Semester: 4th			
Paper code: AIDS204/AIML204/IOT204	L	T/P	Credits
Subject: **Database Management Systems**	3	0	3
Marking Scheme			

1. Teachers Continuous Evaluation: As per university examination norms from time to time
2. End term Theory Examination: As per university examination norms from time to time

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks: As per university norms
1. There should be 9 questions in the end term examination question paper
2. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions.
3. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Everyunit should have two questions. However, students may be asked to attempt only 1 question from each unit.
4. The questions are to be framed keeping in view the learning outcomes of course/paper. The standard/ level of the questions to be asked should be at the level of the prescribed textbooks.
5. The requirement of (scientific) calculators/ log-tables/ data-tables may be specified if required.

Course Objectives:	
1.	To introduce the concepts of databases, database models, and their uses.
2.	To assess the need for Database design to create a strong foundation for application.
3.	To understand the various complications & its solution for Transaction management.
4.	To understand advanced data bases and its application.

Course Outcomes:	
CO1	Understand the principles of Database Management Systems.
CO2	Apply Structured Query Language to a varied range of queries and work on database using state of art tools.
CO3	Analyse various techniques and various models used for designing databases for different real-life situations.
CO4	Investigate normalized database schema and prepare a report for a real-life scenario.

CO/PO	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO1	2	3	2	2	1	-	-	-	-	-	1	2
CO2	2	3	2	2	3	-	-	-	-	-	1	1
CO3	2	3	3	2	1	1	1	1	1	1	1	3
CO4	2	3	2	2	1	-	-	-	-	-	1	3

Course Overview:

The objective of the course is to present an introduction to database management systems with advanced topics of DBMS, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from databases. It includes Entity-Relational model, Normalization, Relational model, Relational algebra, and data access queries as well as an Introduction to SQL, MongoDB.

UNIT I: **[8]**
Introduction-Overview of Database System and various Data Models (Hierarchical, Network, and Relational Models), Views of Data, Comparison of Database Management System with File System, Architecture of DBMS, components of DBMS. Data Independence. Entity-Relationship Model- Entities, Entity Types, Attributes, Relationships, Relationship types, E/R diagram notation, Conversion of E/R diagram to relations.

UNIT II: **[8]**
Relational Data Model- Concept of Relations, Overview of Various Keys, Referential Integrity, and foreign keys. Relational Language- Relational Algebra, Tuple and Domain Relational Calculus, SQL, DDL and DML, Introduction and basic concepts of PL/SQL (Cursors, Procedures, Triggers). Basic steps in Query Processing and Optimization.

UNIT III: **[8]**
Database Design- Dependencies and Normal forms, Functional Dependencies, 1NF, 2NF, 3NF, and BCNF. Higher Normal Forms-4NF and 5NF. Transaction Management: ACID properties, Serializability, Concurrency Control (2PL, Timestamp protocol), Database recovery management – Log based recovery, checkpoints.

UNIT IV: **[8]**
Advanced Topics- CAP Theorem, Data Storage and Indexes, Hashing Techniques, NOSql, Types of NOSql databases, MongoDB: Introduction, History of MongoDB, Installation and configuration. Key Features. Core servers & tools. Basic commands, Comparison of relational databases to MongoDB, Cassendra, HBASE, etc.

Text Books:
1. Silberschatz, A., Korth, Henry F., and Sudharshan, S., Database System Concepts, 5th Edition, Tata McGraw Hill, 2016.
2. Elmasri, Ramez and Navathe, Shamkant B., Fundamentals of Database Systems 7th Edition, Pearson, 2015.

Reference Books:
1. Date, C. J, Kannan, A. and Swamynathan, S., An Introduction to Database Systems, 8th edition, Pearson Education, 2012.
2. J. D. Ullman, Principles of Database Systems, 2nd Ed., Galgotia Publications, 1999.

3. Vipin C. Desai, An Introduction to Database Systems, West Publishing Co.