

**Gondwana University,
Gadchiroli**



Choice Based Credit System (CBCS)

**Syllabus
of**

B.Sc. (Computer Science) - II

Semester – III & IV

Optional Subject

(Three Years Degree Course)

Prepared by

BOS Computer Science

2018-2019

B.Sc.-II (Computer Science) SEMESTER-III

B.Sc. (Computer Science) – II (Semester -III)											
Subject	Paper Code	Paper Name	Total Period /Week	Credit	Theory (Th) Assessment				Practical (Prac.)		Total (Th. + Prac.)
					IA	UE	Total	Min. Passing (40%)	UE	Min. Passing (40%)	
Core Course	USCST05	DATABASE MANAGEMENT & SYSTEM ANALYSIS	6T + 1Tu (Per Batch)	6	10	50	60	48 Marks	30	12	150
	USCST06	OBJECT ORIENTED PROGRAMMING WITH C++			10	50	60				

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**B.Sc.–II
SEMESTER-III
(Computer Science)
USCST05**

Paper-1: DATABASE MANAGEMENT AND SYSTEM ANALYSIS

[Max. Marks: 50]

UNIT–I: Database Environment

Basic Terminology, Data Processing, Traditional and DBMS Environment, Components of DBMS, Advantages & Disadvantages of DBMS. Three Tier Architecture, Data Abstraction, DBA & Functions. **Data Models:** Record Based Logical Model, Object Based Logical Model.

UNIT–II: Functional Dependency & Normalization

Functional Dependency, Normalization, Normal Forms (1NF, 2NF, 3NF, 4NF, 5NF), Relational Database Structure, Relational Algebra, Codd's Rules.

UNIT –III: System Analysis

System Definition, Components of System, **System Analysis:** System Development Life Cycle (SDLC), PARIS Model. **Information Gathering Tools:** Sources, Methods (Interviews, Questionnaires, Observation, Document Analysis, etc.). **Tools of Structure Analysis:** Data Flow Diagram, Data Dictionary, Decision Tree, Decision Table, CASE tools.

UNIT – IV: System Design & Implementation

System Design: System Design Principle, Input Design, Output Design, Form Design

Implementation: Testing, Level of Testing, Nature of Test Data, Conversion, User Training, Hardware and Software Selection.

Documentation: Types of Documentations, Quality Assurance, Privacy, Disaster Recovery Plan, Maintenance Review

Text Books:

- 1) Dr. S.B. Kishor, "Database Management System & Ms-Access", Das Ganu Prakashan, ISBN 978-93-81660-92-8
- 2) R. Panneerselvam, "Database Management System", PHI, 2006, ISBN : 81-203-2028-X
- 3) Dr. S.B. Kishor, "System Analysis & Design", Das Ganu Prakashan, ISBN-978-93-81660-17-1

Reference Books:

- 1) Elias Award, "System Analysis & Design", Golgotha Publication, 2nd Edition, ISBN: 81751568-X
- 2) Dr. Madhulika Jain, Vinita Pillai, Shashi Singh and Satish Jain, "Introduction to Database Management", BPB, 2002, ISBN: 81-7656-638-1

B.Sc.–II
SEMESTER-III
(Computer Science)
USCST06

Paper-2: OBJECT ORIENTED PROGRAMMING WITH C++

[Max. Marks: 50]

UNIT -I: Elements of Programming and Function

Introduction: Basic Elements of Programming, Console I/O Operations,

Function: Function Prototyping, Call and Return By Reference, Inline Function, Default and Constant Arguments, Function Overloading, Arrays, Manipulators and Enumeration.

UNIT -II: Classes and Object

Object Oriented Methodology: Basic Concepts, Characteristics of OOP. Advantages and Application of OOPs, Procedural Programming Vs OOP.

Classes and Objects: Specifying a Class, Creating Objects, Private & Public Data Members and Member Functions, Defining Inline Member Functions, Static Data Members and Member Functions. Arrays within Class, Arrays of Objects, Objects as Function Arguments, Returning Objects.

UNIT -III: Constructors, Destructors, Operators Overloading and Inheritance.

Constructors and Destructors: Introduction, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructors, Dynamic Constructors, Const Objects, Destructors

Operators Overloading: Definition, Unary and Binary Overloading, Rules for Operator Overloading.

Inheritance: Defining Derived Classes, Types of Inheritance, Constructors and Destructors In Derived Classes.

UNIT -IV: Pointers Virtual & Friend functions and file handling

Pointers: Pointer to Objects, this Pointer, 'New' and 'Delete' Operators, Virtual Function, friend Functions. Opening, Closing A File, File Modes, File Pointers and Their Manipulation,

Sequential Input and Output Operations: Updating A File, Random Access, and Error Handling During File Operations, Command Line Arguments.

Text Books:

- 1) K.R.Venugopal, Rajkumar, T. Ravishankar, "Mastering C++", TMH ,ISBN:0-07-463454-2.
- 2) Dr. S.B. Kishor, "Object Oriented Programming with C++", Das Ganu Prakashan, ISBN-978-93-84336-24-0
- 3) Farrel,"Object-Oriented Programming using C++",Cenage Pub, ISBN: 9788131505175

Reference Books :

- 1) D Ravichandran, "Programming with C++", Tata McGraw Hill Publishing Company Limited, New Delhi, ISBN 0-07-049488-6
- 2) E Balagurusamy, "Object Oriented Programming with C++ ", Tata McGraw Hill Publishing Company Limited, New Delhi, ISBN:- 13- 978-07-066907-9

B.Sc.–II
SEMESTER–III
(Computer Science)
Practical-1: MS-ACCESS

- A] Create table Student (Student no, Student name, and Course) in MS-ACCESS with the following details and perform following operations.

Student_no	Student_name	Course
101	Sunil	Vb
102	Anshu	Vb.Net
103	Sonam	Tally
104	Shital	Vb.Net

1. Use Column width as best fit.
2. Set Student no as a Primary Key.
3. Insert at least 10 students' records.
4. Display all the students whose name begin with letter 'S'.
5. Display the query view and take out the print out.
6. Add new fields such as Fees, Date_adm ,Date_of_birth, .Address)
7. Add data to above newly fields.
8. Select Student name, Course and Fees from student table.
9. Delete all the students who were admitted on specific date.
10. Update fees to increase it by thrice.
11. Select all the students of VB.NET paying course fees of 4000.
12. Update table by replacing the course name to TALLY wherever the course fees is 3500.
13. Delete the record where Student name is SONAM.
14. Display the student name, student no who was born on '14/6/1996'
15. Replace the Address of student say, ANSHU to PUNE.
16. Remove all the records where number of students is less than 2 for particular course.

- B] Create the Tables in which

Stud_per_Detail(Stud_no, Stud_name, Sex, date_of_birth, Address, Ph_no) and
Stud_off_detail(Stud_no, Course, Fees, date_Adm).

1. Select Stud_Name, Address from Stud_Per_Detail and Stud_no, Course, Fees from Stud_off_datail.
2. Create a report view for above query.
3. Append the records of above tables Stud_Per_Detail to Stud_History where StudentDate_of_Birth i s 14/06/1996.
4. Print the table design view and datasheet view.

- C] Create a table Donar(Donar_no, Donar_name, BG, Sex) by using following instruction.

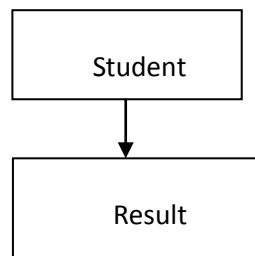
1. Use Columnar Layout.
2. Use Blueprint style.
3. Give the title for Form as Donar Details Form.
4. Enter 5 records.
5. Print the Form view.

**B.Sc.–II
SEMESTER–III
(Computer Science)**

Practical-2: OBJECT ORIENTED PROGRAMMING WITH C++

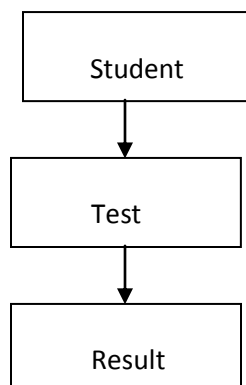
1. Design inline functions for add and multiply of two integer numbers.
2. Write a cpp program to overload “sum()” function for add two integers, to add three real and add three integers.
3. Write a ‘C++’ program to demonstrate the concept of Call & Return by reference.
4. Write a ‘C++’ program to demonstrate the concept of Default argument.
5. Design a class “Complex” with real and imaginary members also design appropriate member function to get and print complex numbers.
6. Design a class “ Time” with hours and minutes as data members and to get and print data of Time class also design a sum() with object as arguments to add two objects of Time class.
7. Design a class “Employee” with appropriate members. Demonstrate array of objects.
8. Write a ‘C++’ program to demonstrate Static Data Members and Member Functions.
9. Create a class “ Complex” with real and imaginary members and to initialize them write overloaded constructor for i) Default constructor ii) Constructor with one parameter iii) Constructor with two parameters.
10. Write a ‘C++’ program to overload unary ‘++’ and ‘-’ operator for “Sample” class with X,Y, Z of integer type
11. Write a ‘C++’ program to overload binary ‘+’ operator for adding two complex numbers.
12. Write a ‘C++’ program to Single inheritance for following structure.

Student Class (rollno, sub1, sub2) and Result Class (total, avg)



13. Write a class for Multilevel Inheritance for following structure

Student Class (rollno), Test Class(sub1,sub2), Result Class(total, avg)



14. Write a program in 'C++' for overriding of show() and display() function.
Demonstrate use of virtual function for runtime polymorphism.
15. Write a program in 'C++' which demonstrates the pure virtual function.
16. Write a 'C++' program which read contents from file and counts number of vowels and consonants in a file.
17. Write a 'C++' program which counts number of command line arguments on command line.
18. Write a 'C++' program which demonstrates use of this pointer.

B.Sc.-II(Computer Science)

SEMESTER-IV

B.Sc.(ComputerScience)–II(Semester-IV)											
Subject	Paper Code	Paper Name	Total Period /Week	Credit	Theory(Th) Assessment			Min. Passing (40%)	Practical (Prac.)		Total (Th. + Prac.)
					IA	UE	Total		UE	Min. Passing (40%)	
Core Course	USCST07	ALGORITHM & DATA STRUCTURES	6T + 1Tu (Per Batch)	6	10	50	60	48 Marks	30	12	150
	USCST08	VISUALBASIC & INTRODUCTION TO .NET			10	50	60				

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**B.Sc.-II
SEMESTER-IV
(Computer Science)
USCST07**

Paper-1: ALGORITHM & DATA STRUCTURES

[Max. Marks: 50]

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UNIT-I : Introduction to Data Structure

Data Structure and Algorithms: Introduction to Data Structures, Fundamentals of DS, Operations on Data Structures.

Sorting Methods : Bubble Sort, Insertion Sort, Selection Sort, Merge Sort

Searching: Definition, Types of Searching (Binary Search, Linear Search.), Complexity of algorithms.

Stack: Introduction & Definition, Application of Stack, Various Representation of Stack, Operation on stack (PUSH and POP), Representation of Arithmetic Expression (Infix, Postfix, Prefix), Multiple Stack, Evaluation of Postfix Expressions and their Conversions.

UNIT-II: Recursion and Queue

Recursion: Introduction, Recursion Properties, Applications of Recursion (Factorial, Addition of Two Numbers, Power of a Number, Fibonacci Series, Multiplication of Two Numbers)

Queues: Introduction, Representations of Queue, Operations on queue, Circular Queue, Priority Queue, Concept of Double Ended Queue.

UNIT-III: Linked List

Linked List: Introduction, Representation of Linked List, Operations on Linked List (Inserting, Removing, Reversing and Searching). Double Linked List – Insertion and Deletion

UNIT-IV: Tree and Graphs

Trees: Introduction, Binary Tree, Memory Representation of Binary Tree, Types of Binary Tree, Traversal of Binary Tree, Binary Search Tree (BST), Expression Trees,

Graphs: Definition of Graph, Various Terminology Used in Graph, Sequential Representation of Graph, Path Matrix, Spanning Tree and Minimum Spanning Tree (Kruskal Algorithm, PRIM'S Algorithm), Traversing a Graph.

Text Books:

- 1) Lipschutz Schaum's "Data Structure", Outline Series [TMH]. ISBN-0-07-060168-2
- 2) Dr. S.B. Kishor, "Algorithm & Data Structures", Das Ganu,

Reference Books:

- 1) D. Samanta, "Classical Data Structure", Prentice Hall India, ISBN: 8120318749

B.Sc.-II
SEMESTER-IV
(Computer Science)
USCST08

Paper-2: VISUAL BASIC & INTRODUCTION TO .NET

[Max. Marks: 50]

UNIT-I: Introduction to Visual Basic

Integrated Development Environment (IDE): Features, Event driven programming, **Programming Constructs:** Data Types, Variable, Constant, Operators, System defined Functions, Dialog Box and Creating User Interface.

Control flow statement: if-then, select-case, for-next, while-wend, do-loop statement, With-End With, Type of Event.

UNIT-II: VB Control and Procedure

Visual Basic Control: Form, Label, Textbox, Frame, Checkbox, Option Button, ListBox, ComboBox, Timer, Scrollbar, Picture, Image, File Controls, Artwork Control.

ActiveX Control: Tab Strip, Status Bar, Slider, Month View, DTPicker, Common Dialog

Procedure: Types of Procedure, Subroutine, Function, Module

UNIT-III: Interface, Array and ActiveX Data Object

Interface: SDI, MDI

Array: One Dimensional Array, Built-in Array function, For-Each Loop, Array Types

ActiveX Data Object : Data & ADODC Control, Connecting ADODC to Bound Control, Use of ADO Object, ADO Architecture, ADO Object Methods for Editing, Updating and Searching.

UNIT-IV: Introduction to .NET :

Basic functionality of CLR, MSIL, CTS & CLS, Common Language Implementation, .NET Languages, Namespaces & Assemblies, Garbage Collection.

Visual Studio.NET : WPF Designer and Windows Form Integration, Multi-Framework Targeting, Better Intelligent Support, Refactoring and Enhancements, Visual Studio Split View, Debugging the .NET Source Code.

Text Books:

- 1) Paul Sheriff, "Visual Basic 6", Eastern Economy Edition, ISBN-81-203-1562-6
- 2) Dr. S.B. Kishor, "Front End Development using Visual Basic", Das GanuPrakashan, ISBN 978-93-81660-0-5
- 3) Jeffrey Shapiro, "Visual Basic.NET: The Complete Reference", McGraw-Hill, ISBN-0-07-213381-3

Reference Books:

- 1) Prosenjit Sinha, "Visual Basic Complete", S. Chand & Company Ltd., ISBN-81-219-2345-X
- 2) Dan Rahmel, "Visual Basic .NET (Programmer's Reference)3rd Edition", McGraw-Hill, ISBN-0-07-219534-7

B.Sc.–II
SEMESTER-IV
(Computer Science)
Practical based on : DATASTRUCTURES

- 1) To delete an element from K^{th} position of Array.
- 2) To insert an element ITEM at K^{th} position of Array.
- 3) To insert an element Item in Sorted Array.
- 4) To implement the operation of Push, Pop and to know the status of stack.
- 5) An algorithm to check the status of stack.
- 6) To find factorial of a number using Recursion.
- 7) To find multiplication of two numbers using Recursion.
- 8) To simulate the game of Tower of Hanoi using recursion.
- 9) To implement the operation of insertion and deletion on Queue.
- 10) A menu driven program to implement the operation of addition, deletion, searching, traversing, reversion, sorting, counting number of nodes and at the end erasing the link list.
- 11) Implementation of stack using linked list.
- 12) Implementation of Queue using linked list.
- 13) To create binary search tree, traverse it and find number of leaves and total nodes in the Tree.
- 14) To arrange the list of numbers in a Sorted order using Merge Sort.
- 15) To arrange the list of numbers in the Sorted order using Quick sort.
- 16) To check all the elements of list are in sorted order or not.
- 17) To search an element using sequential or linear search. At the end display time required to search an element including number of comparisons.
- 18) To search an item position in sorted list (Binary search).

Practical based on: VISUAL BASIC & INTRODUCTION TO .NET

1. Build application that collect marks for five different subjects. If total is ≥ 500 display message "You are allowed" otherwise display "You are not allowed."

A book stall gives discount on the books as per the following conditions, No. of Books Purchased

	Discount	
1.	≤ 5	Nil
2.	> 5 and ≤ 10	10%
3.	> 10 and ≤ 15	12%
4.	> 15	20%

Create a form as follows to calculate the Discount

2. Build the VB application that converts a number entered into the Text box to Octal, Hexadecimal and Decimal.
3. Build the application to accept the password with in time limit say 8 seconds otherwise display a message time elapsed.
4. Build the application using timer for personal appointment reminder while working with computer system.
5. Evaluate following $\sin(x)$ series
 - i. $\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} - \dots$
6. Build the application, to change the color of Frame using RGB function from the values that are set by 3 Scroll bars.
7. Build a Calculator application to perform basic arithmetic operation
8. Build the application, to accept the temperature of Number of days passed in the current month and determines the highest and average temperature.
9. Demonstrate the working of data bound controls
10. Create a data bound control application to perform various data operation using ADO Control. Assume Database Name and Table Name is Donor having 4 fields Donor_Number, Donor_Name, Date_of_Birth, Donor_Blood and Sex.
11. Create a data bound control application to perform various data operation using ADO Control. Assume Database Name and Table Name is Donor having 4 fields Donor_Number, Donor_Name, Date_of_Birth, Donor_Blood and Sex.
12. Write an application to divide the number by another and it must be able to handle any error that may arise during run time.

Following Program Should be Performed using VB.Net
13. Design a form to accept First, Middle and Last Name and display the full name (Concatenate three text box) on Label when user click on Command Button.
14. Design an application that gives five choices of colors. Design an application to choose any one color using option button and change the Fore Color of Textbox.
15. Write an application to add and remove the name of city from combo box
16. Design a VB.Net screen, to display current time in digital format continuously after every one second and change the background color of form.
17. Build the VB. Net application, which marquee the caption of Form.

Build the VB. Net application, to convert the Fahrenheit temperature selected through scrollbar value into corresponding temperature in Celsius.