



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

## COURSE CONTENT

DATABASE MANAGEMENT SYSTEMS								
<b>IV Semester: CSE /IT / CSE (AI&amp;ML) / CSE (DS) / CSE (CS)</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AITD03	Core	3	0	0	3	40	60	100
<b>Contact Classes: 45</b>	<b>Tutorial Classes: Nil</b>	<b>Practical Classes: Nil</b>			<b>Total Classes: 45</b>			
<b>Prerequisite: Programming for Problem Solving, Data Structures</b>								

### I. COURSE OVERVIEW:

The purpose of this course is to provide a clear understanding of fundamentals with emphasis on their applications to create and manage large data sets. It highlights on technical overview of database software to retrieve data from a database. The course includes database design principles, normalization, concurrent transaction processing, security, recovery and file Organization techniques.

### II. COURSES OBJECTIVES:

#### The students will try to learn

- I. The role of database management system in an organization and learn the data base concepts.
- II. The design of databases using data modeling and Logical database design techniques.
- III. The database queries using relational algebra and calculus and SQL.
- IV. The concept of a database transaction and related concurrent, recovery facilities and evaluate a set of queries in query processing.

### III. COURSE OUTCOMES:

#### At the end of the course students should be able to:

- CO1 Describe data models, schemas, instances, view levels and database architecture for voluminous data storage.
- CO2 Define the concept of Relational Algebra and Relational Calculus from set theory to represent queries.
- CO3 Make Use of SQL queries for data aggregation, calculations, views, sub-queries, embedded queries manipulation.
- CO4 Illustrate the definition of Functional Dependencies, Inference rules and minimal sets of FD's to maintain data integrity.
- CO5 State the concepts of transaction, states and ACID properties in data manipulation.
- CO6 Apply indexing, hashing techniques to access the records from the file effectively.

### IV. COURSE CONTENT:

#### MODULE-I: CONCEPTUAL MODELING INTRODUCTION (10)

Introduction to Databases: Purpose of Database systems, view of data, data models, Database languages, Database users, various components of overall DBS architecture, various concepts of ER model, basics of Relational Model.

#### MODULE-II: RELATIONAL APPROACH (09)

Relational algebra and calculus: Relational algebra, selection and projection, set operations, renaming, joins, division, examples of algebra queries, relational calculus: Tuple relational calculus, Domain relational calculus, expressive power of algebra and calculus.

#### MODULE-III: SQL QUERY-BASICS, RDBMS- NORMALIZATION (10)

SQL – Data Definition commands, Queries with various options, Data manipulation commands, Views,

Joins, views, integrity and security, triggers and cursors;

Relational database design: Pitfalls of RDBD, Lossless join decomposition, functional dependencies, Armstrong axioms, normalization for relationaldatabases1st, 2nd and 3rd normal forms, Basic definitions of MVDs and JDs, 4th and 5th normal forms.

#### **MODULE–IV:TRANSACTIONMANAGEMENT (09)**

Transaction processing: Transaction concept, transaction State, implementation of atomicity and durability, concurrent executions, serializability, recoverability.

Concurrency Control: Lock-based protocols, timestamp-based protocols, validation-based protocols, multiple granularity, multiversion schemes, deadlock handling.

Recovery: Failure classification, storage structure, recovery and atomicity, Log-Based recovery, shadow paging, recovery with concurrent transactions buffer management.

#### **MODULE–V:DATA STORAGEANDQUERYPROCESSING (10)**

Data storage: Overview of physical storage media, magnetic disks, storage access, file organization, organization of records in files.

Indexing and Hashing: Basic concepts: Ordered indices, B+ tree index files, B-tree index files, static hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing.

Query Processing: Overview, measures of query cost.

#### **V. TEXT BOOKS:**

1. Abraham Silberschatz, Henry F.Korth, S.Sudarshan, “Database System Concepts”, McGraw-Hill, 6<sup>th</sup> edition, 2017.

#### **VI. REFERENCE BOOKS:**

1. Ramez Elmasri, Shamkant, B. Navathe, “Database Systems”, Pearson Education, 6<sup>th</sup> edition, 2013.
2. Peter Rob, Carles Coronel, “Database System Concepts”, Cengage Learning, 7<sup>th</sup> edition, 2008.

#### **VII. ELECTRONICS RESOURCES:**

1. [https://www.youtube.com/results?search\\_query=DBMS+onluine+classes](https://www.youtube.com/results?search_query=DBMS+onluine+classes)
2. <http://www.w3schools.in/dbms/>
3. <http://beginnersbook.com/2015/04/dbms-tutorial/>

#### **VIII. MATERIALS ONLINE**

1. Course template
2. Tutorial question bank
3. Tech-talk topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. PowerPoint presentation
11. E-Learning Readiness Videos (ELRV)