Course Overview

Title :	**Mathematical methods**
Duration :	24 hours
Professor :	Paul Dubois
Email :	b00795695@essec.edu
Website :	https://github.com/pauldubois98/RefresherMaths2024

Course description / summary

This course teaches basic mathematical methodologies for data science. It is intended for students with a lack of mathematical background, or with a lack of confidence in mathematics. We will try to cover most of the prerequisites of the courses in the Master, mainly linear algebra, differential calculus, integration, and optimization.

Structure

Each session of the course consists in 3 hours: class (notes written on the board) and exercises to assimilate the methodologies and notions covered in class. Computers with Python installed are required for some of the exercises.

Content (table of contents)

The table of contents may change according to student's needs.

- Combinatorics
- Calculus
- Optimization
- Linear Algebra
- Differential Equations
- Principal Component Analysis
- Binary Classification

Learning objectives

- gain confidence in mathematics
- use numerical experiments for a better understanding of mathematical concepts.

Prerequisites

High school mathematics.

Reading material

On the website (https://github.com/pauldubois98/RefresherMaths2024) you will be able to find the notes for the class, and the exercises.
If you want to go (much) further than this course in terms of mathematics, I suggest reading “Real and Complex Analysis” (Walter Rudin).

Evaluation

The grade is binary : pass or fail.
In order to pass the course, you need to validate each session.
Validating a session can be done either by *coming in person to the session*, or by successfully *solving all compulsory questions* from the corresponding problem set.