Department Of Computer Science and Engineering
Kathmandu University
Dhulikhel, Kavre

Subject: Database Management System   **Course: COMP 232**

Level: B.E./B.Sc 2nd Year 2nd Semester   **Credit Hours: 3**

Course Objective:

To make the student able to understand the concept of the database. To make the student able to design, analysis and implement the database system

Contents:

1. **Introduction**: Database Systems Applications, Database System versus File systems, View of Data, Database Languages, Database Users and Administrators, Transaction Management, Database Architecture**.**   **[3 Hrs.]**

2. **Database Design**: Design Process, Entity Relationship Model, Constraints, Keys, Entity-Relationship Diagram, Design Issues, Weak Entity Sets, Extended E-R features, Design of an E-R Database Schema, Reduction of an E-R Schema to tables.   **[6 Hrs.]**

3. **Relational Model**: The Relational Algebraic Operations, Operation on basic SQL and intermediate SQL**.**   **[9 Hrs.]**

4. **Relational Database Design**: Functional dependencies, trivial and non-trivial dependencies, closure of a set of functional dependencies, irreducible sets of dependencies, Lossless Decompositions, First Normal Form, Second Normal Forms, Third Normal Forms, Boyce-Codd Normal Form.   **[6 Hrs.]**

5. **Transactions:** Transaction Concept, Transaction state, Implementation of Atomicity and Durability, Concurrent Executions, Serializability and its test, Recoverability**. [6 Hrs.]**

6. **Concurrency Control:** Concurrency Control techniques, Deadlock handling - detection and resolution   **[6 Hrs.]**

7. **Database Recovery Techniques:** Database Failure and Recovery Concepts; Recovery Techniques based on Deferred and Immediate Update; Recovery with Concurrent Transactions.   **[3 Hrs.]**

8. **New Trends in Database**: NoSQL database, NoSQL characteristics and its categories. Introduction to Graph database and Neo4j   **[9 Hrs.]**

TEXT BOOKS:

1. Database Systems Concepts, 4th Edition, Abraham Silberschatz,Henry F. Korth, S. Sudarshan, McGraw-Hill Higher Education ©2001,ISBN:0072283637
2. Database Management Systems, 2nd Edition, Raghu Ramakrishnan, Johannes Gehrke, McGraw-Hill, Inc. New York, NY, USA ©2000, ISBN:0072440422