



B.Sc. Computer Science Syllabus
Under the

CHOICE BASED CREDIT SYSTEM
(With effect from 2017-18)

DEPARTMENT OF COMPUTER SCIENCE
University College, TU, Nizamabad-503322

Syllabus for Computer Science (With effect from 2017-18)

Proposed scheme for **B.Sc.** Programme under Choice Based Credit System

Code	Course Title	Course Type	HpW	Credits
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SEMESTER – I

BS106	Programming in C	DSC-3A	4T+2P=6	4+1=5
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SEMESTER – II

BS206	Object Oriented Programming with C++	DSC-3B	4T+2P=6	4+1=5
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SEMESTER – III

BS301	A: SciLab - 1	SEC-1	2T	2
	B: Boolean Algebra			
BS306	Data Structures and File Processing	DSC-3C	4T+2P	4+1=5

SEMESTER – IV

BS401	C: Scilab-2	SEC-2	2T	2
	D: Digital Logic			
BS406	Database Management Systems	DSC-3D	4T+2P=6	4+1=5

SEMESTER – V

BS501	Information Technologies-1	GE-1	2T	2
BS502	E: Discrete Structures-1	SEC-3	2T	2
	F: Computer Organization			
BS505	Programming in Java	DSC-3E	3T+2P=5	3+1=4
BS506	Elective-A: Operating Systems	DSE-1A	3T+2P=5	3+1=4
	Elective-B: Software Engineering	DSE-2A		
	Elective-C: Data Mining	DSE-3A		

SEMESTER – VI

BS601	Information Technologies-2	GE-2	2T	2
BS602	G: Discrete Structures-2	SEC-4	2T	2
	H: Information Security			
BS605	Web Programming	DSC-3F	3T+2P=5	3+1=4
BS606	Elective-A: PHP with MySQL	DSE-1B	3T+2P=5	3+1=4
	Elective-B: Object Oriented Analysis and Design	DSE-2B		
	Elective-C: Computer Networks	DSE-3B		
Total Number of Credits				48

Unit – I

Computer Fundamentals : Introduction of Computers, Classification of Computers, Anatomy of a computer, Memory Hierarchy, Introduction to OS, Operational Overview of a CPU.

Program Fundamentals : Generation and Classification of Programming Languages, Compiling, Interpreting, Loading, Linking of a Program, Developing Program, Software Development.

Algorithms : Definitions, Different Ways of Stating Algorithms (Step-form, Pseudo-code, Flowchart), Strategy for Designing Algorithms, Structured Programming Concept.

Basics of C : Overview of C, Developing Programs in C, Parts of Simple C Program, Structure of a C Program, Comments, Program Statements, C Tokens, Keywords, Identifiers, Data Types, Variables, Constants, Operators and Expressions, Expression Evaluation–precedence and associativity, Type Conversions.

Unit – II

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

Control Statements : Selection Statements – if, if-else, nested if, nested if-else, comma operator, conditional operator, switch; Iterative Statements–while, for, do-while; Special Control Statement–goto, break, continue, return, exit.

Arrays and Strings : One-dimensional Arrays, Character Arrays, Functions from ctype.h, string.h, Multidimensional Arrays.

Unit – III

Functions : Concept of Function, Using Functions, Call-by-Value Vs Call-by-reference, Passing Arrays to Functions, Scope of Variables, Storage Classes, Inline Functions, and Recursion.

Pointers : Introduction, Address of Operator (&), Pointer, Uses of Pointers, Arrays and Pointers, Pointers and Strings, Pointers to Pointers, Array of Pointers, Pointer to Array, Dynamic Memory Allocation.

Unit – IV

User-defined Data Types : Declaring a Structure (Union) and its members, Initialization Structure (Union), Accessing members of a Structure (Union), Array of Structures (Union), Structures verses Unions, Enumeration Types.

Files : Introduction, Using Files in C, Working with Text Files, Working with Binary Files, Files of Records, Random Access to Files of Records, Other File Management Functions.

Text Pradip Dey, Manas Ghosh, Computer Fundamentals and Programming in C (2e)

References

1. Ivor Horton, Beginning C
2. Ashok Kamthane, Programming in C
3. Herbert Schildt, The Complete Reference C
4. Paul Deitel, Harvey Deitel, C How To Program
5. Byron S. Gottfried, Theory and Problems of Programming with C
6. Brian W. Kernighan, Dennis M. Ritchie, The C Programming Language
7. B. A. Forouzan, R. F. Gilberg, A Structured Programming Approach Using C

C Lab

Practical

2 Hours/Week

1 credit

- 1 .Write a program to find the largest two (three) numbers using if and conditional operator.
- 2 .Write a program to print the reverse of a given number.
- 3 .Write a program to print the prime number from 2 to n where n is given by user.
- 4 .Write a program to find the roots of a quadratic equation using switch statement.
- 5 .Write a program to print a triangle of stars as follows (take number of lines from user):

```
 *
  * * *
   * * * *
    * * * * *
     * * * * *
      * * * * *
       * * * * *
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- 6 .Write a program to find largest and smallest elements in a given list of numbers.
- 7 .Write a program to find the product of two matrices..
- 8 .Write a program to find the GCD of two numbers using iteration and recursion.
- 9 .Write a program to illustrate use of storage classes.
- 10 . Write a program to demonstrate the call by value and the call by reference concepts.
- 11 .Write a program that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
- 12 .Write a program to illustrate use of data type enum.
- 13 .Write a program to demonstrate use of string functions string.h header file.
- 14 .Write a program that opens a file and counts the number of characters in a file.
- 15 .Write a program to create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
- 16 .Write a program that opens an existing text file and copies it to a new text file with all lowercase letters changed to capital letters and all other characters unchanged.

Note:

- Write the Pseudo Code and draw Flow Chart for the above programs.
- All the concepts of programs from Text Book including exercises must be practiced, executed and written down in the practical record book.
- Faculty must take care about UG standard programs it should be minimum 25 – 30.
- In the external lab examination student has to execute at least three programs with compilation and deployment steps as necessary.
- External Viva-voce is compulsory.

Object Oriented Programming with C++

BS206

Theory	4 Hours/Week	4 credits
Practical	2 Hours/Week	1 credit

Unit I

Introduction to C++ : structure of C++ program, creating the source file, compiling and linking ,Tokens, Keywords, Identifiers and Constants , Basic Data types, User defined Data types, storage classes, Derived data types, Operators in C++,Arrays, Strings.

Functions in C++: Introduction, The main function, Function Prototyping, Call by Reference, Return by reference, Inline Functions, Recursion, , Function Overloading, Friend and Virtual functions.

Principles of Object Oriented Programming : A look at Procedure oriented programming, Object oriented programming paradigm, Basic concepts of Object Oriented Programming , Benefits of OOP, Object oriented languages, Applications of OOP.

Unit II

Classes and Objects : Specifying a Class, Defining member functions, making an Outside function inline, Nesting of member functions, Private member functions, Memory allocation for Objects , Static Data members, Static Member Functions, Arrays Of Objects, Objects as function arguments, returning objects, Pointers to members, Local Classes.

Constructors and Destructors: Introduction, Constructors , Parameterized Constructors, Multiple constructors in a class, Constructor with default arguments , Dynamic initialization of Objects, Copy Constructor, Dynamic Constructors , Destructors.

Operator overloading and Type Conversions : Defining Operator Overloading, Overloading Unary Operators, Overloading Binary Operators, Rules for Operator Overloading , Type Conversions.

Unit III

Inheritance : Introduction , Defining Derived Classes , Single Inheritance, Multi level Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes , Abstract Classes, Constructors in derived classes, Nesting of classes.

Virtual functions and polymorphism: Virtual Functions, Pure Virtual Functions, Virtual Constructors and Destructors.

Managing Console I/O operations: C++ streams, C++ stream classes, Unformatted I/O Operations, Formatted console I/O Operations.

Unit IV

Templates: Introduction, Class templates , Function templates, Class templates with multiple parameters , Function templates with multiple parameters, Overloading of Template Functions.

Exception handling : Introduction, Exception handling mechanism , Throwing and Catching an Exception, Re-throwing an Exception , Exceptions in Constructors and Destructors, Introduction to the Standard Template Library .

Text Book:

E. Balagurusamy “Object Oriented Programming with C++” TMH, 6th edition, 2013.

Recommended Books :

1. Reema Thareja “Object Oriented Programming with C++” Oxford university Press, 2015
2. Tony Gaddis, Starting out with C++: from control structures through objects (7e)
3. B. Stroustrup, *The C++ Programming Language*, Addison Wesley, 2004.
4. Herbert Schildt, C++: The Complete Reference
5. Spoken Tutorial on “C++” as E-resource for Learning:- <http://spoken-tutorial.org>

C++ Lab

Practical 2 Hours/Week 1 credit

- 1 Write a program to.
 - a. Print the sum of digits of a given number.
 - b. Check whether the given number is Armstrong or not
 - c. Print the prime number from 2 to n where n is natural number given.
2. Write a program to find largest and smallest elements in a given list of numbers and sort the given list.
- 3 .Write a program to read the student name, roll no, marks and display the same using class and object.
- 4 Write a program to implement the dynamic memory allocation and de-allocation using new and delete operators using class and object.
- 5 .Write a program to find area of a rectangle, circle, and square using constructors.
6. Write a program to implement copy constructor.
7. Write a program using friend functions and friend class.
- 8 .Write a program to implement constructors
 - Default Constructor, Parameterized Constructor, Copy Constructor
 - Define the constructor inside/outside of the class
 - Implement all three constructors within a single class as well as use multiple classes(individual classes)
9. Write a program to implement the following concepts using class and object
 - Function overloading
 - Operator overloading (unary/binary(+ and -))
10. Write a program to demonstrate single inheritance, multilevel inheritance and multiple inheritances.
- 11 .Write a program to implement the overloaded constructors in inheritance.
12. Write a program to implement the polymorphism and the following concepts using class and object.
 - Virtual functions
 - Pure virtual functions
13. Write a program to demonstrate inline functions
14. Write a program to demonstrate static polymorphism using method overloading.
15. Write a program to demonstrate dynamic polymorphism using method overriding and dynamic method dispatch.
16. Write a program to implement the template (generic) concepts
 - Without template class and object
 - With template class and object

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