

UE Graphs and discrete structures



Level
Baccalaureate
+5



ECTS
3 credits



Component
UFR IM2AG
(informatique,
mathématiques
et
mathématiques
appliquées)



Semester
Automne

- > **Teaching language(s):** English
- > **Teaching method:** In person
- > **Teaching type:** Lectures
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** GBX9CO06

Presentation

Description

The aim of this course is to learn how to use the structure of graphs and other discrete objects to obtain general results on them, and in particular efficient algorithms solving important problems.

We will cover the following topics:

- **Structural Graph Theory:** we will study the structure of important graph classes with nice algorithmic properties (planar graphs, interval graphs, comparability graphs, ...) and show several concrete problems that can be solved thanks to their structural properties.
- **Graph Drawing:** with the rise of Big Data, representing huge data sets is a fundamental challenge. Efficient ways to represent large graphs will be presented.
- **Codes:** we will see various codes (dominating, locating, identifying, ...) in graphs and their applications.
- **Extremal combinatorics:** the typical question in this field is "what global condition do we need to impose in some graph in order to make sure that some nice structure appears locally?" We will introduce a powerful tool called "the probabilistic method", and show how it can be applied to solve problems in this important area of research.

Course parts

CM	Lectures (CM)	18h
Period : Semester 9		

Useful info

Contacts

Program director
Louis Esperet
✉ louis.esperet@grenoble-inp.fr

Place

> Grenoble

Campus

> Grenoble - University campus