

CS451: ADVANCE DATABASE CONCEPTS
COURSE OUTLINE
Spring 2018

Course Instructor: Muhammad Ishaq Raza

Email: ishaq.raza@nu.edu.pk

Office Hours: Mon - Thu (12:20pm – 2:00pm)

Course Credit Hours: 3

Prerequisite: CS203 Database Systems

Course Objectives

This course is intended for students who wish to specialize in database management systems or wish to practice the advanced techniques involved in optimization of data storage, database design and queries. The course primarily addresses design and implementation of a database management system. It covers advanced topics like physical storage and access methods, query optimization, transaction processing, and concurrency control.

Goals

- To discuss the advanced concepts involved in:
 - Efficient storage and retrieval of information especially when massive data storage is involved,
 - Multi-user database environment, and
 - Performance tuning of databases.
- To provide insight about the internal working of a DBMS so that students should be able to implement its necessary components.

Textbook: Ramez Elmasri, *Fundamentals of Database Systems* (7th Edition)

Reference Books

- Jefferey D. Ullman, Jennifer Widom, Hector Garcia-Molina, *Database System Implementation*
- Raghu Ramakrishnan, *Database Management Systems* (3rd Edition)
- George Coulouris, *Distributed Systems; Concepts and Design* (3rd Edition)

Grading Scheme

Midterms (25%), Class Participation (5%), Quizzes (10%), Assignments (10%), Project/Term Paper (10%), Final (40%).

Course Contents Breakup (Tentative)

S. No	Topics	Readings
1.	Transaction Processing Concepts	Chapter 20
2.	Concurrency Control Techniques	Chapter 21
3.	Database Recovery Techniques	Chapter 22
4.	Data Storage, Basic File Structures and Hashing	Chapter 16
5.	Indexing Structures for Files	Chapter 17
6.	Strategies for Query Processing	Chapter 18
7.	Query Optimization	Chapter 19
8.	Physical Database Design and Tuning	Chapter 17
9.	Distributed Database Concepts	Chapter 23
10.	NOSQL Databases and Big Data Storage Systems	Chapter 24