Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
MAT408	Topological Data Analysis	7	3	0	0	3	5

Prerequisites	
Admission Requirements	
Language of Instruction	French
Course Type	Elective
Course Level	Bachelor Degree
Objective	The aim of the course is to explore the fundamental concepts, techniques, and results in Topological Data Analysis.
Content	Simplicial complexes, Homology Persistent Homology Complexes on point clouds Reeb Graphs Mapper Algorithm
References	-Herbert Edelsbrunner, John L. Harer, Computational Topology An Introduction, -Topology For Computing, Afra Zomorodian

Theory Topics

Week	Weekly Contents
1	Simplicial complexes
2	Complexes from Point Cloud Data
3	Complexes from Point Cloud Data
4	Simplicial Homology
5	Chains, Cycles, Boundaries, and Homology Groups
6	Matrix View and Algorithm for Calculation
7	Computing Simplicial Homology of Topological Spaces
8	Exam
9	Persistent homology
10	Filtrations
11	Matrix View and Reduction-Based Algorithm
12	Computing Persistent Homology
13	Analysis of Point Cloud Data
14	Analysis of Point Cloud Data