

DATABASE FOUNDATIONS

Course Description

Author: Eng. Carlos Andrés Sierra, M.Sc.
cavirguezs@udistrital.edu.co

Lecturer
Computer Engineer
School of Engineering
Universidad Distrital Francisco José de Caldas

2024-III



UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Outline

- 1 You don't know who I am
- 2 Course Overview
- 3 Syllabus
- 4 Grading & Rules
- 5 Bibliography



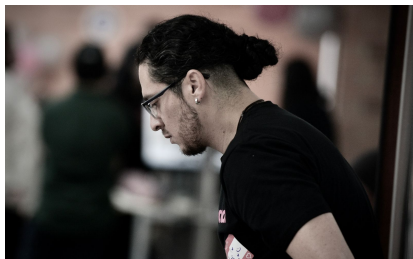
Outline

- 1 You don't know who I am
- 2 Course Overview
- 3 Syllabus
- 4 Grading & Rules
- 5 Bibliography



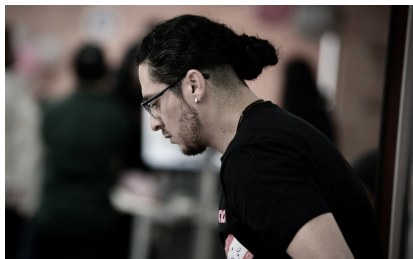
Academic Experience

- **Computer Engineer**, M.Sc. in Computer Engineering, and *researcher* for **15 years**.
- 7 years as **full-time associate professor** at colleges, for **Computer Engineering programs**.
- 3 years as **lecturer professor** for both colleges and **government STEM programs**.
- **Speaker** in Colombia, Brasil, Bolivia, at **IEEE** events and colleges.



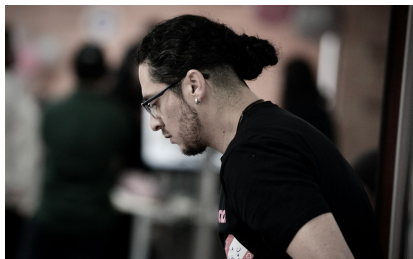
Academic Experience

- **Computer Engineer**, M.Sc. in Computer Engineering, and *researcher* for **15 years**.
- 7 years as **full-time associate professor** at colleges, for **Computer Engineering programs**.
- 3 years as **lecturer professor** for both colleges and **government STEM programs**.
- **Speaker** in Colombia, Brasil, Bolivia, at **IEEE** events and colleges.



Academic Experience

- **Computer Engineer**, M.Sc. in Computer Engineering, and *researcher* for **15 years**.
- 7 years as **full-time associate professor** at colleges, for **Computer Engineering programs**.
- 3 years as **lecturer professor** for both colleges and **government STEM programs**.
- **Speaker** in Colombia, Brasil, Bolivia, at **IEEE** events and colleges.



Academic Experience

- **Computer Engineer**, M.Sc. in Computer Engineering, and *researcher* for **15 years**.
- 7 years as **full-time associate professor** at colleges, for **Computer Engineering programs**.
- 3 years as **lecturer professor** for both colleges and **government STEM programs**.
- **Speaker** in Colombia, Brasil, Bolivia, at **IEEE** events and colleges.



Non-academic Experience



- **PyCon Colombia** and **Python Bogotá co-organizer.**
Collaborations in ScipyLATAM and Jupyter LATAM.
- 3 years as **software engineer** for several **tech companies** in Colombia.
- 3 years as **Technical Leader of Machine Learning and Data Science** in a USA startup.
- 1 year as **MLOps Engineer** for a **Fintech** in LATAM.



Non-academic Experience



- **PyCon Colombia** and **Python Bogotá co-organizer**. Collaborations in ScipyLATAM and Jupyter LATAM.
- 3 years as **software engineer** for several **tech companies** in Colombia.
- 3 years as **Technical Leader of Machine Learning and Data Science** in a USA startup.
- 1 year as **MLOps Engineer** for a **Fintech** in LATAM.



Non-academic Experience



- **PyCon Colombia** and **Python Bogotá co-organizer**. Collaborations in ScipyLATAM and Jupyter LATAM.
- 3 years as **software engineer** for several **tech companies** in Colombia.
- 3 years as **Technical Leader** of **Machine Learning and Data Science** in a USA startup.
- 1 year as **MLOps Engineer** for a **Fintech** in LATAM.



Non-academic Experience



- **PyCon Colombia** and **Python Bogotá co-organizer**. Collaborations in ScipyLATAM and Jupyter LATAM.
- 3 years as **software engineer** for several **tech companies** in Colombia.
- 3 years as **Technical Leader of Machine Learning and Data Science** in a USA startup.
- 1 year as **MLOps Engineer** for a **Fintech** in LATAM.



Outline

- 1 You don't know who I am
- 2 Course Overview
- 3 Syllabus
- 4 Grading & Rules
- 5 Bibliography



Overview

This course is designed to introduce **undergraduate students** to foundations of **database systems** and **good practices** of **databases design**. This is **not** a course fully focus on **software engineering**, but it is part of main concepts of **software systems building**.

Classes will consist of **lectures**, **discussions**, practical examples, and **workshops**. Also, you must take some **readings** from **software development**. In addition, there will be a **semester-long project**, as well **one exams**, **four workshops**, and **ten additional assignments**.



Overview

This course is designed to introduce **undergraduate students** to foundations of **database systems** and *good practices* of **databases design**. This is **not** a course fully focus on **software engineering**, but it is part of main concepts of **software systems building**.

Classes will consist of **lectures**, **discussions**, practical examples, and **workshops**. Also, you must take some readings from *software development*. In addition, there will be a **semester-long project**, as well **one exams**, **four workshops**, and **ten** additional **assignments**.

English - 400-500
200-300



Goals

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

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



Goals

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

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



Prerequisites

This is a basic course, so you must have some knowledge in:

- **Programming** in **Python**, **Java** or **C++**.
- **Object-Oriented Programming** foundations.
- **UML** and **Class Diagrams** basic concepts.
- **Git** basic usage, and **GitHub** basic usage.
- Use of **IDEs** like **VS Code**, **Eclipse**, or **PyCharm**.



Prerequisites

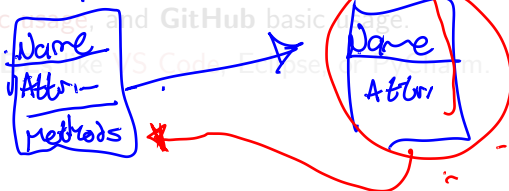
This is a basic course, so you must have some knowledge in:

- **Programming** in Python, Java or C++.
- **Object-Oriented Programming** foundations.

• UML and Class Diagrams basic concepts.

• Git basic usage, and GitHub basic page.

• Use of IDEs like VS Code, Eclipse or PyCharm.



Prerequisites

This is a basic course, so you must have some knowledge in:

- **Programming** in **Python**, **Java** or **C++**.
- **Object-Oriented Programming** foundations.
- **UML** and **Class Diagrams** basic concepts.
- **Git** basic usage, and **GitHub** basic usage.
- Use of **IDEs** like **VS Code**, Eclipse, or PyCharm.



Prerequisites

This is a basic course, so you must have some knowledge in:

- **Programming** in **Python**, **Java** or **C++**.
- **Object-Oriented Programming** foundations.
- **UML** and **Class Diagrams** basic concepts.
- **Git** **basic usage**, and **GitHub** basic usage.
- Use of **IDEs** like **VS Code**, **Eclipse**, or **PyCharm**.



Prerequisites

This is a basic course, so you must have some knowledge in:

- **Programming** in **Python**, **Java** or **C++**.
- **Object-Oriented Programming** foundations.
- **UML** and **Class Diagrams** basic concepts.
- **Git** ~~basic usage~~, and **GitHub** basic usage.
- Use of **IDEs** like **VS Code**, Eclipse, or PyCharm.

~~IDEs~~ → F.O.S.S. ⇒ Free Open Source Software
DBEaver



Outline

- 1 You don't know who I am
- 2 Course Overview
- 3 Syllabus**
- 4 Grading & Rules
- 5 Bibliography



Syllabus I

Period	Topic	Time
Period I	Introduction to DataBases	3 sessions
	DataBase Models	3 sessions
	Workshop Introduction to DataBases	1 session
	DataBase Design	4 sessions
	DataBase Tools	2 sessions
	Workshop on DataBase Design	1 session
	Projects Presentation	1 session

Table: Schedule for Period I



Syllabus II

Period	Topic	Time
Period II	Data Engineering	2 sessions
	SQL Language — DDL	3 sessions
	Workshop on DataBase Tools	1 session
	SQL Language — DML	2 sessions
	SQL Language — DQL	4 sessions
	Workshop on SQL Language	1 session
	Advanced SQL	2 sessions
	Introduction to a Transactional Backend	1 session
	Course Test	1 session
Period III	Projects Dissertation	2 sessions

Table: Schedule for Period II & III



Outline

- 1 You don't know who I am
- 2 Course Overview
- 3 Syllabus
- 4 Grading & Rules**
- 5 Bibliography



Grades Percentages

Period	Item	Percentage
Period I	Assignments	5%
	Workshops	20%
	Project	10%
Period II	Assignments	5%
	Workshops	20%
	Course Test	10%
Period III	Paper + Poster	5%
	Project Report	10%
	Project on Production	15%

Handwritten notes in red:

- Next to 5% (Assignments Period I): -5
- Next to 20% (Workshops Period I): -2
- Next to 10% (Project Period I): 10% + 10% + 10% + 10%
- Next to 5% (Assignments Period II): -5
- Next to 20% (Workshops Period II): -2
- Next to 10% (Course Test Period II): -2
- Next to 5% (Paper + Poster Period III): 30%
- Next to 10% (Project Report Period III): 30%
- Next to 15% (Project on Production Period III): 30%

Table: DataBases Foundations Grades Distribution



Don't hate the player, hate the game

- All assignments must be submitted **hand-written** on **time** and in **english**. Grammar and spelling will **not** be evaluated.
- Copying and pasting from internet is **forbidden**. Please, **develop** your own solutions.
- Class attendance is **not mandatory**. If you **miss** classes, you must *study by yourself*.
- No cell-phones, no smartwatches, no whatsapp, no tinder, no smartanything. **Just you and your brain**. Pay attention at clase.
- Communications with me must be done by **email** or by **slack**. I will **not** answer any question by *WhatsApp*.



Don't hate the player, hate the game

- All assignments must be submitted **hand-written** on **time** and in **english**. Grammar and spelling will **not** be evaluated.
- Copying and pasting from internet is **forbidden**. Please, **develop** your own solutions.
- Class attendance is **not mandatory**. If you miss classes, you must *study by yourself*.
- No cell-phones, no smartwatches, no whatsapp, no tinder, no smartanything. **Just you and your brain**. Pay attention at clase.
- Communications with me must be done by email or by slack. I will **not** answer any question by *WhatsApp*.



Don't hate the player, hate the game

- All assignments must be submitted **hand-written** on **time** and in **english**. Grammar and spelling will **not** be evaluated.
- Copying and pasting from internet is **forbidden**. Please, **develop** your own solutions.
- Class attendance is **not mandatory**. If you **miss** classes, you must **study by yourself**.
- No cell-phones, no smartwatches, no whatsapp, no tinder, no smartanything. **Just you and your brain**. Pay attention at clase.
- Communications with me must be done by **email** or by **slack**. I will **not** answer any question by *WhatsApp*.



Don't hate the player, hate the game

- All assignments must be submitted **hand-written** on **time** and in **english**. Grammar and spelling will **not** be evaluated.
- Copying and pasting from internet is **forbidden**. Please, **develop** your **own solutions**.
- Class attendance is **not mandatory**. If you **miss** classes, you must *study by yourself*.
- No cell-phones, no smartwatches, no whatsapp, no tinder, no smartanything. **Just you and your brain**. Pay attention at clase.
- Communications with me must be done by email or by slack. I will **not** answer any question by WhatsApp.



Don't hate the player, hate the game

- All assignments must be submitted **hand-written** on **time** and in **english**. Grammar and spelling will **not** be evaluated.
- Copying and pasting from internet is **forbidden**. Please, **develop** your **own solutions**.
- Class attendance is **not mandatory**. If you **miss** classes, you must *study by yourself*.
- No cell-phones, no smartwatches, no whatsapp, no tinder, no **smartanything**. **Just you and your brain**. Pay attention at clase.
- Communications with me must be done by **email** or by **slack**. I will **not** answer any question by **WhatsApp**.



Code of Conduct

- Always be **respectful** to your **classmates** and to me. You must be **kind** with everyone inside (*and outside*) the classroom.
- There is **no** a better **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 cry**.
- You must **not be annoying**, or affect the **classroom environment**. If you do, I will **ask you** to **leave** the classroom.



Code of Conduct

- **Always** be **respectful** to your **classmates** and to me. You must be **kind** with everyone inside (*and outside*) the classroom.
- There is **no** a better **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 cry**.
- You must **not be annoying**, or affect the **classroom environment**. If you do, I will **ask you to leave** the classroom.



Code of Conduct

- **Always** be **respectful** to your **classmates** and to me. You must be **kind** with everyone inside (*and outside*) the classroom.
- There is **no** a better **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 cry**.
- You must **not be annoying**, or affect the **classroom environment**. If you do, I will **ask you** to **leave** the classroom.



Code of Conduct

- **Always** be **respectful** to your **classmates** and to me. You must be **kind** with everyone inside (*and outside*) the classroom.
- There is **no** a better **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 cry**.
- You must **not be annoying**, or affect the **classroom environment**. If you do, I will **ask you** to **leave** the classroom.



Code of Conduct

- **Always** be **respectful** to your **classmates** and to me. You must be **kind** with everyone inside (*and outside*) the classroom.
- There is **no** a better **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 cry**.
- You must **not be annoying**, or affect the **classroom environment**. If you do, I will **ask you to leave** the classroom.



Outline

- 1 You don't know who I am
- 2 Course Overview
- 3 Syllabus
- 4 Grading & Rules
- 5 Bibliography**



Bibliography

Recommended bibliography:

- **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 Date C.J..



Bibliography

Recommended bibliography:

- **Procesamiento de Bases de Datos, Fundamentos, Diseño e Implementación**, by **David M. Kroenke**.
- **Sistemas de Bases de Datos: Conceptos Fundamentales**, by **Elmasri, Navathe**.
- **Database System Implementation**, by **Hector Garcia-Molina, Jeffrey D. Ullman, and Jennifer Widom**.
- **Fundamentos de Bases de Datos**, by **Silberschitz A., Korth H.F, and Sudershan S.**



Outline

- 1 You don't know who I am
- 2 Course Overview
- 3 Syllabus
- 4 Grading & Rules
- 5 Bibliography



Thanks!

Questions?



www.linkedin.com/in/casierrav

