3.11 **Data Flow Diagrams (DFDs):** Introductions, Data Flow Diagram, Symbol, Files or data store, External entities, Data flows,

3.12 **Describing System by Data Flow Diagram:** Context diagram, Top level DFD, Expansion Level DFD, Conversions of Data.

3.13 **Object Modeling:** Object -Oriented Concept, Object Structure, Object Feature, Class and Object.

3.14 **Representation:** Association and Composition, Inheritance, Multiple Inheritances.

3.15 **Modeling:** Use Case Diagram, State Diagram, Event Flow Diagram.

3.16 **Documentation:** Automatic and Manual System.

4. **Operating Systems**

4.1 Define an Operating System, Trace the Developments in Operating Systems, Identify the functions of Operating Systems,

4.2 Describe the basic components of the Operating Systems, Understand Information Storage and Management Systems,

4.3 List Disk Allocation and Scheduling Methods, Identify the Basic Memory Management strategies, List the Virtual Memory Management Techniques, Define a Process and list the features of the Process Management System

4.4 Identify the Features of Process Scheduling; List the features of Inter-Process Communication and Deadlocks,

4.5 Identify the Concepts of Parallel and Distributed Processing, Identify Security Threats to Operating Systems

4.6 Overview of the MS-DOS Operating System

4.7 Introduction to the Windows Family of Products, Unix Family of Products, Linux Family of Products.

4.8 Introduction to Windows Networking

4.9 Windows Architecture, Linux Architecture

4.10 Troubleshooting Windows, & Linux

4.11 Managing Network Printing

4.12 Managing Hard Disks and Partitions

4.13 Monitoring and Troubleshooting Windows

4.14 Users, Groups and Permission Linux and Windows.

5. **Database Management System and Design**

5.1 Introduction, A Database Model, Relational Database Model, Integrity, RDBMS.

5.2 SQL and Embedded SQL

5.3 Writing Basic SQL SELECT Statements

5.4 Restricting and Sorting data

5.5 Single Row Functions

5.6 Displaying Data from Multiple Tables

5.7 Aggregation Data Using Group Functions

5.8 Sub Queries, Manipulating Data and Creating &Managing Tables

5.9 Creating Views and Controlling User Access

5.10 Using Set Operators, Datetime Function

5.11 **Database Design:** Logical Design, Conceptual Design, Mapping Conceptual to Logical, Pragmatic issues, Physical Design, Integrity and Correctness, Relational Algebra, Relational Calculus.

5.12 Normalization: 1NF, 2NF, 3NF, BCNF, 4NF,5NF, DKNF

5.13 **Architecture of DBMS:** Client-server, Open Architectures, Transaction Processing, Multi-User & Concurrency, and Backup & Recovery Database.

5.14 **Basic Concept of major RDBMS products:** Oracle, Sybase, DB2, SQL Server and other Databases.

6. **Programming Language**

6.1 Overview of Programming Language: History, Programming Paradigms, The role of Language translates in the Programming Process.

6.2 Fundamental Issues in Language Design.