



SCHOOL OF COMPUTER ENGINEERING
KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY (KIIT)
(Deemed to be University, u/s 3 of UGC Act 1956)

SPRING SEMESTER 2022

CS13001 : Course Handout

1. **Course Code:** CS13001
2. **Course title:** Programming Lab
3. **L-T-P Structure:** 0-2-4
4. **Course Coordinator:** Krishna Chakravarty
5. **Contact hours per week :** 6
6. **Credit :** 4

7. Course Objective(s):

The course aims to provide exposure to problem-solving through programming. It aims to train the student to the basic concepts of the C-programming language. This course involves lab component which is designed to give the student hands-on experience with the concepts.

8. Course (learning) outcomes: At the end of the course, the students will be able to:

	Course Outcomes	Modules
CO1	Able to have fundamental knowledge on basics of computers hardware and number systems.	Module #1
CO2	Able to understand the basic terminology used in computer programming .	Module #1, #2
CO3	Able to write, compile and debug programs in C language.	Module #2, Module#3
CO4	Able to design programs involving decision structures, loops and functions.	Module#3, #4, #5, #6, #7
CO5	Able to understand the dynamics of memory by the use of pointers.	Module#8, #10
CO6	Able to use different data structures and create/update basic data files.	Module#9, #11

9. Course Contents

Module#	Name	Details
1	Introduction	Introduction to computer and it's organization <ul style="list-style-type: none">• Computer memory• Introduction to programming (High level/low level languages, procedural/structural programming)• Introduction to Flowchart & Algorithm• Number system representation
2	Variables, constants, Data types, Operators	<ul style="list-style-type: none">• Types of variables and constants• Console input/output operations (library functions)• Operators• Type casting

3	Control statements	<ul style="list-style-type: none"> • Decision control and branching statements (if, nested if and switch case statements, etc.) • Looping control and their types (while, do-while, for, etc.) • break and continue statements
4	Arrays	<ul style="list-style-type: none"> • Introduction to Array • Single Dimensional Array • Multidimensional array
5	Functions	<ul style="list-style-type: none"> • Library & User defined Functions, Formal and Actual parameters • Declaring, defining and calling functions • Parameter Passing – call-by-value and call-by-reference, Recursion
6	Storage Classes	<ul style="list-style-type: none"> • Introduction to different types of storage classes – (auto, static, extern, register)
7	Character Arrays and Strings	<ul style="list-style-type: none"> • String Manipulation
8	Pointers	<ul style="list-style-type: none"> • Pointer variable, Pointer Arithmetic, • Passing parameters by reference, • Pointer to pointer, Pointer to functions
9	User Defined Data Types – Structures and Unions	<ul style="list-style-type: none"> • Structure: definition, structure variable, creation, initialization and assignment • Pointers to structures • Union and their uses • Enum and their uses
10	Dynamic Memory Allocation	<ul style="list-style-type: none"> • Memory allocation functions (malloc, calloc, realloc, etc.) • Memory de-allocation function (free)
11	File Handling	<ul style="list-style-type: none"> • File operations - opening, closing, reading, writing etc.
12	Additional Features	<ul style="list-style-type: none"> • Command line arguments • Bitwise operators • Macros

10. Text books

T1: Programming in ANSI C (8th Edition) by E. Balagurusamy

11. Reference books

R1: The C Programming Language by Brian Kernighan and Dennis Ritchie (Second Edition)

12. Week-wise Lesson Plan

Pre Mid Sem classes				
Calendar Week	LAB Days	Module#	Theory	Lab Manual Reference
Week 1	1,2	Introduction	<ul style="list-style-type: none"> •Introduction to computer fundamentals, memory •Flow chart, algorithm •Number system representation (Binary-decimal) 	LAB#1: Linux commands(optional) Number system problems
Week 2	3,4	Variables, constants, Data types, Operators	<ul style="list-style-type: none"> •Types of variables and constants •Console input/output operations (library functions) •Operators Type casting 	LAB#2 : Simple Input output statements, simple mathematical operations, Operators and Expressions
Week 3	5,6	Control statements	<ul style="list-style-type: none"> •Decision control and branching statements 	LAB#3 : If - else, Switch cases
Week 4	7,8	Control Statements contd..	More problems on loops	LAB#4 : Loop - while, do-while, for loop
Week 5	9,10	Array	Introduction to Array	LAB#5: Array (1D) programs
Week 6	11,12	Array contd..	More Array programs	LAB#5: Array (multi D) programs , matrix
Week 7 - MID SEMESTER EXAMINATION :				
Post Mid Sem classes				
Week 8	13,14	Functions	<ul style="list-style-type: none"> •Library & User defined Functions, Formal and Actual parameters •Declaring, defining and calling functions 	LAB#6: Function Programs
Week 9	15,16	Functions Storage class	<ul style="list-style-type: none"> •Parameter Passing – call-by-value and call-by-reference, Recursion •Storage class 	LAB#6: Function Programs
Week 10	17,18	Character Arrays /Strings	String Manipulation functions	LAB#7 : String
Week 11	19,20	Pointer, Dynamic Memory Allocation	<ul style="list-style-type: none"> •Pointer variable, Pointer Arithmetic, Passing parameters by reference, •Pointer to pointer, Pointer to functions •Memory allocation functions (malloc, calloc, realloc, etc.) •Memory de-allocation function (free) 	LAB#8: Pointer programs
Week 12	21, 22	User Defined Data Types – Structures and Unions	<ul style="list-style-type: none"> •Structure: definition, structure variable, creation, initialization and assignment •Pointers to structures, Union and their uses, Enum and their uses 	LAB#9: Structure programs
Week 13	23, 24	File Handling	<ul style="list-style-type: none"> •File operations - opening, closing, reading, writing etc. 	LAB#10 : File Handling in C

			<ul style="list-style-type: none"> ••Command line arguments ••Bitwise operators ••Macros 	
Week 14	25, 26		Additional, buffer week/Sessional	
Week 15	27, 28		Sessional	

13. Assessment components:

S No.	Internal/Sessional	Assessment Component	Weightage / Marks
1	Internal (Sample) (60 Marks)	Lab Report	20
		Viva	10
		Quiz	10
		Programming Test	10
		Continuous Evaluation	10
2	Sessional (40 Marks)	Quiz	20
		Programming Test	20

14. Activity Components (Internal Assessment)

S No.	Activity Components	Act#	Details	Type of Component	CO#
1	Lab Report	1	Write All Linux commands in the LAB report	Practical LAB program practice and Assignments	1
		2	Practice and write all programs on simple input and output operations		1
		3	Practice and write all programs on Operators and Expressions		2
		4	Practice and write all programs on branching statements		3
		5	Practice and write all programs on looping (control) statements		3
		6	Practice and write all programs on Arrays		4
		7	Practice and write all programs on Character Arrays		4
		8	Practice and write all programs on Functions		4
		9	Practice and write all programs on Pointers		5
		10	Practice and write all programs on Structures		5
		11	Practice simple programs on file handling		6
2	Viva	1	One to one Viva	Oral evaluation	1 to 6
3	Quiz	1	Objective type quiz	Quiz	
4	Programming Test	1	Test to understand the programming skills	Practical Test	

15. Attendance: Every student is expected to be regular (in attendance) in all lecture classes, tutorials, labs, tests, quizzes, seminars etc and in fulfilling all tasks assigned to him / her. Attendance will be recorded and 75% attendance is compulsory.

16. Additional consultation hour for doubts clarification: Evening hours.

17. Notices: All notices regarding the course will be communicated through online systems (email etc).

Course Coordinator

Krishna Chakravarty