

**COMPUTER SCIENCE /
COMPUTER SCIENCE AND ENGINEERING
COURSE DETAILS**

COMPUTER SCIENCE/ COMPUTER SCIENCE AND ENGINEERING COURSE DETAILS

SEMESTER I

KU1DSCCSE101 PRINCIPLES OF PROGRAMMING

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	DSC	100	KU1DSCCSE101	4	90

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
2	4	1	50	50	100	2(T)+3(P)*

* ESE duration: 2 hours for theory and 3 hours for Lab

Course Description: Computer Science is all about developing correct and efficient solutions for our day-to-day problems. The process of developing solutions is not centered on learning a programming language and doing coding straight away. Instead, a blueprint of the proposed solution should be outlined and tested for correctness. Once a proposed blueprint leads to a correct solution, it can be implemented using a suitable programming language. The objective of this course is to impart knowledge to the learner about building the blueprint of a solution. Learners are also exposed to implementing the solutions using the C programming language.

Course Objectives:

- To impart knowledge about various constructs for developing solutions

- To become familiar with using the various constructs to develop solutions
- To compare and contrast various constructs for solution development for selection
- To compare and contrast various constructs for solution development for iteration
- To implement solutions using C programming language

Course Outcomes:

At the end of the Course, the Student will be able to:

SL #	Course Outcomes
CO1	Illustrate the foundations of developing solutions using flowcharts and algorithms
CO2	Develop solutions using various selection constructs and implement them in the C programming language
CO3	Develop solutions using various iteration constructs and implement them in the C programming language
CO4	Understand advanced concepts in direct memory handling, file handling and functions.

Mapping of COs to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓	✓	✓	✓	✓
CO2	✓	✓	✓	✓	✓
CO3	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓	✓

COURSE CONTENTS

Module 1: Problem-Solving: Preparing Solutions using Flowcharts: Conventions - Structure - Symbols. Preparing Solutions using Algorithms - Conventions - Top-Down and bottom-up approach. **Program:** Characteristics - Modular Approach - Style - Documentation and Maintenance - Compilers and Interpreters - Preparing, Running and Debugging Programs - Types of Errors. Fundamentals of C Language: Evolution and Features - Program Structure - Elements - Constructs. Character Set, Tokens, Keywords, Identifier. Data Types, Constants, Symbolic Constants, Variables, Data Input and Output, Statements - Assignment statements. Operators in C: arithmetic, relational, logical, assignment, auto increment, auto decrement, conditional, comma operators. Precedence of operators - expressions – evaluation of expressions, type conversion in expressions – precedence and associativity. **(15 hours)**

Module 2: Selection Constructs: Simple if - if else - if else if ladder - switch. Branching statements: break, goto. Case study: Developing solutions (flowcharts and algorithms) for problems using various selection constructs - Comparative Study of various Selection Constructs - Converting a solution using one selection construct with other selection constructs. (20 Hours)

Module 3: Iteration Constructs: Top Tested Vs Bottom Tested - while - for - do while - Nesting of loops - skipping breaking loops. Arrays - 1D and 2D, 3 D - Case study: Developing solutions (flowcharts and algorithms) for problems using various iteration constructs - Comparative Study of various iteration constructs - Converting a solution

using one iteration construct with other iteration constructs. Functions and function calling mechanisms. **(20 hours)**

Module 4 : Advanced concepts in C: Concepts of memory allocation for variables- Direct memory accessing - Pointers- pointer arithmetics- structures- files and file operations- preprocessor directives- preparing customized header files. **(25 hours)**

Module X:

C programming for embedded systems: concepts of embedded systems - microcontrollers- basic programming with microcontroller. (10 Hours)

Core Compulsory Readings

1. J.B Dixit, Computer Fundamentals and Programming in C, Firewall Media
2. Anil Bikas Chaudhuri, The Art Of Programming Through Flowcharts Algorithms, Laxmi Publications, New Delhi.
3. Maureen Spraknle and Jim Hubbard, Problem Solving and Programming Concepts, Pearson
4. E Balaguruswamy, Programming in ANSI C, TMH, 5th Edition

Core Compulsory Readings

1. R G Dromey, How to Solve by Computer, Pearson Education, 5th Edition
2. Brian W. Kernighan and Dennis M. Ritchie, C Programming Language, PHI
3. Kanetkar, Let Us C, BPB Publications, 8th Edition

TEACHING LEARNING STRATEGIES

- Lecturing, case study/mini projects, Team Learning, presenting seminars on selected topics, Digital Learning

MODE OF TRANSACTION

- Lecture, Seminar, Discussion, Demonstration, Questioning and Answering, Video tutorial

ASSESSMENT RUBRICS

Refer to section 7 of FYIMP- Computational Science - Scheme and Syllabus for the 4 credit courses with 2 Credit Theory + 2 Credit Practical.

Sample Questions

1. Define algorithms ?
2. Discuss various characteristics of Algorithms ?
3. Explain flowchart and its symbols?
4. Draw flowcharts swapping two numbers with using an additional variable and without using additional variable
5. Write a program to illustrate the use of if-else statement
6. Explain nested-if statement
7. Compare between if-else and else-if ladder
8. Explain various methods for iteration
9. Explain switch case statement
10. Write a program to generate the series 1, 2, 4, 7, 11, 16.....
11. What is function and how function is called
12. What is direct memory accessing,
13. Define pointers
14. Explain various file operations.

Semester II

KU2DSCCSE102 FOUNDATIONS OF COMPUTER SCIENCE

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	DSC	100	KU2DSCCSE102	4	90