DATABASE MANAGEMENT SYSTEMS

II Year I Semester: CSE/IT/CSIT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
A5CS05	PCC	3	1	0	4	30	70	100

COURSE OBJECTIVES:

The course should enable the students to:

1. **Discuss** the basic database concepts, applications, data models, schemas and instances.
2. **Design** Entity Relationship model for a database.
3. **Demonstrate** the use of constraints and relational algebra operations.
4. **Describe** the basics of SQL and construct queries using SQL
5. **Understand** the importance of normalization in databases.
6. **Demonstrate** the basic concepts of transaction processing and concurrency control.
7. **Understand** the concepts of database storage structures and identify the access techniques.

COURSE OUTCOMES:

At the end of the course the students are able to:

1. Use the basic concepts of Database Systems in Database design
2. Design a Database using ER Modelling
3. Apply normalization on database design to eliminate anomalies
4. Apply SQL queries and PL/SQL queries to interact with Database
5. Analyze database transactions and can control them by applying ACID properties

UNIT-I	INTRODUCTION	Classes: 09

INTRODUCTION: Introduction and applications of DBMS, Purpose of data base, Data Independence, Database System architecture- Levels, Database users and DBA.

DATABASE DESIGN: Database Design Process, ER Diagrams - Entities, Attributes, Relationships, Constraints, keys, extended ER features, Generalization, Specialization, Aggregation, Conceptual design with the E-R model.

UNIT-II	RELATIONAL MODEL &SCHEMA REFINEMENT	Classes: 09

THE RELATIONAL MODEL: Introduction to the relational model, Integrity constraints over relations, Enforcing integrity constraints, Querying relational data, Logical database design: E-R to relational, Introduction to views, Destroying/altering tables and views.

SCHEMA REFINEMENT AND NORMAL FORMS: Introduction to schema refinement, functional dependencies, reasoning about FDs. Normal forms: 1NF, 2NF, 3NF, BCNF, properties of decompositions, normalization, schema refinement in database design.

UNIT-III	RELATIONAL ALGEBRA AND CALCULS &SQL	Classes: 11

RELATIONAL ALGEBRA AND CALCULUS:Relational algebra operators, relational calculus - Tuple and domain relational calculus.

SQL: 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,

UNIT-IV	SQL &PL/SQL	Classes: 11

SQL: Use of group by, having, order by clauses, join and its types, Exist, Any, All clauses . Transaction control commands – Commit, Rollback, Save point,

PL/SQL: Environment, block structure, variables, operators, data types, control structures; cursors, stored procedures, Triggers.

UNIT-V	TRANSACTION &CONCURRENCY CONTROL	Classes: 10

TRANSACTIONS MANAGEMENT: Transaction concept, transaction state, concurrent executions, Serializability, recoverability, testing for serializability.

CONCURRENCY CONTROL AND RECOVERY SYSTEM: Concurrency control,lock based protocols, time-stamp based protocols, validation based protocols, multiple granularity and deadlock handling. Recovery system - failure classification, storage structure, recovery and atomicity, log based recovery.

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2011.
2. Raghurama Krishnan, Johannes Gehrke, "Data base Management Systems", TATA McGraw Hill, 3rd Edition, 2007.
3. R.P. Mahapatra & Govind Verma, Database Management Systems, Khanna Publishing House, 2013.
4. Michael McLaughlin, Oracle Database 11g PL/SQL Programming, Oracle press.

Reference Books:

1. Peter Rob, Carlos Coronel, Database Systems Design Implementation and Management, 7th edition, 2009.
2. Scott Urman, Michael McLaughlin, Ron Hardman, "Oracle database 10g PL/SQL programming ",6th edition, Tata McGraw Hill,2010
3. S.K.Singh, "Database Systems Concepts, Design and Applications", First edition, Pearson Education, 2006.
4. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fourth Edition, Pearson / Addision wesley, 2007

Web References:

1. http://www.learndb.com/databases/how-to-convert-er-diagram-to-relational-database
2. https://www.w3schools.com/sql/sql_create_table.asp
3. http://www.edugrabs.com/conversion-of-er-model-to-relational-model/?upm_export=print
4. http://ssyu.im.ncnu.edu.tw/course/CSDB/chap14.pdf
5. http://web.cs.ucdavis.edu/~green/courses/ecs165a-w11/8-query.pdf

E-Text Books:

1. http://www.freebookcentre.net/Database/Free-Database-Systems-Books-Download.html
2. http://www.ddegjust.ac.in/studymaterial/mca-3/ms-11.pdf

MOOC Course:

1. https://www.mooc-list.com/tags/dbms-extensions
2. https://onlinecourses.nptel.ac.in/noc18_cs15/preview