LNMIIT, Jaipur Department of Computer Science & Engineering	LNMIIT The LNM Institute of Information Technology

Programme: B. Tech. (CSE)	Course Title: Information and Database Management Systems			Course Code: CSE 227
Type of Course: Program Core	Prerequisites: Data Structures & Algorithms			Total Contact Hours: 40 Theory + 20 Lab
Year/Semester: 2/Odd	Lecture Hrs/Week: 3	Tutorial Hrs/Week: 0	Practical Hrs/Week: 2	Credits: 4

Learning Objective:

The course is primarily concerned with the capture, digitization, representation, organization, transformation, and presentation of information; algorithms for efficient and effective access and updating of stored information; data modeling and abstraction; and physical file storage techniques.

Course outcomes (COs):

On completion of this course, the students will have the ability to:		Bloom's Level
CO-1	Understand the different issues involved in the design and implementation of a database system	2
CO-2	Apply the modeling concepts and notation of the relational data model	3
CO-3	Determine database storage structures and access techniques for a given problem.	3
CO-4	Understand the basic working of database management aspects in terms of transaction processing, concurrency control, and recovery.	2

Course Topics		Lecture Hours
UNIT – I (Information Management Concepts)		3
1.1 Information systems as socio technical systems, basic information storage and retrieval concepts, Information capture and representation	1	
1.2 Supporting human needs: searching, retrieving, linking, browsing, and navigating. Information management applications	1	
1.3 Declarative and navigational queries, use of links, Analysis and indexing, Quality issues: reliability, scalability, efficiency, and effectiveness	1	
UNIT – II (Introduction to DBMS)		3
1.1 File system vs DBMS	1	
1.2 Approaches to and evolution of database systems, Components of database systems, Design of core DBMS functions (e.g., query mechanisms, transaction	1	

management, buffer management, access methods),		
1.3 Database architecture and data independence, Use of a declarative query language	**1**	
UNIT – III (Data Modeling)		
1.1 Data modeling, Conceptual models (entity-relationship diagrams)	**2**	**4**
1.2 Relational data models	**1**	
1.3 Semi-structured data model (expressed using DTD or XML Schema)	**1**	
UNIT-IV (Relational Databases)		
1.1 Mapping conceptual schema to a relational schema, Entity and referential integrity	**1**	**7**
1.2 Relational algebra and relational calculus, Relational Database design	**2**	
1.3 Functional dependency, Decomposition of a schema; lossless-join and dependency-preservation properties of a decomposition, Candidate keys, superkeys, and closure of a set of attributes	**2**	
1.4 Normal forms (3NF, BCNF)	**2**	
UNIT-V (Query Languages)		
1.1 Overview of database languages, SQL (data definition, query formulation, update sublanguage, constraints, integrity)	**1**	**3**
1.2 Selections, Projections, Select-project-join, Aggregates and group-by	**1**	
1.3 Subqueries, stored procedures, triggers	**1**	
UNIT-VI (File structures, Indexing, and Hashing)		
1.1 Secondary storage devices; File records; Unordered file, ordered file	**2**	**6**
1.2 Hashed file; Indexes; Dense and Sparse index; Single-level and Multi-level indexes;	**2**	
1.3 Multi-level indexing using B+ tree	**2**	
UNIT-VII (Transaction Processing, Concurrency Control, and Recovery)		
1.1 Transaction and system concepts; ACID properties;	**1**	**12**
1.2 Serializability; Concurrency control techniques – Two phase locking, Deadlock and starvation;	**5**	
1.3 Recovery concepts; Immediate update, Deferred update; Write-ahead logging; Checkpointing;	**6**	
UNIT-VIII (Advanced Topics)		
1.1 Introduction to distributed, and object-oriented databases;	**1**	**2**
1.2 Basic concepts of data warehouse; Approaches for managing large volume of data (noSQL database systems)	**1**	

List of experiments:

Experiment No.	Topic
1	File System
2	Creating a Database, table; Specifying Relational Data Types, Constraints
3	Table and Record Handling: INSERT, SELECT, DELETE, UPDATE, TRUNCATE, DROP, ALTER
4	Retrieving Data from a Database: SELECT, WHERE clause, LOGICAL OPERATORS in WHERE clause
5	Retrieving Data from a Database: Using IN, BETWEEN, LIKE,
6	Retrieving Data from a Database: Using ORDER BY, GROUP and HAVING
7	Retrieving Data from a Database: Using: Aggregate Functions
8	Retrieving Data from a Database: Combining Tables using JOINS; Subqueries
9	Database Management: Creating Views, Aliases, Creating Database Users, GRANT, REVOKE
10	Minor Project

Textbook References:
Text Book:

- R. Elmasri and S. Navathe, *Fundamentals of Database Systems*, Addison-Wesley, 6th ed., 2011

Reference books:

- Silberschatz, H. Korth, and S. Sudarshan, *Database System Concepts*, McGraw-Hill.
- R. Ramakrishnan, *Database Management Systems*, WCB/McGraw-Hill.
- C.J. Date, An Introduction to *Database Systems*, Pearson, 8th ed.

Additional Resources (NPTEL, MIT Video Lectures, Web resources etc.):

- http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-830-database-systems-fall-2010/
- http://nptel.ac.in/courses/106106093/
- http://nptel.ac.in/courses/106106095/
- http://www.nptelvideos.in/2012/11/database-management-system.html

Evaluation Method	
Item	**Weightage (%)**
Lab Evaluation 1	5
Lab Evaluation 2	5
Lab Quiz	5

Lab Project	10
Quiz 1	8
Quiz 2	8
Quiz 3	8
Midterm	21
Endterm	30

CO and PO Correlation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1						2	1		3	3	1	
CO2	3	3	2						2	1		3	3	1	
CO3	3	3	1						2	1		3	3	1	
CO4	3	2	1						2	1		3	3	1	

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Approved By: