

Course Name : Data Mining II							
Course Code	Course Type	Regular Semester	Lecture (hours/week)	Seminar (hours/week)	Lab. (hours/week)	Credits	ECTS
CMP 509	C	Fall	3.00	1.00	0.00	3.50	6.00
Lecturer		Eris Zeqo, PhD					
Assistant		Damiana Teliti, Msc					
Course language		Albanian					
Course level		Master					
Description		“Data Mining II” focuses on advanced knowledge discovery techniques including big data analysis, advanced classification, clustering, anomaly detection, and mining data streams. The emphasis is on applying state-of-the-art algorithms in real-world contexts.					
Objectives		To explore advanced data analysis techniques. To apply classification and clustering algorithms in complex scenarios. To analyze streaming and unstable data. To understand anomaly detection and personalization techniques.					
Core Concepts		Advanced classification and performance improvement Hierarchical, fuzzy, and DBSCAN clustering Data stream mining Anomaly and outlier detection Dimensionality reduction (PCA, t-SNE) Model selection and ensemble techniques					
Course Outline							
Week	Topic						
1	Introduction & Review of Data Mining I						
2	Advanced Classification: Boosting and Bagging						
3	Feature Selection & Dimensionality Reduction						
4	Fuzzy Clustering and DBSCAN						
5	Mining Data Streams						
6	Anomaly and Outlier Detection						
7	Personalization and Recommendation Systems						
8	Midterm Exam						
9	Text and Unstructured Data Mining						
10	Ensemble Methods: Random Forests, Stacking						
11	Performance Evaluation & Cross-Validation						
12	Data Mining in Big Data Contexts						
13	Practical Tools (Weka, Scikit-learn, RapidMiner)						
14	Ethics and Privacy in Data Analysis						
15	Final Project Presentations / Review						
16	Final Exam						

Prerequisites	The student must attend the course at a minimum rate of 75%.		
Literature	• Jiawei Han, Micheline Kamber, Jian Pei – Data Mining: Concepts and Techniques, 4th Edition, Morgan Kaufmann, 2022.		
References	• Pang-Ning Tan, Michael Steinbach, Anuj Karpatne, Vipin Kumar – Introduction to Data Mining, 2nd Edition, Pearson, 2019. • Charu C. Aggarwal – Data Mining: The Textbook, Springer, 2015. • Trevor Hastie, Robert Tibshirani, Jerome Friedman – The Elements of Statistical Learning, Springer, 2017.		
Course Outcome			
1	Students will be able to apply advanced data mining techniques on real-world and large-scale datasets.		
2	They will be able to choose appropriate algorithms for classification, clustering, or anomaly detection.		
3	They will use practical tools for both structured and unstructured data analysis.		
4	They will understand the importance of ethics and privacy protection in data analysis.		
Course Evaluation			
In-term Studies		Quantity	Percentage
Midterms		0	0
Quizzes		0	0
Projects		1	20
Term Projects		1	20
Laboratory		0	0
Class Participation		0	0
Total in-term evaluation percent			40
Final exam percent			60
Total			100
ECTS Workload (Based on Student Workload)			
Activities	Quantity	Duration (hours)	Total (hours)
Course duration (Including the exam week: 16x Total hours of the course)	16	4	64
Study hours outside the classroom (Preparation, Practice, etc.)	14	2	28
Duties	2	24	48
Midterms	0	0	0
Final Exam	1	10	10
Other	0	0	0
Total Work Load			150
Total Work Load / 25 (hours)			6.00
ECTS			6.00