

IT 202 Introductory Database

Module Objectives

This module aims to provide the students with the basic knowledge, issues and manipulation of database so that the students develop the skill of producing reports and managing business information.

Contents

Introduction to DBMS, Types of DBMS, Data Models, Relational Database Model, Entity Relationship models, Structured Query Language, Distributed Database Management Systems, Database Security, and Designing Good Designed Database

Detailed Course

Chapter 1: Introduction to DBMS

[5hrs]

- Introduction to Database Management System
- DBMS vs File System
- View of data
- Data models
- Database Languages: DML, DDL
- Database users and administrators
- Transaction Management
- Database System Structure
- Application architectures

Chapter 2: Types of DBMS

[2hrs]

- Types of DBMS
- Relational DBMS
- Object-oriented Database Management System

Chapter 3: Data Models

[5hrs]

- Basic concepts
- Constraints
- Keys
- Design issues
- The Entity Relationship Database Model
- Weak entity sets
- Extended E-R Features
- Design of an E-R database schema
- Reduction of an R-R schema to tables

Chapter 4: Relational Database Model [5hrs]

- Structure of relational databases (Basic Structures, Database schema, keys, Schema Diagram, query languages, joins (Natural, outer))
- Data Integrity
- Types of Data Integrity (Entity integrity constraint (Primary key), Referential Integrity, Domain Constraints, triggers, assertions)
- Relationships within the Relational Database

Chapter 5: Entity Relationship Modeling [6hrs]

- Entity Relationship modeling
- Entities, Attributes, Relationships
- Degree of a relationship
- Connectivity and Cardinality
- Specialization and Generalization Entity relationship diagram

Chapter 6: Structured Query Language [7hrs]

- Structured Query Language
- Data Definition Language
- SQL Constraints
- Creating Tables
- Data Manipulation Languages (Insert, Update, Delete, Select)
- SELECT Queries
- Syntax for the SELECT statement
- SQL Views
- JOIN

Chapter 7: Distributed Database Management Systems [5hrs]

- Distributed Database Management System
- Characteristics of DDBMS
- Advantages / Disadvantages of DDBMS
- Components of Distributed Database system
- Distributed Database Design
- Fragmentation (horizontal and vertical fragmentation)

Chapter 8: Database Security [5hrs]

- Authorization is SQL (privileges in SQL)
- Roles
- The privilege to Grant Privileges
- Limitations of SQL authorization

Chapter 9: Designing Good Designed Database [5hrs]

- Normalization

- Functional Dependencies: partial dependency, transitive dependency, join dependency, multivalued dependency
- Update Anomalies
- Normal forms: First, Second, Third, Fourth, Fifth

Text Book

Abraham Silberschatz, Henry Korth, S. Sudarshan, *Database System Concepts*,

C.J. Date, *An Introduction to Database Systems*

Reference Books

Philip J. Pratt and Joseph J. Adamski , *Concepts of Database Management* , Cengage Learning, 7 edition (June 14, 2011)

David Kroenke , David Auer , ,*Database Concepts (6th Edition)*, Prentice Hall; 6 edition (July 20, 2012)