Apprentissage topologique

**ECTS** : 3

**Volume horaire** : 24

**Description du contenu de l'enseignement :**

The objective of this course course is to give students an overview of the field of graph mining and network science. Since graphs form a complex and expressive data type, we need methods for extracting information efficiently. Moreover, graph applications are very diverse and need specific algorithms.

The course presents new ways to model, mine and analyze graph-structured data and include many examples of applications. Lab sessions are included alowing students to practice graph mining and network science.

Outline of the course:

1. Centrality measures
2. Spectral graph theory and graph signal processing
3. Community detection
4. Machine learning and deep learning on graphs
5. Node classification and link prediction
6. Graph representation learning
7. Diffusion process and epidemics on networks

**Compétence à acquérir :**

1. Manipulate and create graphs using Python's NetworkX library

2. Master the centrality, community detection, classification and machine learning algorithms

3. Know how to use your knowledge in network science to solve problemes arising in other domains (cloud points, image, audio files, ...)