

**NIRMA UNIVERSITY**  
**Institute of Technology**

**B. Tech Computer Science and Engineering**  
**(all branches Except CSE)**

**Open Elective (Technical Pool)**

L	T	P	C
2	0	2	3

<b>Course Code</b>	
<b>Course Title</b>	<b>Database Management Systems</b>

**Course Outcomes (COs):**

**At the end of the course, students will be able to -**

- relate various aspects of the relational database like models, functional dependencies and normalization
- evaluate various storage and retrieval methods to correlate with relational model through appropriate indexing
- Design database queries using SQL, PL/SQL and NOSQL.

**Syllabus**

**Teaching  
hours**

**Unit I**

05

**Overview and Architecture of Database Systems:** Purpose of database, File System versus DBMS, Advantages of a DBMS, Describing and Storing Data in a DBMS: The Relational Model, Levels of Abstraction in a DBMS, Data Independence. Multi-level architecture, Client/Server architecture, Mapping, Database users and Administrators.

**Unit II**

09

**Relational Database: Concepts and Design:** Relational Model, Database Schema, Schema Diagrams, Relational Query Languages, Relational Operations. Relational Data Integrity: Keys: Candidate Keys and Constraints: Candidate Keys, Primary Keys and Alternate Keys, Foreign Keys and rules, Null value concept and other integrity constraints. Relational Operators: Relational Algebra: Closure, set operations, special relational operations, algebra for update operations, Relational Comparisons. Relational Calculus: Tuple and Domain-Oriented relational calculus. ER Diagram, ER to Relational Database Design

**Unit III**

05

**SQL Concepts:** Basics of SQL, DDL, DML, DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, Functions - aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All, view and its types. transaction control commands – Commit, Rollback, Savepoint.

**Unit IV**

05

**Normalization:** Introduction, Non loss decomposition and functional dependencies

**Unit V**

06

**PL/SQL and NOSQL:** Introduction to PL/SQL, Introduction to NOSQL and Streaming SQL, MongoDB database, Advantages of MongoDB over RDBMS, Data Model Design of MongoDB

**Self-Study:**

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

**Laboratory Work:**

Above concepts are to be implemented using SQL and PL/SQL and at least 10 experiments are to be carried out.

**Suggested Readings^:**

1. Silberschatz, Korth, Sudarshan ,Database System Concepts, McGraw-Hill computer science series
2. C J Date, An introduction to Database Systems, Addison-Wesley
3. Nilesh shah, Database System using Oracle, PHI.
4. Ramez Elmasri & Shamkant B. Navathe, Fundamentals of Database Systems, Addison-Wesley
5. Hector Gracia-Molina, Jeffrey D. Ullman, and Jennifer Widom, Database System Implementation, Pearson.
6. Ivan Bayross, SQL, PL/SQL, BPB Publications
7. Scott Urman, Oracle9i PL/SQL programming, McGraw-Hill

L = Lecture, T = Tutorial, P = Practical, C = Credit

^ this is not an exhaustive list