

GANPAT UNIVERSITY										
FACULTY OF ENGINEERING & TECHNOLOGY										
Programme		Bachelor of Technology				Branch/Spec.		Computer Science & Engineering (CSE/BDA/CS/AI&ML)		
Semester		III				Version		1.3.1.3		
Effective from Academic Year				2026-27		Effective for the batch Admitted in				June 2025
Subject code		2CSE301		Subject Name		DATABASE MANAGEMENT SYSTEM				
Teaching scheme					Examination scheme (Marks)					
(Per week)	Lecture (DT)		Practical(Lab.)		Total		CE	SEE	Total	
	L	TU	P	TW						
Credit	4	0	2	0	6	Theory	40	60	100	
Hours	4	0	4	0	8	Practical	60	40	100	
Pre-requisites:										
Set Theory, Mathematical relationships, simple file records concept										
Learning Outcomes:										
After Successful completion of the course, students will be able to:										
<ul style="list-style-type: none"> <li>Understand database concepts and structured query language (SQL)</li> <li>Understand the fundamentals of Entity Relationship model and designing of ER model</li> <li>Design and build a database system for various use cases.</li> <li>Apply PL/SQL programming techniques using advanced concepts of RDBMS.</li> </ul>										
Theory syllabus										
<b>Unit</b>	<b>Content</b>								<b>Hrs</b>	
<b>1</b>	<b>Basics of Database</b> Introduction and applications of DBMS, Purpose of database, View of Data, Database Languages, Database architecture, Database users and DBA								<b>4</b>	
<b>2</b>	<b>Relational Model</b> Structure of Relational Databases, Database Schema, Keys, Relational Operations and Relational Algebra								<b>6</b>	
<b>3</b>	<b>Entity Relationship Model</b> Basic Concepts and definitions, Constraints, Entity Relationship Diagram, Weak Entity Sets, Extended E-R Features, Conversion of ER diagram into relations								<b>8</b>	
<b>4</b>	<b>SQL</b> Introduction to SQL, Data Definition of SQL, Basic structure of SQL queries, Basic SQL operations (rename, string operations, order by, where clause), Set operations, Null values, Aggregate functions, Nested Subqueries, Modification of Database, JOIN expressions, Views, Integrity constraints, Data types and Schemas, Authorization								<b>10</b>	
<b>5</b>	<b>Relational Database Design</b> First Normal Form, Decomposition, Desirable Properties of Decomposition, Functional Dependencies, Second and Third Normal Form and Boyce-Codd Normal Form								<b>10</b>	
<b>6</b>	<b>Advanced SQL</b> Introduction, Cursors, Stored Procedures, Stored Functions, Triggers, Partitioning								<b>4</b>	
<b>7</b>	<b>Indexing and Hashing</b> Basic concepts, Ordered Indices, Hash Based Indexing, Tree based Indexing								<b>4</b>	

<b>8</b>	<b>Transaction Management and concurrency</b> Transaction concepts, properties of transactions, serializability, testing for serializability, Transaction Isolation and Atomicity, Transaction isolation levels, Implementation of isolation levels, Lock based protocols, Deadlock handling, Timestamp based protocols, two-phase locking protocol	<b>12</b>
<b>9</b>	<b>NoSQL Databases</b> Introduction, properties of NoSQL Databases, types of NoSQL databases	<b>2</b>

### Self-Study Topics:

#### Database System Architecture

Centralized Client-Server Architecture, Parallel Systems, Distributed Systems

#### Query Processing and Query Optimization

Overview, Measures of Query Cost, Transformation of Relational Expressions

#### Practical content

Practical contents will be based on following concepts:

- Based on the given schema/scenario, create appropriate database and perform CRUD operations
- Queries based on Advanced SQL concepts
- JDBC & MySQL (CRUD operations)

#### Mooc Course

Course Name: Database Management System

Link: [https://onlinecourses.nptel.ac.in/noc19\\_cs46/preview](https://onlinecourses.nptel.ac.in/noc19_cs46/preview)

#### Text Books

1 Database System Concepts By Silberschatz, Korth, Sudarshan

2 MySQL(TM): The Complete Reference By Vikram Vaswani

#### Reference Books

1 An Introduction to Database Systems : Eighth Edition By C. J. Date

2 Database Management Systems by G K Gupta

### Course Outcomes:

COs	Description
CO1	Understand database concepts and query language
CO2	Understand the E R model and relational model
CO3	Design and build a database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing a DBMS.
CO4	Apply PL/SQL programming using various basic and advanced concepts of RDBMS.

#### Mapping of CO and PO:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	0	1	2	0	0	0	0	3	0	0	1
CO2	2	1	1	2	1	0	0	0	0	0	2	1
CO3	2	1	2	2	0	1	0	0	2	0	0	1
CO4	2	1	1	3	1	0	0	0	0	0	1	1