SEMESTER - I

PROGRAMMING IN C

1. Course Description

Programme: B.Sc. **Max. Hours: 60**
Course Code: U26/CSC/DSC/101 **Hours per week:4**
Course Type: DSC **Max. Marks: 100**
No. of credits: 4

2. Course Objectives

1. To understand the art of writing programs using C
2. To apply all the concepts learnt in C programming in developing programs and applications in C.
3. To practice writing codes efficiently.

3. Course Outcomes

After the successful completion of the course, the student will be able to:

CO1: ***Explain*** basic concepts of C programming and program structure. (L II)

CO2: ***Apply*** control structures and arrays to develop C programs. (L III)

CO3: ***Analyze*** programs using functions, strings, structures, and unions (L IV)

CO4: ***Implement*** pointer-based programs with dynamic memory and file I/O. (L III)

4. Course Content

MODULE I: **15 Hours**

Programming Fundamentals

Introduction to Computer Software, classification of computer Software, Programming Languages, Algorithms and Flow charts.

Basics of C Programming

Introduction, Characteristics of C, uses of C, Structure of a C, writing, compiling and Executing C Program. Preprocessor Directives Processes involved in program execution: compilation, interpretation, loading and linking. Comments, Keywords, Identifiers, Basic

data types, variables, constants, Input /Output Statements, operators in C, type Conversion and type casting.

MODULE II: **15 Hours**

Control Structures and Arrays

Control Statements: Introduction, Conditional Branching Statemen: if, if-Else, if-Else-if Statement, Switch Case. Iterative statements: while, do-while and For, Nested loops, Arrays: Introduction, Declaration, Initialization, Accessing elements, storing values on One-dimensional arrays and two-dimensional arrays.

MODULE III **15 Hours**

Functions

Functions: Introduction, Declaration, Definition, Function call, return statement, passing Parameters to the function, and calling mechanisms, types of functions, String: string functions, call-by-value, call-by-reference. Passing arrays to functions, Scope of variables, Storage classes. recursive Function.

Strings, Structures, Unions

Strings: Introduction, String Operations. Structures and Unions: Introduction-Declaration, initialization, Accessing the members, Structures vs. Unions. Enumerated data types.

MODULE IV: **15 Hours**

Pointers and Files

Pointers: Introduction, Declaring Pointer variables, Pointer Expressions and Pointer, Arithmetic, Null Pointers, Dynamic Memory Allocation, Drawback of Pointers. Files: Introduction, Reading Data from files, Writing data to files. Working with text and binary files.

5. References Books

1. "Programming in C", by Reema Thareja, Oxford University Press, Second Edition, 2016
2. Programming with C, by Byron S. Gottfried, Schaum's Outline Series ,2E
3. Let Us C, by Yashwant Kanetkar, BPS Publications, 13E,
4. Programming in ANSI C, by Balaguruswamy, McGraw Hill Education, 7E
5. C Programming Language, by Brian W. Keringhan, Dennis M Ritchie, Pearson Publications, 2E
6. A Structured Programming Approach Using C by B. A. Forouzan.

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6. Syllabus Focus

a) Relevance to Local, Regional, National and Global Development Needs

S. No	Local/Regional/National /Global Development Needs	Relevance
1.	National	C is an adaptable, effective, and performance-driven language.
2.	Global	C is language and is widely employed in everything from system software to game development.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Modules 1I, III &IV	Designing algorithms, flowcharts and writing C programs for given algorithm and testing programming skills in C.

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative Learning	Seminars, Presentations and Group discussions.
2..	Problem solving	Case Studies

8. Course Assessment Plan

a) Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA -40%	End Semester Examination-60%
CO1	CIA 2– Test 1: MCQ's, Quiz test or subjective	Written Exam
CO2	CIA 2 – Subjective	
CO3		
CO4	CIA 2 – Test 2: MCQ's or Presentation	

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b) Model Question Paper- End Semester Exam Theory

PROGRAMMING IN C

Course Code: U26/CSC/DSC/101 **MAX MARKS: 60**
Credits: 4 **TIME: 2 hours**

Note: This question paper consists of Section A and B. The answer to Section A & B must be written in the answer book given.

Section - A (Long Essay Type)

Answer ALL questions: **Marks:4 x 10 = 40**

1. What are the different symbols used in flow charts? Design a flow chart to find the maximum of three numbers

OR

2. What are different data types supported in C with examples.
3. What are arrays? Explain one-dimensional array with an appropriate program

OR

4. Explain the concept of if-else and nested if. Write a program to show the usage of both if else and nested if.
5. Elaborate the need for recursion. Write a program to print factorial of a number using recursion.

OR

6. Explain the difference between structure and union with an example
7. Explain the concept of Pointers with a suitable example.

OR

8. Explain various file operations and their functions in C.

Section – B (Short Essay Type)

II. Answer any Four: **4 x 5 = 20M**

9. Explain switch case with example.
10. Define Algorithms and write an algorithm to display the multiplication table of a given number.
11. What is the purpose of the scanf function? Explain various formats with example.
12. Differentiate while loop and do-while loop.
13. Write a C program to display the smallest elements in an array using one dimensional array.
14. What a brief note on Dynamic Memory allocation.

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Question Paper format – Blooms Taxonomy Level

SECTION A - INTERNAL CHOICE				**4Q X 10 M = 40 M**
Question Number	**Module Covered**	**Question**	**CO**	**BTL (Blooms Taxonomy Level)**
1	Module 1	What are the different symbols used in flow charts? Design a flow chart to find the maximum of three numbers.	CO 1	Level II
2	Module 1	What are different data types supported in C with examples.	CO 1	Level II
3	Module 2	Elaborate the need for recursion. Write a program to print factorial of a number using recursion.	CO 2	Level III
4	Module 2	Explain the concept of if-else and nested if. Write a program to show the usage of both if else and nested if.	CO 2	Level III
5	Module 3	What are arrays? Explain one-dimensional array with an appropriate program	CO 3	Level IV
6	Module 3	Explain the difference between structure and union with an example	CO 3	Level IV
7	Module 4	Explain the concept of Pointers with a suitable example.	CO 4	Level III
8	Module 4	Explain various file operations and their functions in C	CO 4	Level III
SECTION B - ANSWER ANY 4 OUT OF 6 (To compulsorily have ONE question from each module)				**4Q X 5 M = 20 M**
9	Module 2	Explain switch case with example.	CO 2	Level III
10	Module 1	Define Algorithms and write an algorithm to display the multiplication table of a given number.	CO 1	Level II
11	Module 1	What is the purpose of the scanf function? Explain various formats with example	CO 1	Level II
12	Module 2	Differentiate while loop and do-while loop?	CO 2	Level III
13	Module 3	Write a program to accept and print single dimensional array	CO 3	Level IV
14	Module 4	What a brief note on Dynamic Memory allocation.	CO 4	Level III

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c) Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	CO Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
1	15	CO-1	2	4x10=40	6 (By taking at least one question from each Module)	4x5=20
2	15	CO-2	2			
3	15	CO-3	2			
4	15	CO-4	2			

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions (hrs)
1	1, 2	Analyze	15
2	2, 7	Understand	15
3	1, 2	Remember	15
4	1, 2	Understand	15

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PROGRAMMING IN C

Practical Syllabus

1. Course Description

Programme:	**B. Sc**	**Max. Hours:**	**30**
Course Code:	**U26/CSC/ DSC/101/P**	**Hours per week:**	**2**
Type of Course:	**DSC-1**	**Max. Marks:**	**50**
No. of Credits:	**1**		

2. Course Objectives

1. To Introduce the Fundamental Concepts of Programming through C Language.
2. To write C Programs.

3. Course Outcomes

After the successful completion of the course, the student will be able to:

CO1: To Design Simple Algorithms for Arithmetic and Logical Problems.

CO2: To Understand Conditional Branching, Iteration, Recursion, Arrays, Structures and Unions

4. Course Content

1. Program to display Area, Perimeter of circle.
2. Program to calculate Simple Interest by accepting data
3. Program to display all Data types supported by C
4. Program to find Greatest of 3 numbers using Relational operator
5. Program to swap two numbers i) using third variable ii) without using third variable
6. Program to find Minimum of 3 numbers using Ternary operator (conditional Operator)
7. Program to find Sum of first "n" Even numbers using While loop.
8. Program to find out whether given number is palindrome or not using do while
9. Program to find the Factorial of given number using for loop
10. Program to perform Arithmetic operations using Switch case

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11. Program to generate Fibonacci series.
12. Program to read an array, display the elements in the in reverse order
13. Program to find maximum and Minimum number in an array
14. Program to find the Factorial of given number using recursion
15. Write a C program to multiply two matrices.
16. Write a C program to demonstrate the use of different storage classes (auto, register, static, extern).
17. Write a C program to demonstrate the concepts of call-by-value and call-by-reference
18. Write a C program that demonstrates various string functions from the library.
19. Write a C program that demonstrates structures and unions.
20. . Write a C program that opens a file and counts the total number of characters in it.
21. Write a C program that copies content from an existing text file to a new file
22. Write a C Program to swap two numbers using Pointes
23. Write a C Program to read and display the contents of File.

4. References Books

1. Programming with C, by Byron S. Gottfried, Schaum's Outline Series ,2E
2. Let Us C, by Yashwant Kanetkar, BPS Publications, 13E,
3. Programming in ANSI C, by Balaguruswamy, McGraw Hill Education, 7E
4.C Programming Language, by Brian W. Keringhan, Dennis M Ritchie, Pearson Publications, 2E
5. Brian W. Kernighan, Dennis M. Ritchie, The C Programming Language
6. B. A. Forouzan, R. F. Gilberg, A Structured Programming Approach Using

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PROGRAMMING IN C
PRACTICAL MODEL PAPER

Course Code: U26/CSC/DSC/101/P

No. of Credits:1

Time: 2Hrs

Max Marks:50

Answer any two:

1. Write a C Program to find the greatest of three numbers.
2. Write a C program to find the factorial of a given number using recursion
3. Write a C program to display the numbers of 1D array in reverse order.

Prepared by	Checked &Verified by	Approved by
D.B.Rekha **Teaching faculty**	**Dr. Sr. Sujatha Yeruva** **HoD**	**Prof. Uma Joseph** **Principal**

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SEMESTER - I

COMPUTER SYSTEM ARCHITECTURE

1. Course Description

Programme:	**B. Sc. S.E. (H)**	**Max. Hours:**	**60**
Course Code:	**U26/CSH/DSC/101**	**Hours per week:**	**4**
Type of Course:	**DSC**	**Max. Marks:**	**100**
No. of Credits:	**4**		

2. Course Objectives

1. To provide students with a fundamental understanding of the functional components of a computer system, and how they are organized.
2. To explore the hardware-software interface, emphasizing the physical system components involved in software execution.

3. Course Outcomes

After the successful completion of the course, the student will be able to:

CO1: ***Recognize*** the basic gates and their functions. (L I)

CO2: ***Identify*** the Flip flops and ***illustrate*** their use in constructing different sequential circuits. (L I & III)

CO3: ***Explain*** the regular operation of a computer in terms of the fetch-decode- execute cycle and the interaction between the instruction set architecture and the computer organization. (L II)

CO4: ***Explain*** different types of addressing modes and instruction formats. (L II)

4. Course content

MODULE I: **15 Hours**

Number Systems and Binary Arithmetic

Number systems- decimal, binary, octal and hexadecimal number systems, converting from one number systems to another. Ones and twos complement, signed arithmetic, Binary addition and subtraction.

Logic Gates and Boolean Algebra

Logic gates, OR, inverter, NAND, NOR, exclusive-OR, Boolean function, truth table, logic diagram, DeMorgan's theorem, Complement of a function, Minterm, Maxterm, sum of products, product of sums expression, K-Map, map simplification up to 4 variable, NAND implementation, NOR implementation.

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MODULE II: **15 Hours**

Combinational and Sequential Logic Circuits

Combinational circuits, Block Diagram Analysis and Design, Half-Adder, Full Adder. Decoders, Multiplexers, Sequential Circuits-Block Diagram, Analysis and Design, Types of Sequential Circuits.

Flip-flops and Registers

Flip-flops, SR flip flop, D flip flop, JK flip-flop T flip-flop, Edge-Triggered flip flops, Registers, Shift registers (serial in serial out, Serial in parallel out), binary counters, Decade Counter.

MODULE III: **15 Hours**

Basic Computer Organization and Design

Instruction code, Computer registers, common bus system, computer instructions, instruction set completeness, timing and control, instruction cycle, fetch and decode, types of instruction, register reference instructions, memory reference instruction, input-output and interrupt, input-output configuration, input-output instruction, program interrupt, interrupt cycle.

MODULE IV: **15 Hours**

Central Processing Unit and Memory Management

Register organization, control word, stack organization, register stack, memory stack. Instruction formats, register address, three-address instructions, two-address instruction, zero-address instructions, RISC instructions, addressing modes, Data transfer and manipulation, Data transfer instructions, data manipulation instruction, logic and bit manipulation instruction. Memory Organization: Memory Hierarchy, Main Memory, RAM and ROM, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

5. Reference Books

1. M. Morris Mano, Computer System Architecture, 3rd Edition, Pearson Education, 2017.
2. Thomas L. Floyd, Digital fundamentals, 10th Edition, Pearson Education India, 2013.
3. M. Morris R. Mano, Digital Design,4th Edition, Pearson Education, 2008.
4. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India,2009
5. Carl Hamacher, Computer Organization, fifth edition McGraw Hill, 2012.

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6. Syllabus Focus

a) Relevance to Local, Regional, National and Global Development Needs

S. No	Local/Regional/National /Global Development Needs	Relevance
1.	Global	To understand, fundamental understanding of the functional components of a computer system, and how they are organized.

b) Components on Skill Development/Entrepreneurship Development/Employability

SD/ED/EMP	Syllabus Content	Description of Activity
Skill Development	Module I & II	Recognize the basic gates and their functions, identify the Flip flops and illustrate their use in constructing different sequential circuits.
Employability	Module III & IV	Understanding how basic instruction cycle works along with addressing formats

7. Pedagogy

S. No	Student Centric Methods Adopted	Type / Description of Activity
1.	Participative Learning	Presentations and Seminars
2.	Experiential Learning	Simulations, Quiz
3.	Problem solving	Troubleshooting Scenarios

8. Course Assessment Plan

a) Weightage of Marks in Continuous Internal Assessments and End Semester Examination

CO	Continuous Internal Assessments CIA -40%	End Semester Examination-60%
CO1	CIA 1 – Written Test, Formative Assessment	Written Exam
CO2		
CO3	CIA 2 – Written Test, Quiz	
CO4		

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CBCS 2026

b) Model Question Paper – End Semester Exam Theory

COMPUTER SYSTEM ARCHITECTURE

Course Code: U26/CSH/DSC/101 **MAX MARKS: 60**
Credits: 4 **TIME: 2 hours**

Note: This question paper consists of Section A and B. The answer to Section A & B must be written in the answer book given.

SECTION – A (Long Essay Type)

I. Answer ALL questions: **Marks: 4 x 10 = 40**

1. Determine by means of a truth table the validity of De-Morgan's theorem variables: (ABC)'=A'+B'+C'

OR

2. Explain the different Logic gates in detail with supportive diagram

3. List and briefly explain the various types of Flip-Flops used in computer logic circuits.

OR

4. Define Decoders. Design a 3-to-8 line decoder using basic logic gates and explain its operation as a minterm generator.

5. What is the difference between a direct and an indirect address instruction? How many references to memory are needed for each type of instruction to bring an operand into a processor register?

OR

6. Derive the control gates associated with the program counter PC in the basic computer?
7. Explain the Stack Organization in CPU in detail?

OR

8. Explain RISC and its characteristics?

SECTION –B (Short Essay Type)

II. Answer any <u>FOUR</u> **Marks: 4 x 5 = 20**

9. Given the Boolean expression F=x'y + xyz'
   a. Derive an algebraic expression for the complement F'.
   b. Show that F*F'=0
   c. Show that F+F'=1
10. Simplify the expressions in a) x'z' + y'z' + yz' + xy b) AC + B'D + A'CD + ABCD
    a. Sum-of-products form
    b. Product-of-sums
11. Write a short note on multiplexers.
12. Write about Instruction Codes.
13. Write about Data Manipulation Instruction.
14. Write short notes on Memory Hierarchy.

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Question Paper format – Blooms Taxonomy Level

SECTION A - INTERNAL CHOICE				**4Q X 10 M = 40 M**
Question Number	**Module Covered**	**Question**	**CO**	**BTL (Blooms Taxonomy Level)**
1	Module 1	Determine by means of a truth table the validity of De-Morgan's theorem variables: (ABC)'=A'+B'+C'	CO 1	Level I
2	Module 1	Explain the different Logic gates in detail with supportive diagram.	CO 1	Level I
3	Module 2	List and briefly explain the various types of Flip-Flops used in computer logic circuits.	CO 2	Level I & III
4	Module 2	Define Decoders. Design a 3-to-8 line decoder using basic logic gates and explain its operation as a minterm generator.	CO 2	Level I & III
5	Module 3	What is the difference between a direct and an indirect address instruction? How many references to memory are needed for each type of instruction to bring an operand into a processor register?	CO 3	Level II
6	Module 3	Derive the control gates associated with the program counter PC in the basic computer?	CO 3	Level II
7	Module 4	Explain the Stack Organization in CPU in detail?	CO 4	Level II
8	Module 4	Explain RISC and its characteristics?	CO 4	Level II
SECTION B - ANSWER ANY 4 OUT OF 6 (To compulsorily have ONE question from each module)				**4Q X 5 M = 20 M**
9	Module 1	Given the Boolean expression F=x'y + xyz' a. Derive an algebraic expression for the complement F' b. Show that F*F'=0 c. Show that F+F'=1	CO 1	Level I
10	Module 1	Simplify the expressions in a) x'z' + y'z' + yz' + xy b) AC + B'D + A'CD + ABCD a. Sum-of-products form b. Product-of-sums	CO 1	Level I
11	Module 2	Write a short note on multiplexers.	CO 2	Level II
12	Module 2	Write about Instruction Codes.	CO 2	Level I
13	Module 3	Write about Data Manipulation Instruction.	CO 3	Level II
14	Module 4	Write short notes on Memory Hierarchy.	CO 4	Level I

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c) Question Paper Blueprint

Modules	Hours Allotted in the Syllabus	CO Addressed	Section A (No. of Questions)	Total Marks	Section B (No. of Questions)	Total Marks
1	15	CO-1	2	4x10=40	6 (By taking at least one question from each Module)	4x5=20
2	15	CO-2	2			
3	15	CO-3	2			
4	15	CO-4	2			

9. CO-PO Mapping

CO	PO	Cognitive Level	Classroom sessions (hrs)
1	1	Remember	15
2	1	Apply, Remember	15
3	2	Understand	15
4	2	Understand	15

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COMPUTER SYSTEM ARCHITECTURE
Practical Syllabus

1. Course Description

Programme:	**B. Sc. S.E. (H)**	**Max. Hours:**	**30**
Course Code:	**U26/CSH/DSC/101/P**	**Hours per week:**	**2**
Type of Course:	**DSC**	**Max. Marks:**	**50**
No. of Credits:	**1**		

2. Course Objectives

1. To explore the hardware-software interface, emphasizing the physical system components involved in software execution.

3. Course Outcomes

After the successful completion of the course, the student will be able to:

CO1: To recognize the basic gates and their functions.

CO2: To illustrate the use of the Flip flops and other digital components in constructing different sequential circuits.

4. Course Content

1. Study of logic gates and verification of Boolean Laws
2. Design of adders and subtractors
3. Design of Multiplexers
4. Design of De-multiplexers
5. Design of Encoder and Decoder
6. Study of flip-flops
7. Design and implementation of counters using flip-flops
8. Design and implementation of shift registers

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5. Model Question Paper – End Semester Exam Practical

COMPUTER SYSTEM ARCHITECTURE

Programme: B. Sc. S.E.(H)
Course Code: U26/CSH/DSC/101/P
Type of Course: DSC
No. of credits: 1

Max. Marks: 50
Time: 2 hours

Answer any TWO of the Following

1. Construction of half/full adder using XOR and NAND gates.

2. Verify the truth table of RS, JK, T and D flip flops.

3. Design and verify the 4-bit serial register in parallel out shift register

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Prepared by	Checked & Verified by	Approved by
Ms. Afeefa Noorain Teaching faculty	Dr. Sr. Sujatha Yeruva HoD	Prof. Uma Joseph Principal

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