SUBJECT: COMPUTER SCIENCE							
DCS	**BCS-C301**	**Database Management System**	**L**	**T**	**P**	**C**	**Time for ESE**
			4	**-**	**-**	**4**	**3 Hrs.**

Pre- requisite: Introduction to Computer Programming, Data Structures.

Course Objectives:

- To learn data models, conceptualize and depict a database system using ER diagram.
- To understand the internal storage structures in a physical DB design.
- To know the fundamental concepts of transaction processing techniques.

Course Outcomes:

CO1	For a given specification of the requirement design the databases using E-R method and normalization.
CO2	For a given specification construct the SQL queries.
CO3	For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
CO4	Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

Course Contents

UNIT	Contents	Lectures Required
1.	**Database system architecture:** Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML). **Data models:** Entity-relationship model, network model, relational and object-oriented data models, integrity constraints, data manipulation operations.	6
2.	**Relational query languages:** Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS MYSQL, ORACLE, DB2, SQL server.	8
3.	**Relational database design**: Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design.	10
4.	**Query processing and optimization:** Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.	7
5.	**Storage strategies:** Indices, B-trees, hashing.	4
6.	**Transaction processing:** Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp-based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.	7
7.	**Database Security:** Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.	6
	Total Lectures	48

Suggested Text Book(s):

1.	Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education.
2.	Henry F Korth, Abraham Silberschatz, S. Sudurshan, Database system concepts, McGraw-Hill.

Suggested Reference Book(s):

1.	Thomas Connolly, Carolyn Begg, Database Systems: A Practical Approach to design, Implementation and Management, Pearson Education.
2.	Bipin C Desai, An Introduction to Database Systems, Galgotia Publications Pvt Limited.
3.	C.J.Date, An Introduction to Database Systems, Pearson Education.

Other Useful Resource(s)

1.	https://www.youtube.com/watch?v=EUzsy3W4l0g&list=PL9426FE14B809CC41
2.	https://www.tutorialspoint.com/dbms/database_normalization.htm
3.	https://www.igi-global.com/journal/journal-database-management/1072
4.	https://www.tutorialspoint.com/dbms/dbms_hashing.htm

Course Outcomes Contributed to Programme Outcomes

PO→ CO↓	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	AVERAGE
CO1	1	1	1	2	2	3	2	2	**1.8**
CO2	1	3	2	3	2	3	2	2	**2.3**
CO3	2	3	2	2	2	3	3	3	**2.5**
CO4	2	3	2	2	2	3	3	3	**2.5**
AVG.	**1.5**	**2.5**	**1.8**	**2.3**	**2.0**	**3.0**	**2.5**	**2.5**	**2.3**

Course Outcomes Contributed to Programme Specific Outcomes

PSO→ CO↓	PSO1	PSO2	PSO3	AVERAGE
CO1	2	3	2	**2.3**
CO2	3	3	2	**2.7**
CO3	3	3	3	**3.0**
CO4	3	3	3	**3.0**
AVG.	**2.8**	**3.0**	**2.5**	**2.7**