BAX 421 – 002: Data Management

TERM: Fall 2021

INSTRUCTOR: Mehul Rangwala mrangwala@ucdavis.edu

INSTRUCTOR OFFICE HOURS: Wednesdays from 7:00 pm – 8:00 pm or by appointment

CLASS TIMINGS: Saturdays 1:40 pm – 3:30 pm

COURSE DESCRIPTION: Introduction to the extraction, assembly, storage and organization of data in IT systems. The course covers the concepts of data modeling, entity relationship models, and SQL to help businesses convert data into insights needed to drive business strategies. Use of MySQL and Microsoft SQL Server for writing SQL queries.

PREREQUISITES: None.

REFERENCE TEXTBOOKS:

1. Fundamentals of Relational Database Management Systems
By S. Sumathi and S. Esakkirajan
Publisher: Springer
ISBN-10: 364208012X
ISBN-13: 978-3-642-08012-8
You can get this downloadable ebook from our library.
No need to purchase this.
Link to download:
https://link.springer.com/book/10.1007%2F978-3-540-48399-1

2. Data Modeling and Database Design
by Dr. Narayan S. Umanath, Richard Scamell
ebook ISBN-10: 1305473035 | ISBN-13: 9781305473034

3. SQL: The Complete Reference, 3rd Edition
ISBN-13: 978-0071592550
ISBN-10: 0071592555

4. Murach's MySQL, 3rd Edition
ISBN 978-1-943872-36-7

5. Murach's SQL Server 2019 for Developers
by Bryan Syverson and Joel Murach
ISBN 978-1-943872-57-2

NOTES AND HANDOUTS: They will be available on Canvas.

TOPICS TO BE COVERED: A detailed schedule is available on Page 3.

COMPUTER PACKAGES:

1. **MySQL**. You can either use the MySQL command line console or install MySQL Workbench.

2. **Microsoft SQL Server 2019** with **Microsoft SQL Server Management Studio.**

GRADING:

Homework (Individual)	50%
Midterm Exam	25%
Final Exam	25%

Learning Objectives:

1. Understand the fundamentals of relational database modeling.
2. Analyze the business process rules and create entity relationship diagrams.
3. Understand and apply relational database normalization.
4. Learn the concepts of Structured Query Language (SQL) and evaluate how it can be used to retrieve and transform data from relational databases.
5. Retrieve data from the database using SQL joins, grouping, subqueries, aggregate functions, and window functions.
6. Understand the fundamentals of the role of optimization for SQL queries.

Academic Honor Code:

All students are expected to adhere to the University of California, Davis' Code of Conduct as noted here: http://sja.ucdavis.edu/files/cac.pdf.

Schedule on the Next Page

Schedule (Tentative): This is a tentative schedule. Contents and sequence are subject to change.

Date	Assignments Due	Topics Covered
9/25/2021		• Database Modeling Fundamentals o Types of databases o Database Life Cycle o Introduction to Data Models o Relational Data Model o Keys and Integrity Rules o Relationships o Entity Relationship (ER) Model
10/2/2021		• Entity Relationship (ER) Model (continued) • Advanced Database Modeling o Extended Entity Relationship Model o Entity Clustering o Entity Integrity o Design Cases
10/9/2021	Homework 1	• Advanced Database Modeling (continued) • Database Normalization o Normalization and Database Design o The Need for Normalization o The Normalization Process (1NF, 2NF, 3NF, 4NF)
10/16/2021	Homework 2	• Database Normalization (continued) • Data Modeling Checklist
10/23/2021	Homework 3	• SQL Basics and Joins o SELECT statements o DISTINCT, WHERE, ORDER BY clauses o UNION o UNION ALL o Inner Joins o Outer joins o Self Joins o Cross Joins
10/30/2021	Homework 4	• SQL Aggregate Functions o Summarizing o Grouping o Filtering Grouped data

Date	Assignments Due	Topics Covered

11/6/2021	Midterm Exam (Take Home)	• Subqueries
		  ○ Subqueries versus Joins
		  ○ Nested Subqueries
		  ○ Correlated Subqueries
		  ○ Temporary tables

11/13/2021	Homework 5	• Data Wrangling ○ Using String functions to clean data
11/20/2021		• SQL Window Functions
12/4/2021	Homework 6	• Performance Tuning SQL Queries
12/11/2021	In-class Final Exam (during the class time)	

Final exam is comprehensive, in-class, and during the class time. No make-up final.