LJ University
University with a Difference

Diploma
in
Computer Engineering

Course Code: 025020202

Advanced Programming in C

Programme / Branch Name		Diploma in Computer Engineering			
Course Name	Advanced Programming in C			**Course Code**	025020202
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week				Evaluation Scheme			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**Total**
2	0	4	4	50	50	50	150

Legends:

L: Lectures T: Tutorial P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisites

- ✓ Basic knowledge of computer
- ✓ Basic problem-solving capability
- ✓ C programming fundamentals

3. Rationale

Computer engineers have to write programs to cater with various IT solutions. To develop a program, they have to build logic, develop algorithms and flowcharts. This course has been designed keeping in view of developing these skills. Besides its use to write codes for low-level programming such as developing an operating system, drivers and compilers. 'C' has been widely used as a general-purpose language to develop basic applications. This course deals with fundamental syntactic information about 'C' that will help students to apply the basic concepts, program structure and principles of the 'C' programming paradigm to build given application.
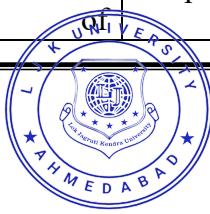
4. Objectives

- ✓ This course aims to help the students to attain the following industry-identified competency through various teaching-learning experiences.
  - Development of problem-solving ability & logic
  - Development of programming & coding ability using 'C' language

5. Contents

Unit No.	Unit Name	Topics	Learning Outcomes	% Weightage	Hours
1	**Arrays**	1.1. Introduction: Definition of array, Needs of array, Advantages of array, Disadvantages of array, Types of array 1.2. One-dimensional array: Definition, Declaration, Initialization of one-dimensional array 1.3. Two-dimensional array: Definition, Declaration, Initialization of two-dimensional array, Matrix operations – addition,multiplication, transpose	• Basics of array • 1D array and its operations • 2D array and its operations • Matrix operations of 2D array	20	4
2	**User Defined Function**	2.1. Introduction: Definition, Requirement of function, Advantages of function, Categories of function 2.2. Inbuilt functions: String functions, Maths functions, Console functions, Functions of ctype.h 2.3. User defined function: Introduction, Declaring, Defining, Invoking user defined function , Callee and Called functions, Parameters & arguments, Function invocation mechanism, Types of user defined functions, "Return" statement 2.4. Array in function 2.5. Recursion and recursive function: Introduction, Example, Advantages and disadvantages	• Fundamentals of function and its types • Library file functions of string, math, console, ctype • Implementation of user defined functions • Return keyword and its implementations • Problem solving using user defined functions • Applications of recursive functions	30	8
3	**Pointers**	3.1. Introduction to pointers: Definition , Need of pointer, Characteristic	• Basics of pointer • Implementing pointers	20	8

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		pointer, Importance of pointer, Advantages of pointer, Types of pointer 3.2. Declaration, Initialization of pointer 3.3. Pointer operations: increment, decrement, addition, subtraction, comparison, Array of pointer 3.4. Call by value and Call by reference 3.5. Void pointer, Null pointer, Pointer to pointer	• Applications of pointer operations		
4	**Structure and Union**	4.1. Introduction: Definition, need, advantages and features of structure 4.2. Declaring and instantiating structures: Declaration, Initialization, Accessing members 4.3. Array of structure 4.4. Pointer to structure 4.5. Union	• Concept of structure • Applying structures • Implementation of array & pointer in structure • Unions	20	4
5	**File Management in 'C'**	5.1. Introduction 5.2. Types of file 5.3. File modes 5.4. File I/O operations : opening, reading, writing and closing a file 5.5. Various file functions	• Basics of file, types & mode • Implementation of I/O operations • Use of in-built file functions	10	4
				Total Hours	**28**

6. List of Practicals / Exercises

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills so that students can acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

Sr. No.	Practicals / Exercises	Key Competency	Hours
1	Implement various C programs related to index, value, searching of elements for 1 dimensional array.	Various operations of 1D array, loop and control structure.	4
2	Implement various C programs related to sorting and merging of 1D array.	Various operations of 1D array, loop and control structure.	4
3	Implement various C programs related to searching and manipulation of 1D array.	Various operations of 1D array, loop and control structure.	4
4	Implement various C programs related to matrix operations and implementation of other concepts using 2D array.	Various operations of 2D array, loop and control structure.	8
5	Implement various C programs related to in-built function library math.h	Various operations of math.h functions.	4
6	Implement various C programs related to in-built functions of library file string.h	Operations of string.h functions.	8
7	Implement various C programs related to in-built functions of library file ctype.h	Implementation ctype.h functions.	4
8	Implement various C programs related to user defined functions.	Concept and implementation of user defined functions.	4
9	Implement various C programs related to pointers.	Operations of pointer and its types.	4
10	Implement various C programs related to file management functions in 'C'.	Concept and implementation of file management operations and functions.	4
11	Write a C program that will include concepts of header files, and user defined functions.	Implementations of header files, user defined functions	4
12	Write a C program that will include concepts of file management, array and pointers.	Implementations of file management, array and pointers	4
		Total Hours	**56**
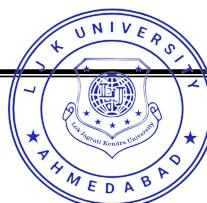
7. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	App %	C %	E %	An %
1	Arrays	25	25	30	10	5	5
2	User Defined Function	25	30	30	5	5	5
3	Pointers	25	25	30	10	5	5
4	Structure and Union	25	25	30	10	5	5
5	File Management in 'C'	30	25	25	10	5	5

Legends: R: Remembering   U: Understanding
            App: Applying   C: Creating
            E: Evaluating   An: Analyzing

8. Textbooks

1) Programming in ANSI C by E Balagurusamy, Latest Edition, Tata McGraw Hill Publication.
2) Let Us C by Yashavant Kanetkar, Latest Edition, BPB Publication.

9. Reference Books

1) Programming in C by Satya Prakash, Latest Edition, I.K. International Pvt. Ltd.
2) C: The Complete Reference by Herbert Schildt, Latest Edition, Tata McGraw Hill Publication.
3) The C Programming Language by Brian W. Kernighan / Dennis Ritchie, Latest Edition, Pearson Education.
4) Computer Fundamentals and Programming in C by Reema Thareja, Latest Edition, Oxford University Press.

10. Open Sources (Website, Video, Movie)

1) https://nptel.ac.in/courses/106/104/106104128/
2) https://www.coursera.org/learn/c-for-everyone
3) https://www.tutorialspoint.com/cprogramming/index.htm