COURSE TITLE	**DATABASE MANAGEMENT SYSTEMS**
COURSE CODE	**01AI0303**
COURSE CREDITS	**4**

Objective:

1 The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

2 The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Course Outcomes: After completion of this course, student will be able to:

1 To Understand the basic concepts and the applications of database systems.

2 Design Database Model for an Application.

3 Apply Concepts of normalization with optimization in context of data loss.

4 To apply the basics of SQL and construct queries using SQL

5 Differentiate and Execute transactional Concepts and locking mechanism

6 Use concepts of Database Security on Database.

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Introductory concepts of DBMS** Data base System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas – data Models – the ER Model – Relational Model – Other Models, Database Languages – DDL – DML – database Access for applications Programs, data base Users and Administrator – Data Base Architecture – Storage Manager , the Query Processor	6

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Contents : Unit	Topics	Contact Hours
2	**Relational Models & SQL Fundamentals** Relational Models & SQL Fundamentals: Relational Data Model: Concept of relations, Schema-instance distinction. Structure of relational databases, Domains, Relations, Relational algebra – fundamental operators and syntax; All set Operators., SQL: Appropriate tool for DBMS, 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.	8
3	**Data Modelling & Design** Data base design and ER diagrams , ER Model - Entities, Attributes and Entity sets – Relationships and Relationship sets , ER Design Issues – Concept Design, Conceptual Design for University Enterprise. Introduction to the Relational Model, Structure – Database Schema, Keys – Schema Diagrams	5
4	**Normalization** Normalization , Introduction, Non-loss decomposition and functional dependencies, First, Second, and third normal forms – dependency preservation, Boyes/Codd normal form. Higher Normal Forms - Introduction, Multi-valued dependencies and Fourth normal form, Join dependencies and Fifth normal form	6
5	**Transactional Management & Concurrency Control** Transaction State- , Transaction Properties, Implementation of Atomicity and Durability, Concurrent – Executions , Serializability, Conflict & View Serialization, Transaction Commands, Problems of Concurrency Controls-Lock based Protocol-2PL protocols, Validation based Protocol-Deadlocks- Recovery and Atomicity , Log – Based Recovery – Recovery with Concurrent Transactions , Buffer Management – Failure with loss of nonvolatile storage, Advance Recovery systems- Remote Backup systems	12
6	**Handling different Objects in SQL & PL-SQL** Views, Synonyms, Sequences, Stored procedures and packages, Table spaces, constrains , PL-SQL Blocks and Programs	5
7	**Security & Advance DBMS Concepts:** Security: Discretionary and Mandatory Access Control, Audit Trails; Multi-Level Security; Statistical Databases; Data Encryption., Introduction to NOSQL Databases. , Introduction to Data Mining	4
Total Hours		**46**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Practical 1** Introduction to RDBMS and APEX Login.	2

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
2	**Practical 2** DDL Commands and Table Creation	2
3	**Practical 3** DML Commands and Queries	2
4	**Practical 4** DML Commands and Related Queries	2
5	**Practical 5** Constraint Based DML Commands	2
6	**Practical 6** Functions and Queries	2
7	**Practical 7** Implement operator, null and special operator-based queries	2
8	**Practical 8** Implement Constraint based and Group by related queries	2
9	**Practical 9** Range Function and Operator based Queries	2
10	**Practical 10** Join based Queries having Functions	2
11	**Practical 11** Understand and implement Conditions and looping in PL/SQL	2
12	**Practical 12** Implement a PL/SQL Block	2
13	**Practical 13** Implement a Procedure and Function for given Statement	2
14	**Practical 14** Understand and Implement Triggers	2
Total Hours		**28**

Textbook :

1 Database Management Systems,, Ramkrishnan, Raghu,, McGraw Hill, -

References:

1 An introduction to Database Systems, An introduction to Database Systems, C J Date, Wesley, -

2 Understanding SQL, Understanding SQL, Martin Gruber, BPB, -

3 Database System Concepts, Database System Concepts, Abraham Silberschatz, Henry F. Korth & S. Sudarshan, McGraw Hill, -

4 Fundamentals of Database Systems, Fundamentals of Database Systems, Ramez Elmasri and Shamkant B Navathe, Addison Wesley, -

5 Oracle – The complete reference, Oracle – The complete reference, ., TMH oracle press, -

6 Database Management Systems, Database Management Systems, Ramkrishnan, Raghu, Mc-Graw Hill, -

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Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	20.00	40.00	20.00	5.00	5.00

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Supplementary Resources:

1. https://apex.oracle.com/en/
2. https://ilearning.oracle.com/

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