بسم الله الرحمن الرحيم

Kingdom of Saudi Arabia
Ministry of Education
Umm Al-Qura University
University College in Adham

المملكة العربية السعودية
وزارة التعليم
جـامعـة أم القرى
الكلية الجامعية بأضم

Advanced Databases

6803435-3 - Advanced Database Systems (3 credits)

Catalog Description

The enhanced entity-relationship (EER) model. Relational database design by ER- and EER-to-relational mapping. Concepts for object databases. Object database standards, languages, and design. Object-relational databases. XML databases. Database transaction and query processing. Distributed databases. Database security. Database tuning and recovery.

Prerequisites

6803412-3 - Fundamentals of Database Systems

Major Topics Covered in the Course (14 week semester)

Topic	Week
Advanced relational algebra and SQL: Set vs. bag semantics, NULL values, Distinct operator, Semi join, left join, right join, SQL constraints and triggers, Data mining and OLAP operators: Group By, Roll Up, Cube, Pivot	1
The Enhanced Entity-Relationship (EER) model and EER to relational mapping	2
Object and Object-Relational Databases: Concepts, Models, Languages and Standards	3
XML for semi-structured data: XML language and its tree representation, XML schema language, XPath/XQuery languages, Translation of an XML schema into a relational schema	4
Database File Indexing Techniques, B-Trees, and B+-Trees	5
Query Processing and Query Optimization Techniques	6,7
Database Tuning and Physical Design Issues	8,9
Advanced Database Transaction Processing	10
Database Recovery Protocols	11
Distributed Databases (DDB): Horizontal/vertical fragmentation, Basic distributed query processing, Semi-join query processing	12,13
Database Security	14

Weekly Hours

3 x 50 mins lectures, 0 lab hours

Textbook/References

Database Systems: Models, Languages, Design And Application Programming, 7th Edition, Pearson International Edition.

Assessment Methods

The student is expected to complete theoretical homework, pass written examinations, and successfully complete a project.

Course Learning Outcomes (CLOs)

1. The students will understand different terms of advanced data modeling e.g. object, object-relational, and XML and the supporting theoretical foundation.
2. The students will learn techniques of advanced schema mapping i.e. from enhanced entity relation to relational, object to relational, object-relational to relational, and xml to relational.
3. The students will understand advanced database topics such as indexing, query processing, local and distributed transaction processing, and security.