CSE3121: Database Management Systems

75 Marks [70% Exam, 20% Quizzes/Class Tests, 10% Attendance]
3 Credits, 33 Contact hours, Exam. Time: 4 hours

Introduction: Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Data Mining and Information, Retrieval, Specialty Databases, Database Users and Administrators.

Introduction to the Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema, Diagrams, Relational Query Languages, Relational Operations.

Introduction to SQL: Overview of the SQL Query, Language, SQL Data Definition, Basic Structure of SQL, Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub-queries, Modification of the Database.

Intermediate SQL: Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization.

Advanced SQL: Accessing SQL From a Programming, Language, Functions and Procedures, Triggers, Recursive Queries, Advanced Aggregation Features, OLAP.

Formal Relational Query Languages: The Relational Algebra, The Tuple Relational Calculus, The Domain Relational Calculus.

Database Design and the E-R Model: Overview of the Design Process, Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling, Data, Other Aspects of Database Design.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition, Decomposition Using Multivalued Dependencies, More Normal Forms, Database-Design Process, Modeling Temporal Data, Multivalued Dependencies, Domain-Key Normal Form.

Application Design and Development: Application Programs and User Interfaces, Web Fundamentals, Servlets and JSP, Application Architectures, Rapid Application Development, Application Performance, Application Security, Encryption and Its Applications.

Data Warehousing and Mining: Decision-Support Systems, DataWarehousing, Data Mining, Classification , Association Rules, Other Types of Associations, Clustering, Other Forms of Data Mining,

Information Retrieval: Relevance Ranking Using Terms, Relevance Using Hyperlinks, Synonyms, Homonyms, and Ontologies, Indexing of Documents, Measuring Retrieval Effectiveness, Crawling and Indexing the Web, Information Retrieval: Beyond Ranking of Pages, Directories and Categories

Object-Based Databases: Complex Data Types, Structured Types and Inheritance in SQL, Table Inheritance, Array and Multiset Types in SQL, Object-Identity and Reference Types in SQL, Implementing O-R Features, Persistent Programming Languages, Object-Relational Mapping, Object-Oriented versus Object-Relational.

XML: Structure of XML Data, XML Document Schema, Querying and Transformation, Application Program Interfaces to XML, Storage of XML Data, XML Applications.

Books Recommended:

1.	A. Silberschatz	:	**Database System Concepts,** *Mcgraw-Hill.*
2.	Raghu Ramakrishnan, Johannes Gehrke	:	**Database Management System,** *McGraw-Hill Higher Education*
3.	James Martin	:	**Principles of Database Management**, *Prentice-hall Of India Pvt Ltd*
4.	Ullman	:	**Database Management systems**, *Prentice-Hall Publication.*

5. Abey : **Oracle 8i a Beginners Guide**, *McGraw Hill.*