

# Object Oriented Programming

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## Rationale

Object orientation is a new approach to understand the complexities of the real world. This course offers the model programming language C++ that shall helped the students to implement the various concepts of object orientation practically.

## Detailed contents

1. Introduction
  - Problems with procedure oriented Programming technique.
  - Concepts of OOPs
  - Characteristics. Of OOPs
  - Advantages and application of OOPs
2. C++ Programming Basics
  - Basic Data types
  - Type Compatibility
  - Operators in C++
  - Scope resolution operator
  - Control Structure
3. Function C++
  - Function Prototyping
  - Call by reference
  - Inline function
  - Function overloading
  - Library Function
4. Class and Objects
  - Comparison of Class and C-Structure
  - Creating objects
  - Arrays within Class
  - Arrays of objects
  - Objects as Function Arguments
5. Constructor and Destructor
  - Constructor and its characteristics
  - Parameterized Constructor
  - Multiple Constructor in a class
  - Copy Constructor
  - Overloaded Constructor
  - Destructor and its characteristics
6. Operator Overloading
  - Overloading of unary operator
  - Overloading of binary operator
  - Manipulation of Strings using operator
  - Type conversion- basic type to class & class to basic type



## 7. Inheritance

- Type of Inheritance
- Need of protected members
- Application of inheritance

## 8. Managing Console I/O operation

- Unformatted I/O operation
- Formatted I/O operation: fill, precision, width
- I/O streams

## 9. File Operation

- Opening & closing a file
- Programming with files

## 10. Virtual & friend function

- Pointers to objects
- This pointers
- Pointer to derived classes
- Virtual functions
- Pure virtual functions
- Concept of late & early binding

## LIST OF PRACTICALS

1. Write a program using control structure.
2. Write a program using constructor and destructor.
3. Using objects as function arguments perform the addition of time hours, minutes, and second's format.
4. Perform addition of two complex numbers using classes.
5. Define a class to represent bank account include the following members Data Member: Name of the depositor, account Number, type of account; and balance amount in the account.  
Member functions: To assign initial value, to deposit an amount, to withdraw an amount after checking the balance, to display name and balances. Write a main program to test the program
6. Modify the program (5) for handling 10 customers using array of objects
7. Create a class FLOAT that contains one float data member overload all the four arithmetic operators so that operate on the object of the FLOAT
8. Define a class string. Use overloaded == operator to compare two strings
9. Write a program using friend function
10. Write a program using virtual function
11. Additional Exercise based on various topics.

## Reference books:

1. Object oriented programming with c++ - E. Balaguruswamy.
2. Object oriented programming in turbo c++ - Robert Lafore.



# COMPUTER ORGANSIATION

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## Rationale

This Subject provides the students with the knowledge of details organisation of currently available Personnel computers in order to understand their functioning and maintenance.

## Detailed Contents

1. **Basic Concept/Introduction**  
Registers, stacks, ALU, Control Unit, Instruction Types, Instruction Formats, Instruction Sets, and Addressing Modes. RISC processor and CISC Processor.
2. **Basic Mathematical Operations**  
Concept of Fixed and floating point number, and their representation, fixed point, Addition, Subtraction and Multiplication, floating point addition and subtraction.
3. **Control Unit**  
Concept of Hard-wired and Micro instruction based Control Units. Principles of instruction decoding and implementation. Horizontal and Vertical classes of micro instructions. Identifying micro-instructions, minimising micro-instruction size, Parallelisin in micro-instructions, encoding control instruction. Timing cycles and Clock generation.
4. **Memory Organisation**  
Main Memory, Memory Hierarchy, memory references, address mapping, relocation mechanism, concept of memory compactions. Principles of virtual memory, paging and segmentation associative memory, cache memory.
5. **Input-Output Organisation**  
Memory mapped and I/O mapped input-output. Modes of Data Transfer - Polled, Interrupt and DMA. Multiple I/O - Daisy Chaining, Polling and Parallel Priority Control.
6. **Parallel Processing**  
Classification (SISD, SIMD, MISD and MIMD). Principles of Pipeline processing.

## Reference Books

1. Moris Mano-Computer System Architecture
2. Morris Mano-Digital Logic and control Design.
3. Raffikuzman-Modern Computer Architecture.
4. J.P. Hayes-Computers Architecture and Organisation.



# Data Communication

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## Rationale

Data communication course is intended to provide practical exposure and awareness of existing and up coming communication technologies.

## Detailed Concepts

- 1. Modulation**  
Need for modulation, various type of modulation (Analog + digital, their basic concept, comparison of different type of modulation with regard to noise immunity and bandwidth requirement. Basic idea of radio, microwave, satellite, optical fiber, mobile communication system
- 2. Transmission lines**  
Different type of transmission lines used in communication their characteristics (such that bandwidth, characteristics impedance and frequency response) different kind of distortions (for both analog and digital signals) produce by transmission line and line conditioners. Concept of matching. Various kinds of noises and their effect on communication S.N.R and channel capacity.
- 3. Principle of data communication**  
Transmission of binary data on telephone lines, simplex, half duplex and duplex mode of transmission two and four line system. Modems and data transfer rate. Basic Block diagram of FSK, PSK, DPSK, QPSK, and QAM modems. Principle of Synchronous, Asynchronous parallel and serial communication. Multiplexing and demultiplexing (TDM & FDM)
- 4. Data security and error detection**  
Signal formats, encryption, Basic principles of error detection and correction single parity and block parity CRC, communication using frame and packets.
- 5. Communication standards**  
Direct and handshake mode of communication. Physical aspect of different interface standards (RS-232 line drivers, IEEE-488, centronics interface)
- 6. Communication Equipment**  
Introduction to data communication, test procedure and test equipments (Line monitors, loop back method and its implementation, BERT, Protocol analyser, cable tester (TDR), OTDR)

## List of Practical

- 1 To obtain an amplitude modulated wave and measure its modulation index.
- 2 To demodulate an AM signal and compare with it with original signal.
- 3 To obtain F.M wave and find maximum deviation.
- 4 To detect F.M signal and compare it with the original Signal.
- 5 To obtain a P.C.M signal and observe the effect of quantization
- 6 To obtain a multiplexed signal of two given signals
- 7 Study of a given modem and its working.
- 8 Study of T.D.R method of detecting fault



9 Study of F.S.K signal.

10 Study of RS-232 port and observe different signals at its various pins

11 Study of fax machine

10 Study of LAN.

#### Reference Books

1. Data and computer communication - William Stallings
2. Data communication- William Schweber
3. Computer networking Tennam Baum
4. Electronic Communication system-Kennedy



# DATABASE MANAGEMENT SYSTEM

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## Rationale

This course will acquaint the student with knowledge of fundamentals concepts of DBMS and its application in different areas, storage, manipulation and retrieval of data using query languages.

## DETAILED CONTENTS

### 1. INTRODUCTION

- View of data
- Data model- ER model, relational model
- Database language- DDL, DML
- Database user and administrator
- Database system Vs File system
- Database system application

### 2. DATABASE SYSTEM CONCEPT AND ARCHITECTURE

- schemes, instances and database state
- DBMS architecture
- Data independence-logical and physical data independence

### 3. ENTITY-RELATIONSHIP MODEL

- Entity and attributes
- Entity types and entity sets
- Weak entity types
- Key- primary key, candidate key and super key
- Relationship among entities
- ER diagram

### 4. RELATION MODEL

- Domains, attributes, tuples and relations
- Domain constraints
- Key constraints and constraints on null
- Entity integrity, referential integrity and foreign key
- Relational algebra- SELECT, PROJECT, JOIN

### 5. RELATION DATABASE DESIGN

- First normal form
- Functional dependency
- Decomposition
- BCNF
- Third normal form
- Forth normal form

### 6. EMERGING DATABASE TECHNOLOGIES

- Database warehousing
- Database mining
- Multimedia database
- Distributed data base concept
- Data Base security & authorisation concept



### PRACTICALS

1. Overview, features and functionality, application development in ORACLE
2. Exercise on creating tables
3. Exercise on insertion of data into tables
4. Exercise on deletion of data using different conditions
5. Exercise on SELECT statement
6. Exercise on PROJECT statement
7. Exercise on JOIN statement
8. Exercise on UPDATE statement

### REFERENCE BOOKS

1. An introduction to Database systems -C.J.Date
2. Database system concept- Silberschatz, Korth, Sudarshan
3. Fundamentals of database systems- Elmasri, Navathe



## PERIPHERALS AND INTERFACES

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### Rationale

A computer Engineer should be able to interface and maintain keyboard, printer, mouse, monitor etc., with the computer system. The course provides necessary knowledge and skills regarding working construction and interfacing aspects of peripherals.

### Detailed Contents

1. **Display devices**  
Basic principles and working of monitor. Video display adapters – CGA, VGA, SVGA. Overview of Raster Scan and Vector Scan. Concept of resolution and bandwidth of monitor. Basic concept of PAL and NTSC standards
2. **Printers**  
Type of printers – Impact and Non-impact Printer, Specifications  
Construction and working principles of DMP, Inkjet printers, Laser printers.
3. **Disk Drives**  
Construction and working of Hard Disk.  
Types of actuators – voice coil and stepper motor.  
Disk preparation – low level formatting, partitioning, high-level formatting.  
Data encoding techniques – MFM, RLL.  
Types of interfaces – SCSI, IDE, EIDE.  
Sector interleaving.
4. **Input Devices**  
Working principles of Keyboard, Mouse, Scanner, Digitizer, Touch Screen, Light pen.
5. **Optical storage media** – construction and working principle of CD-ROM, DVD.
6. **Other devices** – Concept of tape drive, pen drive, zip drive.

### List of Practical

1. To identify various components and peripherals devices of computer
2. Exercise on assembly a PC with peripherals and testing the same.
3. Study the construction, assembly, disassembly, working in and testing of the following devices
  - Monitors (Monochrome, colour, Multisync)
  - Keyboards.
  - FDD
  - HDD
  - Dot Matrix Printer
  - Optical disk drives.
  - Inkjet printers, Laser Printers
  - Mouse and Scanners



### Reference books

1. Douglas Hall-Microprocessor and interfacing & programming
2. Govindaraju-IBM PC and clones
3. Bray-Microprocessor, interfacing and programming
4. Krisna, J.-Understanding Hardisk Management
5. Win Rosch Bible-Hardware Bible



## COMPUTER WORKSHOP-II

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### RATIONALE

Visual Basic is a programming language which enables a programmer to write programs and develop application packages to produce live problems. After undergoing this course, the students will be able to understand the principles of Active-X objects and write programs in Visual Basic.

### DETAILED CONTENTS

1. **Introduction to Visual Basic**  
Features and applications of VB – concept of integrated development environment (IDE) – project application like standard exe.
2. **VB Structure**  
Variable declaration types – user defined data types – scope and life of a variable – arrays – constructors – control flow statements – procedures and functions.
3. **Designing the User Interface**  
Design aspects of VB forms – Elements of user interface – properties of controls – text box, label, command button, check box, list box, picture: image shape timer – designing forms and displaying messages using above controls – control arrays.
4. **Menus and Common Dialogue Control**  
Creating menus at design using menu window – control menus and runtime – create shortest keys for pop up menus – common dialogue control.
5. **Display date, time, string type conversion and Printing Information**  
Data reports and environments – display tabular data in report form – fundamentals of printing – printing with print form method.
6. **Data Base Programming**  
Connecting with database using DAO, RDO, ADO, ODBC  
Familiarization with PL/SQL cursors and Triggers
7. **Active X : Working with inbuilt Active X, Windows control, creating own Active X through Active X Control, Active X, EXE, difference between EXE and DLL.**

### LIST OF PRACTICALS

1. Exercise on opening projects like standard Exe, Active-X EXE and Active-X control
2. Exercise on all the menus of opening window of VB
3. Exercise on all basic controls



4. Exercises on UPDATE statement
5. Exercises on Queries and Nested queries.
6. Exercises on indexes, views and sequences
7. Exercises on data functions, group and scalar functions
8. Exercises on JOINS, Grant and remove privileges
9. Exercises on creation of PL/SQL blocks
10. Exercises on cursor management in PL/SQL
11. Write a database trigger after update, delete
12. Build a small application using the above illustrations.

#### REFERENCE BOOKS

1. Microsoft Visual Basic-John W. Penfold
2. Developing project using Microsoft Visual Basic 5.0/6.0-Debbie Tesch.  
Roy a. Boggs
3. SQL, PL/SQL -Ivan Bayross, BPB Publications, New Delhi