

DATABASES II

Course Description

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2025-III



Outline

- 1 Course Overview
- 2 Syllabus
- 3 Grading & Rules
- 4 Bibliography



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Overview

This course is designed to introduce **undergraduate students** to advanced topics in **database systems** and *good practices* in both **database design** and **basic implementation**.

This is **not** a course fully focused on **software engineering**, but it does cover the main concepts of **software systems building**.

Classes will consist of **lectures**, **discussions**, and **practical examples**. Also, you will be required to complete some readings in *software development*. In addition, there will be a **semester-long project**, as well as **one final course test**, **four workshops**, and **some** additional **quices**.



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Goals

The **main goal** of this course is to provide **undergraduate students** with various **models**, **concepts**, and **tools** for solving the **data layer** of software problems using **database systems** based on **software application project requirements**.

By the end of this course, you should be able to **create** a **full** software **database solution** with a high level of **quality**. Also, you should be able to **design** robust **database systems** in an **agnostic** way.



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Pre-requisites

This is an advanced course, so you should have some knowledge of:

- **Programming** in Python, Java, or C++.
- **Object-Oriented Programming** fundamentals.
- Basic concepts of **Data Structures**.
- Basic concepts of ~~**Relational Databases**~~.
- Using **IDEs** such as VS Code, Eclipse, or PyCharm.

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Additionally, it is desirable to have some knowledge of:

- Basic concepts of UML and Class Diagrams.
- Basic usage of Git and GitHub.
- Basic Linux commands and basic usage of Docker.
- Basic usage of LaTeX for technical writing.



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Syllabus I

Period	Topic	Time
I w. Period I 2 w. 1.	Introduction to Databases	3 sessions ✓
	Database Systems Architecture	2 sessions ✓
	Database Administration	3 sessions ✓
	Transaction Management	3 sessions ✓
	Concurrency Management	2 sessions ✓
	Advanced Query Concepts	3 sessions ✓
	PL/SQL	8 sessions <u>✓</u> <i>Ser. a</i>
	Project Catch-Up	2 sessions ✓
	Course Final Test	1 session <i>Son. a</i>

Table: Schedule for Period I



Syllabus II

Period	Topic	Time
Period II	Object-Oriented Databases	2 sessions
	NoSQL Databases	2 sessions
	Parallel Databases	2 sessions
	Distributed Databases	3 sessions
	Multi-dimensional Databases	6 sessions
	Course Final Test	1 session
Period III	Project Dissertation	2 sessions

Table: Schedule for Period II & III



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Grades Percentages

Period	Item	Percentage
Period I	Quizzes	5%
	Workshops	15%
	Project Catch-Up	5%
	Partial Test	10%
Period II	Quizzes	5%
	Workshops	15%
	Final Course Test	15%
Period III	Paper + Poster	5%
	Implementation + Report	15%
	Project Presentation	10%

Handwritten notes and calculations:

- Period I: 5% + 15% + 5% + 10% = 35%
- Period II: 5% + 15% + 15% = 35%
- Period III: 5% + 15% + 10% = 30%
- Total: 35% + 35% + 30% = 100%

Table: DataBases II Grades Distribution



Don't hate the player, hate the game

- All assignments must be submitted **handwritten**, on **time**, and in **English**. Grammar and spelling will **not** be evaluated.
- Copying and pasting from the internet are **forbidden**. Please **develop** your own ideas and solutions.
- Class attendance is **not mandatory**. If you **miss** classes, you must *study independently*.
- No cell phones, no smartwatches, no WhatsApp, no Tinder, no smart-anything. **Just you and your brain**. Pay attention in class.
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Code of Conduct

- **Always** be **respectful** to your **classmates** and to me. You must be **kind** to everyone inside (*and outside*) the classroom.
- There is **no best programming language, tool, or technology**. There are only **better** or **worse** solutions.
- You must be **honest** with your work. If you **don't know something**, just **ask** me. I will be **glad** to help you.
- You must be **responsible** with your work. If you don't submit **on time**, please **don't complain**.
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Bibliography

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- **Database Systems: The Complete Book**, by Hector Garcia-Molina, Jeffrey D. Ullman, and Jennifer Widom.
- **Database Management Systems**, by Raghu Ramakrishnan and Johannes Gehrke.
- **Fundamentals of Database Systems**, by Ramez Elmasri and Shamkant B. Navathe.
- **Introducción a los Sistemas de Bases de Datos**, by C.J. Date.
- **Procesamiento de Bases de Datos, Fundamentos, Diseño e Implementación**, by David M. Kroenke.
- **Sistemas de Bases de Datos: Conceptos Fundamentales**, by Navathe Elmasri.



Bibliography

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- **Database System Implementation**, by **Hector Garcia-Molina**, **Jeffrey D. Ullman**, and **Jennifer Widom**.
- **Fundamentos de Bases de Datos**, by **A. Silberschatz**, **H.F. Korth**, and **S. Sudarshan**.
- **Database Systems: Concepts, Design and Applications**, by **S.K. Singh**.
- **Database Systems: Design, Implementation, and Management**, by **Carlos Coronel**, **Steven Morris**, and **Peter Rob**.



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Thanks!

Questions?



My profile: www.linkedin.com/in/casierrav

