

# SATAVAHANA UNIVERSITY, KARIMNAGAR

## B.A. (Computer Applications)/B.Sc. (BZ Computer Applications)

### V- SEMESTER

#### Object Oriented Programming with C++ (Paper-I)

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**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. Richard Johnson, *An Introduction to Object-Oriented Application Development*, Thomson Learning, 2006

3. B. Stroustrup, *The C++ Programming Language*, Addison Wesley, 2004.

4. Herbert Schildt, C++: The Complete Reference Page 4 of 43

## Object Oriented Programming with C++ Lab

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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**V-SEMESTER**  
**OPERATING SYSTEMS (Paper-II)**

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**Unit I:** Introduction: Computer-System Architecture, Computing Environments.

Operating-System Structures: Operating-System Services, User Interface for Operating-System, System Calls, Types of System Calls, Operating System Structure.

Process Management: Process Concept, Process Scheduling, Operations on Processes, Inter process Communication, Examples–Producer-Consumer Problem.

**Unit II:** CPU Scheduling: Concepts, Scheduling Criteria, Scheduling Algorithms.

Process Synchronization: Critical-Section Problem, Peterson’s Solution, Synchronization, Semaphores, Monitors. Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

**Unit III:** Main Memory: Introduction, Swapping, Contiguous Memory Allocation, Segmentation, Paging.

Virtual Memory: Introduction, Demand Paging, Page Replacement, Allocation of Frames, Thrashing.

**Unit IV:** Mass-Storage Structure: Overview, Disk Scheduling, RAID Structure.

File Systems: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, Protection. File System Implementation, Directory Implementation, Allocation Methods, Free-Space Management.

**Text Book:**

Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating System Concepts (9e)

**References:**

1. Naresh Chauhan, Principles of Operating Systems
2. Thomas W. Doeppner, Operating Systems in Depth
3. Andrew S. Tanenbaum, Modern Operating Systems
4. William Stallings, Operating Systems – Internals and Design Principles
5. Dhananjay M. Dhandhere, Operating Systems – A Concept Based Approach

## OPERATING SYSTEMS LAB

1.
  - a) Use vi editor to create different files, writing data into files, modifying data in files.
  - b) Use different types of Unix commands on the files created in first program.
2. Write shell programs using 'case', 'then' and 'if' & 'else' statements.
3. Write shell programs using while, do-while and for loop statements.
4.
  - a) Write a shell script that accepts two integers as its arguments and compute the value of first number raised to the power of the second number.
  - b) Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.
5.
  - a) Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers..
  - b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
6.
  - a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
  - b) Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.
7. Write a program to simulate the UNIX commands like ls, mv, cp.
8. Write a program to convert upper case to lower case letters of a given ASCII file.
9. Write a program to program to search the given pattern in a file.
10. Write a program to demonstrate FCFS process schedules on the given data.
11. Write a program to demonstrate SJF process schedules on the given data.
12. Write a program to demonstrate Priority Scheduling on the given burst time and arrival times.
13. Write a program to demonstrate Round Robin Scheduling on the given burst time and arrival times.
14. Write a program to implementing Producer and Consumer problem using Semaphores.
15. Write a program to simulate FIFO, LRU, LFU Page replacement algorithms.
16. Write a program to simulate Sequential, Indexed and Linked file allocation.

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**VISUAL PROGRAMMING (Paper-I)**

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**Unit I:** Introduction to VB: Writing windows application with VB, Programming languages - procedural, object oriented, event driven; VB Environment, Writing first VB project, compiling, debugging, and running the programs.

Controls : Introduction to controls textboxes, frames, check boxes, option buttons, images, setting borders and styles, the shape control, the line control, working with multiple controls and their properties, designing the user interface, keyboard access, tab controls, default & cancel property, coding for controls.

Variables, constants, and Calculation: Data types, naming rules and conversion, constants-named and intrinsic, declaring variables, scope of variables, val function, arithmetic operations, formatting data Counting and accumulating Sums.

**Unit II:** Decisions and Conditions : If statement, Conditions comparing numeric variables and constants, comparing strings, compound conditions (and, or, not), nested if statements, using if statements with option buttons & check boxes, displaying message in message box, input validation. Calling event procedures, debugging VB projects, Debugging Step-by-Step Tutorial.

Modular programming: Menus, using common dialog box, writing general procedure.

**Unit III:** Forms Handling: Multiple forms, creating, adding, removing forms, hide, show method, load, unload statement, me keyword, referring to objects on a different forms, Variables and constants in Multiple-Forms.

Iteration Handling: Lists Boxes and Combo Boxes, Do/loops, for/next loops, using msgbox function, using string function Arrays: control Arrays, the case structure, single-dimension arrays, for Each/Next statement, table lookup, using list boxes with array, multi dimensional arrays.

**Unit IV:** Database Connectivity: VB and database, using the data control, viewing a database file-step-bystep, Navigating the Database in code, using list boxes and comboboxes as data-bound controls, adding a lookup table and navigation-step-by-step, updating a database file, Record sets, working with database fields, creating a new Dynaset.

Advanced topics in VB: ActiveX controls, Dynamic link libraries (DLL), Multiple Document interface (MDI).

**Text Book:**

1. Programming in Visual Basic 6.0 by Julia Case Bradley, Anita C. Millispangh (Tata Mcgraw Hill Edition 2000 (Fourteenth Reprint 2004))

## **VISUAL PROGRAMMING LAB**

1. Print a table of numbers from 5 to 15 and their squares & Cubes.
2. Print the largest of three numbers.
3. Find the factorial of a number n.
4. Enter a list of positive numbers terminated by zero. Find the sum and average of these numbers.
5. A person deposits Rs. 1000 in a fixed account yielding 5% interest. Complete the amount in the account at the end of each year for n years.
6. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.
7. Read n numbers. Count the number of negative numbers, positive numbers and zeroes in the list(use arrays)
8. Read a single dimension array. Find the sum and average of these numbers.
9. Read a two dimension array. Find the sum of two 2D Array
10. Write a program to Demonstrate Control Array.
11. Write a Program to perform String Manipulation Operations.
12. Develop a VB Application to check for Input Validations.
13. Develop a VB Application to Demonstrate MDI.
14. Develop a VB Application to Demonstrate Combobox and Listbox.
15. Develop a VB Application to Demonstrate Option Buttons and Check Boxes.
16. Develop a VB Application to deal the following Database Operations
  - a) Insert
  - b) Delete
  - c) Update
  - d) Display

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**COMPUTER NETWORKS (Paper-II)**

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**Unit I:** Introduction: Data Communication Components, Line Configuration, Topologies, Transmission Mode, Categories of Networks, ISO Reference Model–Layered Architecture, Functions of Layers, TCP/IP Reference Model.

Transmission Media: Guided Media–Twisted Pair Cable, Coaxial Cable, Optical Fiber, Unguided Media– Satellite Communication, and Cellular Telephony. Multiplexing: Frequency–Division Multiplexing, Time–Division Multiplexing.

**Unit II:** Data Link Layer: Error Detection–VRC, LRC, CRC, Checksum, Error Correction–Hamming Code, Burst Error Correction, Line Discipline–ENQ/ACK, Poll/Select, Flow Control–Stop-and- Wait, Sliding Window, Error Control–Stop-and-Wait ARQ, Sliding Window ARQ Go-Back-n ARQ, Selective-Reject ARQ.

**Unit III:** Local Area Networks: Introduction to IEEE 802, Ethernet-CSMA/CD, Implementation, Token Ring,-Token Passing, Implementation.

Switching: Circuit Switching, Packet Switching, Message Switching.

**Unit IV:** Networking and Internetworking Devices: Repeaters, Bridges, Routers, Gateways, Routers, Switches, Distance Vector Routing Algorithm, Link State Routing Algorithm.

Transport Layer: Duties of Transport Layer, Connection. Upper OSI Layers; Session Layer, Presentation Layer, Application Layer.

**Text Book:**

Behrouz A. Forouzan, Data Communication and Networking (2e Update)

**References:**

1. S.S. Shinde, Computer Networks
2. William Stallings, Data and Computer Communications
3. Andrew S. Tanenbaum, David J Wetherall, Computer Networks
4. Behrouz A Forouzan, Firouz Mosharraf, Computer Networks A Top-Down Approach
5. James F. Kurose, Keith W. Ross, Computer Networking: A Top-Down Approach  
Featuring the Internet.

## Computer Networks Lab

1. Write a program to create a socket and implement connect function.
2. Write a program to get MAC address.
3. Write a program to display hello world using signals.
4. Write a program for socket pair system call using IPC.
5. Write a program to implement the sliding window protocol.
6. Write a program to identify the category of IP address for a given IP address.
7. Write a program to print details of DNS host.
8. Write a program to implement listener and talker.
9. Write a program to implement TCP echo using client–server program.
10. Write a program to implement UDP echo using client–server program.
11. Write a UDP client–server program to convert lowercase letters to uppercase letters.
12. Write a TCP client–server program to convert a given string into reverse.
13. Write a UDP client–server program to convert a given string into reverse.
14. Write a program to implement TCP iterative client–server program.
15. Write a program to implement time service using TCP client–server program.
16. Write a program to implement time service using UDP client–server program.

**Note:** Write above program using ‘C’ or C++