



Kenyatta University

SCO304: Advanced Database Systems

2023 Jan-Apr Semester

Course Outline

Course Objective: To equip the learner with the knowledge of advanced database management techniques in computerized systems.

Course Topics

1. Review of Database Systems

DB Development as part of Systems Development; Examples of Application Scenarios; Commercial DBMSs;

2. SQL Overview

DDL, DML, DCL, TCL; SQL Functions;

3. Database Architectures:

Centralized vs Client-Server Architectures: Two-Tier Client/Server Architectures for DBMSs, Three-Tier and n-Tier Architectures for Web Applications. Multi-user databases; Distributed Databases;

4. Database Security

Data Classification; Threats and Risks; Cryptography, Digital signatures, Database Control; Users and Database Privileges; Statistical Databases

5. Transaction Processing

Transaction and System Concepts; Desirable Properties of Transactions; Transaction Support in SQL

6. Concurrency Control In Databases

Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency Control Techniques, Validation (Optimistic) Techniques and Snapshot Isolation, Concurrency Control; Locks for Concurrency Control;

7. Database Recovery

Recovery Concepts, NO-UNDO/REDO Recovery Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging, Database Backup and Recovery from Catastrophic Failures

8. Trends in database technology

Object oriented database systems, Business Intelligence and Datawarehouses; Big Data Analytics and NoSQL; Blockchain Database;

Primary Texts:

Coronel C, Morris S: Database Systems: Design, Implementation, & Management 13th Edition, Cengage Learning, 2017, ISBN 978-1-305-62748-2, 978-1-305-86679-9

Elmasri R, Navathe S: Fundamentals of Database Systems, 7th Edition, Pearson, 2017, ISBN-10: 0-13-397077-9, ISBN-13: 978-0-13-397077-7
