Programme:	Course Title:		Course Code:
B. Tech. (CSE)	Information and Database Management Systems		CSE 227
Type of Course:	Prerequisites:		Total Contact Hours:
Program Core	Data Structures		40
Year/Semester:	Lecture	Tutorial Hrs/Week:	Practical Hrs/Week:	Credits:
2/Odd	Hrs/Week: 3	0	2	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	3
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	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 management, buffer management, access methods),	1	
1.3 Database architecture and data independence, Use of a declarative query language	1	
Lab (Data management using file system)		2
UNIT – III (Data Modeling)	**4**	
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)	**7**	
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	
Lab (SQL - DDL)		4
UNIT-V (Query Languages)	**3**	
1.1 Overview of database languages, SQL (data definition, query formulation, update sublanguage, constraints, integrity)	1	**9**
1.2 Selections, Projections, Select-project-join, Aggregates and group-by	1	
1.3 Subqueries, stored procedures, triggers	1	
1.4 Topology Control	2	
1.5 Data-centric and content-based networking	2	
1.6 Security	1	
Lab (SQL - DML)		4
UNIT-VI (File structures, Indexing, and Hashing)	**6**	
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	
Lab (Indexes)		3

UNIT-VII (Transaction Processing, Concurrency Control, and Recovery)	**12**	**9**
1.1 Transaction and system concepts; ACID properties;	**1**	
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**	
Lab (Triggers)		4
UNIT-VIII (Advanced Topics)	**2**	**2**
1.1 Introduction to distributed, and object-oriented databases;	**1**	
1.2 Basic concepts of data warehouse; Approaches for managing large volume of data (noSQL database systems)	**1**	
Lab (Views)		3

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	5

Quiz 2	5
Quiz 3	5
Assignment	10
Midterm	20
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	

Last Updated On: 17th May 2021

Updated By: Rajbir

Approved By: