

Introduction to Databases

X409.1

Course Objectives

At the completion of the course, the student will be able to:

1. Define the primary components of relational, hierarchical, network, object-oriented, object-relational, dimensional, and NoSQL databases, along with the fundamental differences between them.
2. Use forms-based tools and SQL statements to define, maintain and retrieve data from DBMS products.
3. Create normalized database designs for databases intended to support business transaction processing.

Course Objectives

4. Create star schema designs for databases intended to support historical reporting and analytics (i.e. business intelligence applications).
5. Create data models, including the ability to recognize and use common data structure patterns
6. Translate logical database designs into physical implementations, including specifications for network-connecting the database, indexing, deployment on a cluster server, and accessing the database using various programming languages.

Course Objectives

8. Understand the security ramifications when implementing databases and implement security and data access controls.
9. Design data warehouse and data mart schemas for use in business intelligence applications.

Textbooks

Required: *Databases, A Beginner's Guide*

Andrew J. (Andy) Oppel

First Edition, March, 2009

McGraw-Hill Education

Optional: *NoSql Distilled: A Brief Guide to the Emerging World of Polyglot Persistence*

Pramond J. Sadalage and Martin Fowler

First Edition, 2013

Addison-Wesley

Software Requirements

- Assignment 2 requires access to a Database Management System (DBMS) such as Access, MySQL, Oracle, Sybase and Microsoft SQL Server.
 - Many of these have editions that can be used without payment of a license fee.
 - The data required for the assignment is available on the web site for the course.

Grading

Assignment 1	Choose database architectures	10%
Assignment 2	Database queries	10%
Assignment 3	Star schema design	10%
Assignment 4	Design using common patterns	15%
Assignment 5	Physical data model	15%
Assignment 6	NoSQL implementations	5%
Assignment 7	Database security	10%
Assignment 8	Cursor processing, transactions, alternative data structures	10%
Final Exam	10 definitions, 25 multiple choice, 5 queries, 1 design	15%

Web Site

<http://www.andyoppel.com/X4091>

- Outlines (Syllabi)
- Assignment Instructions and Files
- Assignment Solutions (Password required)
- Lecture Notes (Powerpoint slides)

Instructor Information

- Andy Oppel
 - Senior Data Solutions Architect, Customer Success and Training, GoodData Corporation
 - UC Extension Instructor (over 30 years)
- Contact Information
 - E-mail: aoppel@berkeley.edu
 - Assignments: paper or e-mail to above address

Due to FERPA restrictions, assignment grades cannot be e-mailed

Ground Rules

- Questions are encouraged at any time: There are no stupid questions.
- There is no need to report missing a class; attendance is your responsibility and lecture slides are available online.
- Please read and follow the syllabus.

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