Far Western University
Faculty of Engineering
Mahendranagar, Kanchanpur
Bachelor's Degree in Computer Engineering
Course of study

Course Title: Database Management system	**Credit: 3**
Course Code: CT364	**Number of periods per week: 3**
Nature of the Course: Theory + Practical	**Tutorial/week: 1**
Year/Semester: III/II	**Total hours: 45**

1. Course Objective:

To acquaint students with different aspects of DBMS like database design, query languages, query processing, database security, backup and recovery, access control and transaction control.

2. Course Outline:

Specific Objectives	Contents (UNIT/CHAPTER)	Duration
	1. Introduction 1.1. Concept and applications 1.2. Needs of DBMS 1.3. Data abstraction 1.4. Data independence 1.5. Schema and Instances 1.6. Concept of DDL, DML and DCL Database Manager and users.	**(4 Hours)**
	2. Data Models 2.1. Logical, Physical and Conceptual Model 2.2. E-R Model 2.3. Network Data Model 2.4. Hierarchical Data Model	**(4 Hours)**
	3. Relational Model 3.1. Definitions and terminology 3.2. Structure of relational databases 3.3. The relational algebra 3.4. The relational calculus 3.5. Schemas and Views	**(4 Hours)**
	4. Relational languages 4.1. SQL 4.2. DDL 4.3. DML	**(5 Hours)**

	4.4. DCL 4.5. QBE.	
	5. **Relational Database Design** 5.1. Introduction 5.2. Integrity constraints 5.3. Referential Integrity 5.4. Normalization 5.5. Normal Forms 5.6. Multivalued and Join Dependencies 5.7. User schema or views design 5.8. Decomposition of relation schemes	**(6 Hours)**
	6. **Security** 6.1. Needs of security 6.2. Security and integrity violations 6.3. Access control 6.4. Authorization 6.5. Security and Views 6.6. Encryption and decryption.	**(3 Hours)**
	7. **Query Processing** 7.1. Introduction to query processing 7.2. Query interpretation 7.3. Equivalence of expressions 7.4. Query Optimization 7.5. Join strategies 7.6. Query decomposition.	**(3 Hours)**
	8. **File organization and indexing** 8.1. Needs of filing 8.2. Overview of storage devices 8.3. Organization of records into blocks 8.4. File organizations 8.5. B+Tree 8.6. Hashing and hash function 8.7. Data Dictionary storage 8.8. Buffer Management.	**(5 Hours)**
	9. **Crash Recovery** 9.1. Introduction to crash recovery and its importance 9.2. Failure classification 9.3. Backup-recovery 9.4. Storage hierarchy 9.5. Transaction model 9.6. Log-based recovery 9.7. Shadow paging	**(4 Hours)**
	10. **Transaction Processing and Concurrency Control** 10.1. Introduction 10.2. Transaction and Transaction processing	**(4 Hours)**

	10.3. ACID properties of transaction 10.4. Scheduling and Serializability 10.5. Locking and Lock based protocols 10.6. Time-stamping-based protocols 10.7. Deadlock handling	
	11. **Advanced Database concepts** 11.1. Extended Relational Model 11.2. Object-Oriented Model 11.3. Object-Relational Model (ORM) 11.4. Distributed databases.	**(3 Hours)**

3. Project work:
An individual project should be given to each student. 10% of sessional marks should be allocated for evaluation.

4. Tutorials:
A number of tutorial assignments can be given for fluency in Database design and query languages.

5. Practical:
There shall be 12 laboratory exercises based on some RDBMS (like ORACLE, MS-SQL server, MySQL, etc) to cover theoretical part studied.

6. Field Visit: Three days field visit should be carried to the students to explore about database management system. After the field visit, students should (i) submit the field report individually; and (ii) prepare the group presentation at the end.

Reference Books:

1. H.F. Korth and A. Silberschatz, *Database System Concepts*, McGraw Hill.
2. A.K Majumdar and P. Bhattacharaya, *Database Management Systems*, Tata McGraw Hill, India.
3. R.E. Mani and S.C Nevathe, *Fundamentals of Database Systems*, Benjamin/Cummings Publishing Co. Inc.
4. G.C Everest, *Database Management*, McGraw Hill.

Evaluation scheme:
The questions will cover all the chapters in the syllabus. The evaluation scheme will be as possible as indicated in the table below:

Unit / Chapter	Hours	Marks Distribution* (Tentative)
1	4	4
2	4	5
3	4	5
4	5	8
5	6	10
6	3	4
7	3	4
8	5	6
9	4	5
10	4	5
11	3	4

* There may be minor variation in marks distribution.

Internal Evaluation (Marks Weightage)		Final Exam (Marks Weightage)	Total	Remarks
Assessment/Class Performance/Attendance/Quizzes/ Tutorials/Presentation	Practical			
20	20	60	100	Internal marks will be of 20 if there are practicals in the course (20 marks will be allocated for Practicals)