# Databases

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| Course title – Intitulé du cours | Databases |
| Level / Semester – Niveau /semestre | M2 / Second semester |
| School – Composante | Ecole d'Economie de Toulouse |
| Teacher – Enseignant responsable | Van Duy NGO |
| Other teacher(s) – Autre(s) enseignant(s) | |
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| Lecture Hours – Volume Horaire CM | 18 |
| TA Hours – Volume horaire TD | |
| TP Hours – Volume horaire TP | |
| Course Language – Langue du cours | English / Anglais |
| TA and/or TP Language – Langue des TD et/ou TP | English / Anglais |

**Teaching staff contacts – Coordonnées de l'équipe pédagogique :**

Email: van-duy.ngo@irit.fr
Office: B303@IRIT, Université de Toulouse

**Course Objectives – Objectifs du cours :**

This course is intended to introduce the students to the concept of relational databases, their important role in a complete system, and the general use cases in which databases are used to structure, store, and exploit data. Along with mastering basic data definition and manipulation skills, students are encouraged to apply their newly acquired knowledge about databases on hands-on exercises, with some of them being closely related to practical problems. On top of that, students will learn techniques that bring modern data analytics tools and databases together, aiming at providing students with on-demand and up-to-date knowledge and skills that are important for their future endeavours.

At the end of the course, students are anticipated to work on a real-world "problem". With the problem, the students form groups of people –preferably from different technical/academical backgrounds – to come up with a solution in which the techniques relevant to the course are used.

**Prerequisites – Pré requis :**

- Basic understanding of programming with Python
- Basic skills on data analysis (recommended)

**Practical information about the sessions – Modalités pratiques de gestion du cours :**

- The sessions are held in person, with exceptions applied to circumstances that require online classroom settings
- The information introduced in a session may require knowledge obtained from the preceding sessions
- Should there be Multiple Choice Question (MCQ) tests, they will be available on Moodle
- Personal computers are allowed unless specified otherwise
- Students are encouraged to ask relevant questions during the sessions. Outside of the classroom, communication via the Moodle learning platform is preferred

**Course planning – Planification des séances :**

This course includes 7 formal sessions located in a computer room. The general planning for the sessions is as follows:

- Introduction to relational databases
- Creating and modifying a database: Data Definition Language (DDL)
- Adding and modifying data in a database: Data Manipulation Language (DML)
- Accessing and interacting with databases using SQL queries
- Accessing and interacting with databases using Python
- Data frames from and to databases: how the two converge
- Project proposals and discussions

The information regarding course planning and resources will also be available on Moodle

**Grading system – Modalités d'évaluation :**

The grading of this course will rely on the following criteria:

- MCQ tests/graded quizzes, subjected to being taken during class, accounting for 30% of the final grade
- A final project that accounts for 70% of the final grade, in which groups of 2-4 students are free to choose and work on a problem that involves databases. The evaluation is primarily done on the database part (60%), with some bonus for the problem formulation (20%) and the presentation of their work (20%)

**Bibliography/references – Bibliographie/références :**

The materials used during the course do not directly refer to any available textbooks, but the resources below should be helpful:

- https://docs.oracle.com/en/database/
- https://docs.pola.rs/api/python/stable/reference/index.html
- https://duckdb.org/docs/