

BIDAR UNIVERSITY BIDAR

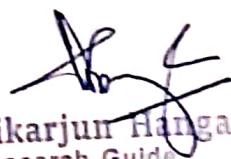


**BACHELOR OF SCIENCE IN COMPUTER SCIENCE
SYLLABUS FOR UNDER GRADUATE
(I and II Semester)
STATE EDUCATION POLICY-2024**

**WITH EFFECT FROM
THE ACADEMIC YEAR 2024-25**

Submitted by

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Chairman
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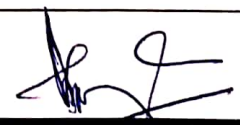

Dr. Mallikarjun Hangarge
Research Guide
Associate Professor of Computer Science
Karnatak Arts, Science, and
Commerce College, Bidar.

Curriculum Structure for B.Sc. Computer Science w. e. f 2024-25

Category	Course Code	Title of the Paper	Marks			Hours/ Week	Credits	Duration of Exams (Hrs.)
			IA	Semester End Exam (SEE)	Total			
SEMESTER I								
DSC01	SEPBSCCST01	Computer Fundamentals and C Programming	20	80	100	4	4	3
	SEPBSCCSP01	C Programming Lab	10	40	50	4	2	3
TOTAL: HOURS/CREDIT					150	8	6	
SEMESTER II								
DSC02	SEPBSCCST02	Data Structures using C++	20	80	100	4	4	3
	SEPBSCCSP02	Data Structures using C++ Lab	10	40	50	4	2	3
TOTAL: HOURS/CREDIT					150	8	6	


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Year	I	Course Code : SEPBSCCST01		Credits	4
Semester	I	Course Title : Computer Fundamentals and C Programming		Hours	60
Course Pre-requisites, if any		NA			
Formative Assessment Marks:20		Summative Assessment Marks: 80	Duration of SEE: 3 hrs		
Course Objectives	After completing this course satisfactorily, a student will be able to: • Understanding model, components of computer and how it works. • Understanding the concept of input and output devices of Computers in detail. • Understanding RAM, ROM and their types in detail. • Understanding the concept of programming languages. • Read, understand and trace the execution of programs written in C language. • Write the C code for any complex and real-time problems. • Write programs that perform operations matrices using Arrays & Strings. • Write programs using pointer concepts for efficient memory usage. • Create user defined functions to strengthen the C Library.				
Unit No.	Course Content			Hours	
UNIT I	Fundamentals of Computers: Introduction, Definition, History of Computers, Generations of Computers, Classification of Computers, Characteristics of Computers, Basic Organization of a Computer, Software, Types of Software, Overview of Operating System. Number Systems – different types, conversion from one number system to another. Introduction to C Programming: History of C, Features of C; Programming Languages and its Classification; Compiler, Interpreter, Linker and Loader; Problem Solving Techniques; Flowcharts; Algorithms; Basic Structure of a C Program; Executing a C Program; Examples of flow charts and algorithms - Largest of three numbers, Reversing the digits of an integer, GCD of two integers, generating Prime numbers, computing n^{th} Fibonacci numbers.			15	
UNIT II	Overview of C: C Character set; C Tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Declaration of Storage Class; Assigning Values to Variables, Symbolic constant, Declaring a Variable as Constant Operators & Expression: Introduction; Arithmetic Operators; Relational Operators; Logical Operators; Assignment Operators; Increment & Decrement Operators; Conditional Operator; Bitwise Operators; Special Operators; Arithmetic Expressions; Evaluation of Expressions; Type Conversion; Operator Precedence and Associativity; Standard Mathematical functions.			10	
UNIT III	Input/output Functions: Formatted I/O Functions - printf and scanf; Unformatted I/O Functions – getch(), putch(), getche(), getchar(), putchar(), gets(), puts(). Control Structures: Branching and Decision Making: Introduction; Decision making with Simple if; if-else; Nesting of if-else; else-if ladder, switch; and goto statement. Decision Making & Looping: Introduction; while loop; do-while loop; for loop, Nested loops; jumps in loops - break, continue, return, exit.			10	


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UNIT IV	Arrays: Introduction; One-dimensional Arrays; Declaration of One-dimensional Arrays; Initialization of One-dimensional Arrays; Two-dimensional Arrays; Initializing Two-dimensional Arrays; Multi-dimensional Arrays; Dynamic Arrays; Passing Arrays to Functions. Strings: Introduction; Declaring & Initializing String Variables; Reading Strings from Terminal; Writing Strings to Screen; String Handling Functions - strlen, strcmp, strcpy, strcmp and strcat ; Character handling functions - toascii, toupper, tolower, isalpha, isnumeric etc.	10
UNIT V	Pointers in C: Introduction; Understanding Pointers; Accessing the Address of a Variable; Declaring Pointer Variables; Initialization of Pointer Variables; Accessing a Variable through its Pointer. User defined functions: Introduction; Need for user defined functions; Elements of User-Defined Functions; Definition, Categories of Functions -No Arguments and No Return Values, Arguments but No Return Values, Arguments with Return Values, No Arguments but Returns a Value. User defined data types: Defining a Structure; Declaring Structure Variables; Accessing Structure Members; Structure Initialization; Arrays of Structures; Unions; Difference between Structure & Union.	15

Recommended Learning Resources

Text Books:

1. Pradeep K. Sinha and Preeti Sinha, "Computer Fundamentals (Sixth Edition)", BPB Publications.
2. David D. Riley and Kenny A. Hunt, "Computational Thinking for Modern Problem Solver", CRC Press.
3. E Balagurusamy, "Computer Concepts and Programming in C (UPTU)", McGraw Hill Education India.
4. Reema Thareja, "Computer Fundamentals and Programming in C(Second Edition, 2017.)", Oxford Higher Education,
5. Brian W. Kernighan and Dennis M. Ritchie, "The 'C' Programming Language", Prentice Hall of Software Series.

Reference Books:

1. J. Glenn Brookshear and Dennis Brylow, "Computer Science: an Overview (12th Edition.)", Pearson.
2. R. G. Dromey, "How to Solve it by Computer", Pearson.
3. Ashok N. Kamthane, "Programming with ANSI and TURBO C", Pearson Education.
4. Yashavant Kanetkar, "Let Us C", BPB Publication.

E-Resources:

Computer Fundamentals:

1. Coursera- Computer Science 101 by Stanford University.
2. edX-Introduction to Computer Science by Harvard University.
3. Codecademy- Computer Science Course
4. FreeCodeCamp-Computer Science Curriculum.
5. GeeksforGeeks- Computer Science Portal.

C Programming:

1. Codecademy - C Programming Course
2. Coursera - C Programming Specialization by University of Colorado Boulder

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3. edX - C Programming by Microsoft.
4. FreeCodeCamp - C Programming Challenges.
5. GeeksforGeeks - C Programming Portal.
6. Tutorialspoint - C Programming Tutorial.
7. (link unavailable) - C Programming Tutorial.
8. OpenClassrooms - C Programming Course.

E-books:

1. "The C Programming Language" by Brian Kernighan and Dennis Ritchie (PDF).
2. "Computer Fundamentals" by Peter Norton (PDF).
3. "C Programming: A Modern Approach" by K. N. King (PDF).

Online Communities:

1. Stack Overflow - C Programming Tag.
2. Reddit - r/learnprogramming and r/C_Programming.
3. GitHub - C Programming Repository.



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Year	I	Course Code : SEPBSCCSP01	Credits	2
Semester	I	Course Title : C Programming Lab	Hours	50
Course Pre-requisites, if any		Knowledge of C Programming Language		
Formative Assessment Marks: 10		Summative Assessment Marks: 40	Duration of SEE: 3 hrs	

Lab Preliminaries

- The following activities be carried out/ discussed in the lab during the initial periods of the semester.
 - Familiarization of Computer Hardware (Inside Components) and Software.
 - Basic Computer Operations and Maintenance.
 - Do's and Don'ts, Safety Guidelines in Computer Lab
- Familiarization of Basic Software – Operating System, Word Processors, Internet Browsers, Integrated Development Environment (IDE) with Examples.
- Type Program Code, Debug and Compile basic programs covering C Programming fundamentals discussed during theory classes.

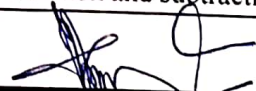
PART-A:

- Write an algorithm, flow chart and a C Program to read the radius of a circle and find the area and circumference of the circle.
- Write an algorithm, flow chart and a C Program to read three numbers and find the biggest of three.
- Write an algorithm, flow chart and a C Program to check the given number is prime or not.
- Write an algorithm, flow chart and a C Program to read a number, find the sum of the digits, reverse the number and check it for palindrome.
- Write an algorithm, flow chart and a C Program to display the following by reading the number of rows as input,


```

1
121
12321
1234321

```
- Write an algorithm, flow chart and a C Program to implement the given problem i. e an electricity board charges the following rates for the use of electricity: for the first 200 units 50 paise per unit: for the next 100 units 90 paise per unit: beyond 300 units Rs 1 per unit. All users are charged a minimum of Rs.100 as meter charge. If the total amount is more than Rs.400, then an additional surcharge of 15% of total amount is charged. Write an algorithm, flow chart and a program to read the name of the user, number of units consumed and print out the charges.
- Write an algorithm, flow chart and a C Program to find the roots of quadratic equation (demonstration of switch-case statement)
- Write an algorithm, flow chart and a C program to read marks scored by n students and find the average of marks (Demonstration of single dimensional array)
- Write an algorithm, flow chart and a C Program to remove Duplicate Elements in a single dimensional Array.
- Write an algorithm, flow chart and a C Program to perform addition and subtraction of Matrices.


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PART-B:

1. Write a C Program to find the length of a string without using built-in function.
2. Write a C Program to demonstrate string functions - strlen, strcmp, strcpy, strrev and strcat.
3. Write a C Program to demonstrate pointers in C.
4. Write a C Program to read, display and to find the trace of a square matrix.
5. Write a C Program to read, display and multiply two M x N matrices using functions.
6. Write a C Program to read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters.
7. Write a C Program to Reverse a String using Pointer.
8. Write a C Program to Swap Two Numbers using Pointers.
9. Write a C Program to demonstrate student structure to read & display records of n students.
10. Write a C Program to demonstrate the difference between structure & union.

Instructions:

1. A certified journal is mandatory for every student to appear for the practical examination.
2. The student has to execute a minimum of eight programs from each part to complete the lab course.



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Year	I	Course Code : SEPBSCCST02		Credits	4
Semester	II	Course Title : Data Structures Using C++		Hours	60
Course Pre-requisites, if any		NA			
Formative Assessment Marks: 20		Summative Assessment Marks: 80	Duration of SEE: 3 hrs		
Course Objectives		After completing this course satisfactorily, a student will be able to: • Learn basics of C++ language. • Learn fundamentals of Data Structures and their Applications. • Illustrate representation of different Data Structures such as Arrays, Stack, Queues, and Linked Lists. • Learn basic operations on Linear Data Structures. • Design and Develop Solutions to problems using Linear Data Structures.			
Unit No.	Course Content			Hours	
UNIT I	Introduction: Object Oriented Programming Paradigm, OOP Principles, The Structure of a C++ Program, Tokens, Keywords and Identifiers, Constants, Variables, Data types, Operators and Expressions, Selection statements, Iterative Statements.			10	
UNIT II	Classes and Objects: Class and Object Definition, Access Specifiers Private. Public, Passing Objects as Arguments, Returning Objects from Functions, Arrays of Objects, Arrays as Member Data, Static Member Data. Constructors and Destructors: Constructors and their Characteristics, Types of Constructors, Default Constructor, Parameterized Constructors, Copy Constructor, Dynamic Constructor, Destructor and its Characteristics.			10	
UNIT III	Introduction to Data Structures: Definition; Classification of Data Structures-Primitive & Non-primitive, Linear and Non-linear Introduction to array, Representation of Linear Arrays in memory; Basic operations on Arrays -Traversing Linear Arrays; Inserting and Deleting elements. Linked List: Introduction-Basic Terminologies, Linked Lists versus Arrays, Memory Allocation and De-allocation for a Linked List; Representation of Linked List, Types of Linked Lists – Singly Linked List, Doubly Linked List, Circular Linked List, Circular Doubly Linked List and Header Linked List; Representation of Linked list in Memory; Operations on Singly Linked Lists –Traversing, Searching, Inserting, Deleting.			16	
UNIT-IV	Stacks: Introduction; Definition and Array Representation of Stacks; Operations on Stacks; Applications of Stacks; Infix, Postfix and Prefix notations; Conversion from infix to postfix using stack. postfix expression using stack. Queues: Introduction; Definition and Array Representation of queues; Types of Queues – Simple Queues, Circular Queues, Double ended Queues, Priority Queues.			14	


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UNIT V	Trees: Definition; Tree Terminologies – Node, Root Node, Leaf Node, Path, Ancestors of a Node, Siblings, Descendant node, Terminal & Non-Terminal Nodes, Degree of a Node, Level Number, In-degree, Out-degree, Types of Trees. Sorting – Bubble sort, Selection sort, Insertion sort, Merge Sort.	10
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Recommended Learning Resources

Text Books:

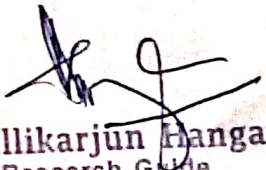
1. Adam Drozdek, "Data Structures and Algorithms in C++ (4th Edition)", Course Technology Ptr.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++ (4th Edition)", Pearson.
3. Yashavant Kanetkar, "Data Structures Through C++ (4th Edition)", BPB Publications.

Reference Books:

1. Horowitz, Sahni, Mehta, "Fundamentals of Data Structures in C++ (2nd Edition)", Silicon Pr.
2. M.T Somashekara, "Object Oriented Programming with C++ (2nd Edition)", PHI.
3. E Balagurusamy, "Object Oriented Programming with C++", Tata McGrawHill, Publications.
4. Herbert Schildt, "C++: The Complete Reference (5th Edition)", Tata McGrawHill, Publication.

E-Resources:

1. GeeksforGeeks: A popular website for learning data structures and algorithms in C++.
2. Codeforces: A platform for competitive programming that offers tutorials, contests, and practice problems.
3. Coursera - University of Pennsylvania's "C++ for C Programmers" course: A free online course covering C++ basics and data structures.
4. edX - Microsoft's "C++ Essentials" course: A free online course covering C++ fundamentals, including data structures.
5. MIT OpenCourseWare - "Introduction to C++ and Data Structures": Free online course materials, including lectures, assignments, and exams.
6. LeetCode: A popular platform for practicing data structures and algorithms in C++.
7. C++ Tutorial by tutorialspoint: A comprehensive tutorial covering C++ basics, data structures, and advanced topics.
8. Data Structures and Algorithms in C++ by Michael McMillan (PDF): A free eBook covering various data structures and algorithms.
9. C++ Data Structures by LearnProgramming: A YouTube channel offering video tutorials on C++ data structures.
10. Stanford University's "C++ Library" documentation: A comprehensive resource for learning the C++ Standard Template Library (STL).


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Year	II	Course Code: SEPBSCCSP02	Credits	2
Semester	II	Course Title: Data Structures Using C++ Lab	Hours	50
Course Pre-requisites, if any		Knowledge of C++ Programming		
Formative Assessment Marks: 20		Summative Assessment Marks: 80	Duration of SEE: 3 hrs	

PART-A:

1. Write a C++ Program to read and display array element using Class.
2. Write a C++ Program to insert an element in given array using Class.
3. Write a C++ Program to delete an element from given array using Class.
4. Write a C++ Program to read the names of cities and arrange them alphabetically.
5. Write a C++ Program to find smallest and largest element of the array.
6. Write a C++ Program to search an element using linear search technique.
7. Write a C++ Program to search an element using binary search technique.
8. Write a C++ Program to sort the given list using selection sort technique.

PART-B:

1. Write a C++ Program to sort the given list using bubble sort technique.
2. Write a C++ Program to sort the given list using insertion sort technique.
3. Write a C++ Program to sort the given list using merge sort technique.
4. Write a C++ Program to implement linear linked list.
5. Write a C++ Program to implement Stack.
6. Write a C++ Program to convert an infix expression to postfix.
7. Write a C++ Program to implement Queue.
8. Write a C++ Program to implement Circular queue.

Instructions:

1. A certified journal is mandatory for every student to appear for the practical examination.
2. The student has to execute a minimum of eight programs from each part to complete the lab course.


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Semester End Exam (SEE) Question Paper Pattern

Duration of the examination: 3 hours

Max. Marks: 80

Section A

Answer any TEN Questions from the following, each carries 2 marks:

[10X2=20]

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____

Note: (Select three questions from Unit I and II. Select two questions each from III, IV and V Units)

Section B

Answer any FOUR from the following questions each carries 5 marks.

[4X5=20]

13. _____
14. _____
15. _____
16. _____
17. _____

Note: (Select one question each from Units I, II, III, IV and V)

Section C

Answer any FOUR from the following questions each carries 10 marks.

[4X10=40]

(The Question consist two sub-questions)

18. _____
19. _____
20. _____
21. _____
22. _____

Note: Select one question each from Units I, II, III, IV, and V.


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CIA (Continues Internal Assessment) for Practical	
Assessment Type	Marks
Test 1 on PART A	10
Test 2 on PART B	10
Maximum Marks to be awarded (Average)	10

Instructions:

1. A Certified Journal is mandatory for appearing the examination.
2. Students shall be given two programming assignments taking into consideration of duration of the time allotted to students for writing, typing and executing the programs.
3. Award maximum 10 marks based on the average of two practical CIA.

Note: Guidelines given by the university from time-to-time shall be followed for IA.

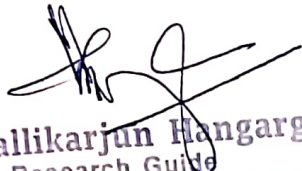
Semester End Examination (SEE) Scheme of Evaluation for Lab Examination

Assessment Criteria	Marks
Writing of 2 Programs (Each from Part A & Part B)	15
Execution (Includes program code modification and execution result)	15
Journal	05
Viva-Voice	05
Total	40 Marks

Instructions:

CIA (Continues Internal Assessment) for Theory	
Assessment Type	Marks
1. Test 1	15
2. Assignment	05
1. Test 2	15
2. Seminar	05
Maximum Marks to be awarded (Average)	20

1. Award maximum 20 marks based on the average of two theories CIA.


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