UNIVERSITY OF SOUTHERN MAINE

Database Systems
Department of Computer Science
Fall 2025

Instructor Info

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Office: Room 288, Dubyak Center
Student Hours: Tuesdays 02:00–03:00 PM
Thursdays 10:30-11:30

Course Meetings
Luther Bonney 326, Portland USM Campus
T/Th 12:30 – 13:45

Services & Policies that Support You

Academic Services & Policies[1]

Contents

1. Course Information

1A. Course Description

This course broadly introduces database systems, including the relational data model, query languages, database design, index and file structures, query processing and optimization, concurrency and recovery, and transaction management. Students acquire hands-on experience in working with database systems and in building web-accessible database applications.

1B. Course Materials & Books

All the resources for this course will be provided by the instructor. Course Books:

- Database System Concepts, Seventh edition, Abraham Silberschatz, Henry Korth, S. Sudarshan
- Fundamentals of Database Systems, Seventh edition, Ramez Elmasri, Shamkant N. Navathe

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[1] https://mycampus.maine.edu/group/usm/common-syllabus

Course Videos

The Database Systems course is designed as a flipped classroom. The pre-recorded videos are created specifically for this course and are the intellectual property of the instructor. These videos are intended solely for enrolled students to support their learning. Students, the university, and any other parties are not permitted to download, share, distribute, or upload these videos to any external platforms or websites without explicit written permission from the instructor. Unauthorized distribution is a violation of the course policy and may lead to academic or disciplinary action.

1C. Course Format

This class is an in-person class. The meeting is every Tuesday and Thursday from 12:30 to 1:45 PM at Luther Bonney 326, Portland USM Campus.

1D. Course Learning Outcomes

- Describe the reasons and purpose of using a database
- Apply queries in relational algebra to retrieve data
- Explain the conceptual foundation of the relational model for databases
- Apply queries in SQL to create, read, update, and delete data in a database
- Apply the concepts of entity integrity constraint and referential integrity constraint
- Describe the normal forms of a relation
- Advanced topics in database systems, including optimization, concurrency, and recovery

2. Coursework & Grading

2A. Grade Scale

[This is a typical percentage-to-letter grade scheme for many U.S. postsecondary institutions.]

100-93%	=	A	79-77%	=	C+
92-90%	=	A-	76-73%	=	C
89-87%	=	B+	72-70%	=	C-
86-83%	=	B	69-60%	=	D
82-80%	=	B-	59% or lower	=	F

2B. Course Grade Breakdown

Assessment Name	Value
Project 1	10%
Project 2	15%
Project 3	15%
Course Presentation	10%
Class Activities	10%
Midterm	20%
Final	20%
Total:	**100%**

2C. Assessment Descriptions & Requirements

COS 457 is offered as a flipped classroom. Students are required to watch the lecture videos before each class, read the book chapters, and be fully prepared for the topic when coming to class. During class time, students will work in teams of 4 or individually (based on the instruction) to complete a set of activities related to the session's topic. During class activities, unless specified otherwise, students are not allowed to use laptops or phones.

The course has two sections; in the first section, the instructor covers the topics. In the second section, in each session, a team of students will present an advanced topic. The course also has one running project broken into three sections. Students will work in pre-selected teams for each phase of the project.

2D. Generative AI Guideline

Students are encouraged to use generative AI tools such as ChatGPT and Gemini for learning purposes. It is important to learn how to effectively use AI; therefore, the following should be considered:

- Brainstorm and Draft: Feel free to use AI assistants to generate ideas for assignments or produce a first draft of your write-ups.
- Revise and Refine: You may also leverage these tools to polish your prose, reorganize explanations of data structures, or tighten up code comments.
- <u>Attribution Required</u>: Any text, diagrams, or code snippets created by an AI must be clearly labeled in your submission (e.g., "Generated with [Tool Name]").
- Verify Everything: Always fact-check AI-provided definitions, complexity analyses, and code examples, especially since general-purpose models can produce inaccurate or overly broad content.

3. Class Schedule

Section 1: The instructor covers these sections.

Date	Topic	Readings
02/09	Introduction	Database System Concepts (Chapter 1)
04/09	Relational Model	Fundamentals of Database Systems (Chapters 5.1, 5.2) Database System Concepts (Chapters 2.1 to 2.4)
09/09	Relation Algebra	Fundamentals of Database Systems (Chapter 8) Database System Concepts (Chapter 2.6)
11/09	Normalization (1)	Database System Concepts (Chapter 7.1 to 7.3) Fundamentals of Database Systems (Chapter 14.1, 14.2, 14.5)
16/09	Normalization (2)	Database System Concepts (Chapter 7.4 to 7.7)
18/09	Entity-Relation (1)	Fundamentals of Database Systems (Chapter 3.1 to 3.4.2) Database System Concepts (Chapter 6.1 to 6.3)
23/09	Entity-Relation (2)	Fundamentals of Database Systems (Chapter 3.4 to 3.10) Database System Concepts (Chapter 6.4 to 6.12)
25/09	Data Storage & Indexing	Database System Concepts (Chapter 12: 1, 3, 5, 6) Database System Concepts (Chapter 13: 1-3) Database System Concepts (Chapter 14.4.1)
30/09	SQL (1)	Database System Concepts (Chapters 3.1 to 3.7 & 3.9)
02/10	SQL (2)	Database System Concepts (Chapters 3.8, 4.1 & 4.2)
07/10	SQL (3)	Database System Concepts (Chapters 4.3 to 4.7 & 5.2 to 5.5)
09/10	Midterm exam	
14/10	Fall Break	
16/10	Project Presentation - Part 1	
21/10	Project Presentation - Part 1	
23/10	Query Processing & Optimization	Database System Concepts (Chapters 15 & 16.1 to 16.4)
28/10	Transaction & Concurrency	Database System Concepts (Chapters 17 & 18.1 to 18.2)
30/10	Recovery	Database System Concepts (Chapters 19.1 to 19.5 & 19.9)

Section 2: The students cover these sessions.

Date	Topic
04/11	NoSQL Databases
06/11	Big Data and Distributed Storage
11/11	No Classes
13/11	Graph Databases
18/11	Time-Series Databases
20/11	In-Memory Databases
25/11	Database Security
27/11	Thanksgiving
2/12	Document Databases
4/12	Stream Databases
9/12	Project Presentation - Part 3
11/12	Project Presentation - Part 3

4. Course-Specific Policies

4A. Attendance

Students are expected to attend all the classes in person. If extenuating circumstances arise, you should communicate this to the instructor as soon as you reasonably can. More than three absences will result in an "L" grade for this course, meaning the student stopped attending. During the class:

- No late arrivals
- No phone and laptop during class (unless told otherwise)
- Sit in teams of four students

4B. Late Work

The deadlines for this course are firm, and there is no possibility for extension.

4C. Class Cancellation

Under circumstances other than institution-wide closures, students will be notified 72 hours before the class.

4D. Inclement Weather Contingencies

Upon campus closure, the class will continue in an online mode using the class Zoom link.

5. Academic Services & Policies

For USM's most current information on services available to students and academic policies, see [The Academic Services & Policies Overview webpage](#)[2] where you will find specifics on the following:

- **Services to help you succeed**
  - Disability Accommodations, Plan for Academic Success, Access Textbooks and Technology, Work with a Trained Peer, Access Wellness Resources, Find Community.
- **University Policies**
  - Academic Integrity, Disability Accommodations, Acceptable Conduct In Class Settings, Course Evaluations, Covid Face Covering Requirement, Dropping/Withdrawal from the Course, Inclement Weather, Online Conduct,, Nondiscrimination Policy And Bias Reporting, Statement On Religious Observance For USM Students, and Title IX Statement, and Technology Requirements.

Scan the QR Code to go to the [Academic Services & Policies webpage](#)[3]

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[2] https://mycampus.maine.edu/group/usm/common-syllabus
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