CVM UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: **Bachelor of Technology (Artificial Intelligence (AI) & Data Science)**

Semester: **V**

Course Code: **202045616**

Course Title: **Advance Database Management Systems**

Course Group: **Professional Elective Course**

Course Objectives: To understand the basic concepts and terminology related to DBMS and Relational Database Design. Students will be also able to design and implement Distributed Databases. Students will understand advanced DBMS techniques to construct tables and write effective queries, forms, and reports.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
3	0	2	4	50 / 18	50 / 17	25 / 09	25 / 09	150 / 53

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction** Formal review of relational database and FDs Implication, Closure, its correctness, Concepts of Normalization, Decomposition and synthesis approaches, Basics of query processing.	**6**
2	**Introduction to Distributed DBMS:** Distributed Data Processing, Distributed Database Systems, Promises of DDBSs, Complicating factors, Problem areas **Distributed DBMS Architecture :** Models- Autonomy, Distribution, Heterogeneity DDBMS Architecture – Client/Server, Peer to peer, MDBS	**7**
3	**Distributed Database Design** **Design Alternatives** – localized data, distributed data **Fragmentation** – Vertical, Horizontal (primary & derived), hybrid,general guidelines, correctness rules **Distribution transparency** – location, fragmentation, replication **Impact of distribution on user queries** – No Global Data Dictionary(GDD), GDD containing location information,	**8**

4	**NoSQL Databases.** Overview and History of NoSQL Database, Types of NoSQL Database, Comparison of relational databases to NoSQL database, Application , Challenges in NoSQL approach ,Introduction: MongoDB, Cassandra, HBASE	**8**
5	**Deadlock and recovery** Detection, Prevention, and Avoidance of deadlock,Wait-Die Algorithm, Wound-Wait algorithm **Recovery in DBMS** - Types of Failure, Methods to control failure, Different techniques of recoverability, Write- Ahead logging Protocol, Advanced recovery techniques- Shadow Paging, Fuzzy checkpoint, ARIES, RAID levels	**5**
6	**Advanced concepts SQL** PL-SQL Block, Stored Procedure, Function, Cursor, Explicit Cursor, Implicit Cursor, Cursor Attributes, Trigger, Database Link, Public, private and protected database link.	**6**

List of Practicals / Tutorials:

1	Revision of DDL, DML statements. Concepts of PK, FK, and composite PK.
2	Concepts of PL-SQL block, store procedure and function.
3	Concepts of Database Trigger.
4	Concepts of explicit and implicit cursor.
5	Study about oracle database link. Concepts of public, private and protected link.
6	Implementation of data hiding using View. Concepts of updatable and non-updatable view.
7	Implementation of Replication in distributed environment.
8	Implementation of Fragmentation in distributed environment.
9	Implementation of Transparency in distributed environment.
10	Case study on NO-SQL database.
11	Case study on HADOOP file system
12	Case study on spark-sql

Reference Books:

1	Principles of Distributed Database Systems, Ozsu, Pearson Publication
2	Distributed Database Management Systems, Rahimi & Haug, Wiley
3	NoSQL Database by Crisof Strauch
4	SQL, PL/SQL by Ivan Byros

Supplementary learning Material:	
1	Coursera course https://coursera.org/learn/spark-sql

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Seminar/Poster Presentation
- Industrial/ Field visits
- Course Projects

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analysing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
20%	25%	25%	10%	10%	10%	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand and apply concepts of Database Normalization	**25**
CO-2	Analyze and implement Distributed DBMS	**25**
CO-3	Understand the need of Replication, Fragmentation and Transparency.	**20**
CO-4	Use NoSQL database as per requirements	**15**
CO-5	Comprehend the methods of Database recovery in case of failure.	**15**

Curriculum Revision:	
Version:	2.0
Drafted on (Month-Year):	June -2022
Last Reviewed on (Month-Year):	
Next Review on (Month-Year):	June -2025