DATABASE MANAGEMENT SYSTEMS

COURSE OVERVIEW

During the machine age, the measure of power was heavy typified by cannon, locomotives and rolling mills. In the information age, the measure of power is the depth, timeliness and accessibility of knowledge. Communication bandwidth has become more crucial than shop floor capacity. With out the ability to communicate by telephone, e-mail or fax, an organization is deaf and dumb. Without access to the **Database,** an organization is blind. Because every firm is now directly or indirectly reliant on computer software, every decision point in the enterprise is an interface point between workers and information systems.

In an information-intensive business environment, knowledge is power. Competitiveness pivots on how effectively information systems enable management and staff to gain advantages. The important requirements for commercial power is the ability to transform operational data into tactical information, and ultimately into strategic knowledge. The main resource that fuels this power is the **corporate database.**

This course introduces the fundamental concepts necessary for designing, using and implementing the database systems applications. This course assumes no previous knowledge of databases or database technology and the concepts are built from ground up- basic concepts to advanced techniques and technologies.

- After this course a student will be able to
- Describe the components of DBMS
- Define a DBMS strategy for a given application requirement
- Will be able to design, create, and modify databases.
- Could apply the techniques to tune database performance.

SYLLABUS

UNIT 1: Database System Concept

Evolution,

Concepts of redundancy and dependence in flat file systems,

DBMS solution,

Data independence,

Data integrity and security,

Components of a typical database management system

UNIT 2: Database Technologies

Technologies:

Hierarchical Model,

Network Model,

Relational Model,

Object model,

Single user Database System,

Multi-user and enterprise wide database applications,

Two and three-tier client-server,

Internet / intranet architectures,

Support for complex data types e.g. graphical, multi-media

UNIT 3: Normalization for Relational Databases

Informal Design Guidelines for Relational Schemas

Functional Dependencies

Normal Forms based on Primary Keys

Second and Third Normal Forms

Boyce-Codd Normal Form

Multi-valued Dependencies and Fourth Normal Forms

Join Dependencies and Fifth Normal Forms

UNIT 4: Database Administrative Tasks

Various Database Administrator's (DBA) functions,

DBA's role,

Creation and management of databases and users,

Use of views,

SQL support for DBA functions

UNIT 5: Database Security

Introduction to Database Security Issues,

Levels of authority,

Access rites,

Service levels,

Recovery Concepts,

Recovery Techniques,

Back-up procedures,

UNIT 6: Database Integrity And Performance

Integrity: insert, update and deletion anomalies,

Entity and Referential integrity,

Database design including integrity constraints,

SQL support for integrity constraints

Performance:

Performance criteria,

Storage and access methods

Use of indexes,

B-trees

Query optimizers,

Costs of improved performance,

Language support for optimizing performance

UNIT 7: Multi-user Environment

Concurrency:

Introduction to Transaction Processing

Properties of Transactions,

Concurrency issues,

Atomicity, consistency, independence and durability (ACID) principles

Locking:

Loss of integrity in concurrent systems

Lost updates,

Inconsistent analysis,

Isolation levels,

Locking mechanisms (including two-phase protocol)

UNIT 8: Backup And Recovery

Backup and recovery:

Use of log files,

Checkpoints,

Time stamping,

Rollback and recovery techniques,

SQL support

UNIT 9: Distributd Databases and Client- Server Architecture

Distributed database concept

Data fragmentation, Replication and Allocation Techniques for Distributed Database Design

Types of Distributed Database Systems

An Overview of Client-Server Architecture and its Relationship to Distributed Databases

Future Prospects of Client-Server Technology