



**Bhavan's Vivekananda College**  
**of Science, Humanities and Commerce**  
Sainikpuri, Secunderabad-500094  
(Reaccredited with 'A' Grade by NAAC)  
Autonomous College – Affiliated to Osmania University

Department of Computer Science  
PROGRAM NAME: B.Sc. (Computer Science)  
COURSE NAME: PROGRAMMING IN 'C'  
(w.e.f. 2023-2024)

COURSE CODE: CS125

YEAR/SEMESTER: I/I

PPW: 4

NO. OF CREDITS: 4

**COURSE OBJECTIVE:** To enable students with the concepts of 'C' Programming to develop Simple Applications.

**UNIT-WISE COURSE OBJECTIVES:**

**COB1:** To discuss the Basics of 'C' Language.

**COB2:** To illustrate different control and looping statements, Arrays and Strings with examples.

**COB3:** To explain the usage of Functions, Pointers.

**COB4:** To construct Structures, unions and working with text files.

**UNIT-1:**

**Basics of C, C Tokens, Input-Output, Control Statements**

**15 Hrs.**

**Basics of C:** Overview of C, Developing programs in C, Writing, Compiling and Executing the program, Parts of simple C program, Structure of a C program, Comments, Program Statements.

**C Tokens:** Keywords, Identifiers, Datatypes, Variables, Constants, Operators and Expressions, Expression Evaluation-Precedence and associativity, Type Conversions.

**Input-Output:** Non-formatted and Formatted Input and Output Functions, Escape Sequences.

**Control Statements:** Selection Statements – if, if-else, nested if, nested if-else, conditional operator, switch.

(Ch: 8(8.1, 8.3, 8.6, 8.9, 8.12, 8.13, 8.16)), 9 (9.3, 9.4), 10 (10.4)).

**UNIT-II:**

**Iterative Statements, Special Control Statement, One Dimensional Array, Two Dimensional Arrays, Character Arrays.**


**15 Hrs.**

**Iterative Statements:** while, for, do-while.

**Special Control Statement:** goto, break, continue, return and exit.

**One Dimensional Array:** Declaration, Initializing, Accessing, Working with One Dimensional Array.

**Two Dimensional Arrays:** Declaration of Two-Dimensional Array, working with Two Dimensional Array.

  
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**Character Arrays:** Declaration of String, String Initialization, Printing Strings, String Input Functions from String.h (strlen(), strcat(),strrev(),strcmp(),strlwr(),strupr()).

Ch: 10 (10.5, 10.7, 10.8 10.9), 11(11.2, 11.3, 11.4.1, 11.4.6, 11.5.1, 11.5.2)).

### UNIT-III:

**Functions, Storage Classes, Pointers, Dynamic Memory Allocation** **15 Hrs.**

**Functions:** Concept of Function: Need of Functions, Using Functions: Function Prototype declaration. Function definition, Function calling, Call-by-Value mechanism, Scope of Variables – Concept of Global and Local Variables.

**Storage Classes:** Storage class specifiers for Variables, Recursive Function.

**Pointers:** Introduction, Address of Operator (&), Pointer: Declaring a Pointer, Initializing Pointers, Indirection operator and dereferencing, Uses of Pointers and Call-by-Reference.

**Dynamic Memory Allocation:** Dynamic allocation of Arrays (calloc (), malloc ()), freeing memory (free ()).

**Note:** Theory concept for Pointers and DMA.

(Ch: 12(12.2, 12.4, 12.7, 12.10), 13(13.1, 13.3, 13.4, 13.17, 13.17.1, 13.17.2))

### UNIT-IV:

**User Defined Data types, Union and Enumeration Type, Files** **15 Hrs.**

**User-Defined Data Types:** Declaring a Structure and its members, Initialization Structure, Accessing members of a Structure, Array of Structures and Nested Structures.

**Union and Enumeration Type:** Declaring a Union and its members, Initialization, Accessing members of a Union, Structures versus Unions, Enumeration types.

**Files:** Introduction, Using Files: Declaration of file Pointer, opening a file, closing a file, Working with Text Files: Character Input and Output.

**Note:** Theory Concept for Files.


(Ch: 14(14.2.1, 14.2.3, 14.3, 14.3.1, 14.3.3, 14.4), 15(15.1, 15.2, 15.3)).


### Prescribed book:

**Computer Fundamentals and Programming in C** , Pradip Dey, Manas Ghosh, 2nd Edition, Oxford University Press, 2013.

### Reference Books:

1. **Beginning C**, Ivor Horton, 7th Edition, Springer, 2024.
2. **C: The Complete Reference** , Herbert Schildt, 4th Edition, McGraw-Hill Education, 2000.
3. **C How to Program**, Paul Deitel, Harvey Deitel, 9th Edition, Pearson Education, 2022.
4. **Schaum's Outline of Programming with C** , Byron S. Gottfried, 2nd Edition, McGraw-Hill Education, 1996.
5. **The C Programming Language**, Brian W. Kernighan, Dennis M. Ritchie, 2nd Edition, Prentice Hall, 1988.
6. **Computer Science: A Structured Programming Approach Using C**, B.A. Forouzan, R.F. Gilberg, 3rd Edition, Cengage Learning, 2006.

  
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**COURSE OUTCOMES:**

**At the end of the course, students will be able to:**

**CO1:** Be familiar and develop basic programs in C.

**CO2:** Develop program using Control Statements, Looping Statements, Arrays and String concepts.

**CO3:** Write programs using Function and Pointers.

**CO4:** Apply the concepts of Structures, Unions and Working with Text Files in C Programs.

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Department of Computer Science  
PROGRAM NAME: B.Sc. (Computer Science)  
COURSE NAME: PROGRAMMING IN 'C' Lab  
(w.e.f. 2023-2024)

COURSE CODE: CS125P

PPW: 2

YEAR/SEMESTER: I/I

NO. OF CREDITS: 1


**COURSE OBJECTIVE:** To develop a strong understanding and practical skills in C programming.

**COB1:** To implement C Programs for Control Statements, Arrays, Functions and Recursion.

**COB2:** To implement C Programs for Structures, Unions, Enum and Files.

1. Introduction to Computers, Fundamentals (Seminar).
2. Classification of Computers & Anatomy of Computers (Seminar).
3. Introduction to O.S, Compiling, Loading, Linking, Interpreting and software development (Seminar).
4. Top-down Analysis, Modular Programming & Memory Hierarchy (Seminar).
5. Generation and Classification of Programming Languages. (Seminar).
6. Different Algorithms (Step-form. Pseudo-code. Flow chart) (Seminar)
7. Write a program to demonstrate comma operator.
8. Write a program to find the largest of two numbers using if and conditional operator.
9. Write a program to calculate arithmetic operations of two numbers using switch.
10. Write a program to print the reverse of a given number.
11. Write a program to print whether the given number is a prime or not.
12. Write a program to find largest and smallest elements in a given list of numbers.
13. Write a program to find the sum of two matrices.
14. Write a program to find the product of two matrices.
15. Write a program to print the reverse of a given string.
16. Write a program to demonstrate any four Functions of ctype.h.
17. Write a program to find the factorial of a positive integer using recursion.
18. Write a program to find the GCD of two positive integers using iteration.
19. Write a program to demonstrate the call by value and the call by reference concepts.
20. Write a program to demonstrate Passing Arrays to Functions.

  
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21. Write a program to demonstrate Arrays and Pointers.
22. Write a program to demonstrate Pointers and Strings.
23. Write a program to illustrate the use of Enumeration data type.
24. Write a program to illustrate the use of structure concept.
25. Write a program to illustrate the use of union concept.
26. Write a program to write content into a file and display contents of a file.

### **COURSE OUTCOMES:**


**At the end of the Course, Students will be able to:**


**CO1:** Execute C Programs for Control Statements, Arrays, Functions and Recursion.

**CO2:** Execute C Programs for Structures, Unions, Enum and Files.

**Note:** Write the Pseudo Code and draw flow Chart for the above programs Recommended to use Open Source.

Some are: GCC on Linux; Dev C++ (or) Code Blocks on 'Windows 10.

  
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Department of Computer Science  
PROGRAM NAME: B.Sc. (Computer Science)  
COURSE NAME: PROGRAMMING IN C++  
(w.e.f. 2023-2024)

**COURSE CODE: CS225**

**PPW: 4**

**YEAR/SEMESTER: I/II**

**NO. OF CREDITS: 4**

**COURSE OBJECTIVE:** To enable students with the concepts of object-oriented programming and develop simple applications.

**UNIT-WISE COURSE OBJECTIVES:**

**COB1:** To explain basic concepts like control statements, Arrays, Pointers and Functions.

**COB2:** To explain the concepts of OOP, class definition, constructors and destructors.

**COB3:** To illustrate different programs on inheritance, polymorphism, virtual Functions and C++ streams.

**COB4:** To construct programs using templates and exception handling.

**UNIT-1:**

**Introduction to C++, Control Structures, Arrays, Functions.**

**15 Hrs.**

**Introduction to C++:** Applications, Example programs.

**Control Structures:** if statement, if-else, if/else-if, nested if, switch statement, while, do While, for.

**Arrays:** Arrays hold Multiple values, Accessing Arrays elements, Inputting and displaying contents (using cin and cout), Array Initialization (One-Dimensional and Two-Dimensional).

**Functions:** Introduction, Function Prototype Passing data by value (Call by Value), Reference Variables definition and simple example program.

(BOOK I: CH-2.1, CH 3, CH- 4 (4.2,4.3,4.4,4.6,4.12) CH-5.2,5.5,5.6; CH-6.3,6.5,6.13; CH- 8 (8.1,8.2,8.3,8.4) CH-2.9 , CH- 10 (10.1,10.2,10.5)

**UNIT-II:**

**Object Oriented Programming, Classes, and Constructors.**

**15 Hrs.**

**Object Oriented Programming:** Procedural Programming versus Object Oriented Programming Terminology, Benefits, OOP Languages and OOP Applications.

**Classes:** Introduction, defining instance of a Class, why have Private members? Private Member Functions, Inline Member Functions.

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**Constructors:** Default Constructor, Passing Arguments to Constructors (Parameterized Constructors), Copy Constructors, Destructors, Arrays of Objects.

(BOOK I: CH-13 (13.1,13.2,13.3,13.4,13.5,13.6,13.7,13.8,13.9,13.11,13.12))

### UNIT-III:

**Inheritance, Polymorphism, Virtual Member Functions.**

**15 Hrs.**

**Inheritance:** Introduction, Protected Members and Class Access: Base Class Access Specification, Single Inheritance, Multilevel Inheritance, And Hierarchical Inheritance

**Polymorphism:** Overloading Functions, Overloading Constructors, Operator Overloading (Overloading with prefix ++Operator, Overloading Postfix -- Operator)

**Polymorphism and Virtual Member Functions** (Simple example program)

(BOOK I: CH-15 (15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8))

### UNIT-IV:

**Exceptions, Templates.**

**15 Hrs.**

**Exceptions:** Introduction, Throwing an Exception, Handling an Exception, Object-Oriented Exception Handling with Classes, Multiple Exceptions, Re-Throwing an Exception

**Templates:** Function Templates-Introduction, Function Templates with Multiple type, Overloading with Function Templates, Class Templates-Introduction, Defining Objects of the Class Template.

(Book I: CH-16.1, 16.2, 16.4, 16.5)

### Prescribed books:

1. **Starting Out with C++: From Control Structures through Objects**, Tony Gaddis, 9th Edition, Pearson Education, 2017.
2. **C++: The Complete Reference**, Herbert Schildt, 5th Edition, McGraw-Hill Education, 2009.

### Reference Books:

1. **C++ Primer**, B. Lippman, 5th Edition, Addison-Wesley, 2012.
2. **Thinking in C++**, Bruce Eckel, 2nd Edition, Prentice Hall, 2000.
3. **Mastering in C++**, K.R. Venugopal, 2nd Edition, Tata McGraw-Hill, 2006.
4. **The C++ Programming Language**, Bjarne Stroustrup, 4th Edition, Addison-Wesley, 2013.
5. **Object-Oriented Programming with C++**, Sourav Sahay, 2nd Edition, Oxford University Press, 2013.

### **COURSE OUTCOMES:**

**At the end of the course, students will be able to:**


**CO1:** Develop simple programs using conditional statements and Functions.

**CO2:** Illustrate the concepts of classes, constructors and destructors.

**CO3:** Implement inheritance and polymorphism concepts in programs.

**CO4:** Apply the concepts of templates and exception handling.

  
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PROGRAM NAME: B.Sc. (Computer Science)  
COURSE NAME: PROGRAMMING IN 'C++' Lab  
(w.e.f. 2023-2024)

COURSE CODE: CS225P

YEAR/SEMESTER: I/II

PPW: 2

NO.OFCREDITS: 1

**COURSE OBJECTIVE:** To gain knowledge and practical experience in C++ programming.

**COB1:** To implement C++ programs using control statements, functions, recursion, and arrays.

**COB2:** To implement C++ programs that demonstrates object-oriented concepts.

1. Write a program to print the sum of digits of a given number.
2. Write a program to check whether the given number is Armstrong or not.
3. Write a program to check whether the given string is Palindrome or not.
4. Write a program to implement
  - a) Linear Search
  - b) Bubble Sort.
5. Write a program to demonstrate Reference Variables as Parameters.
6. Write a program to demonstrate Passing Arrays to Functions.
7. Write a program on Pointers.
8. Write a program to read student name, roll no, marks and display the same using class and object (Separating Class Specification from Implementation example).
9. Write a program to find area of a rectangle, circle, and square using class and object.
10. Write a program to implement inline function inside and outside of a class.
  - a) Finding the area of a square
  - b) Finding the area of a cube.
11. Write a program to implement friend function and friend class.
12. Write a program to demonstrate
  - a) Instance and Static Members
  - b) Member-wise Assignment.
13. Write a program to implement constructor and destructor with in a class (Constructor Overloading and Constructor with Default Arguments).
14. Write a program to demonstrate hierarchical inheritance.
15. Write a program to demonstrate multiple inheritance.
16. Write a program implementing Constructor in Inheritance.
17. Write a program to demonstrate static polymorphism.
18. Write a program to implement polymorphism using pure virtual Functions.
19. Write a program to demonstrate unformatted I/O operations (cin, cout, get (), put (), getline(), write()).
20. Write a program to demonstrate the function templates and class templates.

  
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21. Write a program to demonstrate exception handling using try, catch, and finally.
22. Write a program to demonstrate for Re-throwing an Exception.
23. Write a program to demonstrate Class Templates and Inheritance.

### **COURSE OUTCOMES:**

**At the end of the Course, Students will be able to:**

**CO1:** Execute C++ Programs for Control Statements, Functions, Recursion and Arrays.

**CO2:** Execute C++ Programs for Object-Oriented Concepts.

**Recommended to use Open-SourceSoftware: GCC on Linux: Dev C++ or Code Blocks on Windows.**

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