, static storage class, register storage class	B01-Chapter-11
34-36	Introduction to Pointers in C, Parameter passing techniques, Pointer Arithmetic in C, Pointer Arithmetic with Pointers	B01-Chapter-9
37-38	Arrays, Searching an Element, Arrays and Memory in C,	B01-Chapter-13
39-40	Pointers with Arrays, Functions and Arrays	B01-Chapter-13
ST-2 (Syllabus = (Lecture number 17-40) (Online MapIT)		

41-43	2D Arrays	B01-Chapter-14
44-48	Introduction to recursion, Recursion basic programs like: factorial, Fibonacci, sum of digits	B01-Chapter-10
ETE(Syllabus = (Lecture number 1-48)(Online MapIT)		

8. Delivery/Instructional Resources

Lecture No.	Topics	Web References	Audio-Video
1-4	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	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec01/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-1 to Lecture-3
5	Introduction to programming in C, First Program in C	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-4, Lecture-8
6-8	Variables and Identifiers, Data types, Basic Input Output in C - Characters, Basic Input Output in C - Formatted IO	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec02/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-5
9-10	Arithmetic Operators, Relational and Logical Operators, More Operators, Precedence and Associativity of operators	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec02/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-11 to Lecture-14
11-14	If statement, if-else statement, if statement mistakes, nested if statements.Decision control sturctures.	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec03/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-15 to Lecture-16

15-16	Conditional Operator, Switch statement Decision control sturctures (contd.).	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec03/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-17 to Lecture-18 Lecture22 to Lecture-23
17-20	While loop, Looping - For loop, Control with break and continue, Variants of for loop. Iterative control structures.	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec03/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-19 to Lecture-21 Lecture-23 to Lecture-25
21-24	Nested for loops , Printing patterns with loops, do-while loop. Iterative control structures (Contd.).	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec04/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-19 to Lecture-21 Lecture-23 to Lecture-25
25-29	Functions in c, Definition and declaration of a function, Scope of a function	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec08/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-9 Lecture-35 to Lecture-38
30-33	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_lec08/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-35
34-36	Introduction to Pointers in C, Parameter passing techniques, Pointer Arithmetic in C, Pointer Arithmetic with Pointers	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec07/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-58 to Lecture-59
37-38	Arrays, Searching an Element, Arrays and Memory in C	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec05/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-26 to Lecture-30

39-40	Pointers with Arrays, Functions and Arrays	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec07/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-47
41-43	2D Arrays. Implementation, basic transformations on 2D arrays like transpose, addition, subtraction and multiplication.	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec05/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-34
44-48	Introduction to recursion, Recursion basic programs like: factorial, Fibonacci, sum of digits	https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/resources/mit6_087iap10_lec12/	https://archive.nptel.ac.in/courses/106/105/106105171/ Lecture-53 to Lecture-54

9. Action plan for different types of learners

Slow Learners	Average Learners	Fast Learners
Remedial Classes, Doubt Sessions, Guided Tutorials	Workshop, Doubt Session	Coding Competitions, Project

10. Evaluation Scheme & Components:

Evaluation Component	Type of Component	No. of Assessments	Weightage of Component	Mode of Assessment
Component 1	Lab Evaluations ##	02*	20%	Offline
Component 2	Sessional Tests (STs)	02**	30%	Online MapIT
Component 3	End Term Examination	01***	50%	Online MapIT
Total		**100%**		

* Lab Evaluation is mandatory evaluation taken twice in a semester, one will be considered as mid term evaluation and another one will be final evaluation based on lab practicals.

**Out of 02 STs, the ERP system automatically picks the best 01 ST.

***As per Academic Guidelines minimum 75% attendance is required to become eligible for appearing in the End Semester Examination.

#NPTEL Online Certification Courses (https://onlinecourses.nptel.ac.in/), Appearing in Dean's list for selected students based on performance in competitive coding platforms, ST's and ETE..

List of practicals attached in Annexure-1

11. Syllabus of the Course:

Subject: Fundamentals of C Programming			
S.No.	**Topic (s)**	**No. of Sessions**	**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 - Characters, Basic Input Output in C - Formatted IO. Arithmetic Operators, Relational and Logical Operators, More Operators, Precedence and Associativity of operators. If statement, if-else statement, if statement mistakes, nested if statements. Conditional Operator, Switch statement	**16**	**35%**
ST-1 (Covering 35% syllabus)			
2	While loop, Looping - For loop, Control with break and continue, Variants of for loop, Nested for loops , Printing patterns with loops, do-while loop. 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, Pointer Arithmetic with Pointers. Arrays, Searching an Element, Arrays and Memory in C, Pointers with Arrays, Functions and Arrays	**24**	**50%**
ST-2 (Covering 50% syllabus)			
3	2D Arrays, Introduction to recursion, Recursion basic programs like: factorial, Fibonacci, sum of digits	**08**	**15%**
End Term (Covering (35%+ 50%+ 15%=)100% syllabus)			

This Document is approved by:

Designation	**Name**	**Signature**
Course Coordinator	Dr. Mandeep Kaur/Dr. Gurpreet Singh	
Head-Academic Delivery	Dr. Navjeet Kaur/Dr. Srikant Mohapatra	
Dean	Dr. Monit Kapoor	
Date (DD/MM/YYYY)		