

Course title	Data Mining	
Course number	COMP 612	
Credit hours (lecture and lab)	3 (3 + 0)	
ECTS (weekly contact and self-study load)	6 (3 + 3)	
Prerequisites/co-requisites by course number and name	None	
Prerequisites by topic (other than the formal prerequisites above)	None	
Level and type (compulsory, elective)	Masters' elective course	
Year of study and semester	Any	
Catalogue description	Data mining and knowledge discovery, motivation of using data mining, data mining models, data mining techniques: association rules, and classification in data-mining clustering. Introduction to recommender systems. Sequential patterns mining, applications, and case studies.	
Objectives	This course introduces the concepts, principles, methods, and implementation techniques. The course put emphasis on data mining functions, pattern discovery, techniques, clustering, and sequential pattern mining. The students are introduced to the use of modern data mining tools.	
Intended learning outcomes	Upon successful completion of this course, students will be able to:	
	No	Intended learning Outcome (ILO)
	1	Demonstrate understanding of pattern discovery concepts, methods, and applications.
	2	Identify efficient pattern mining methods and evaluation issues.
	3	Apply well-known sequential pattern mining methods.
	4	Apply graph pattern mining.
	5	Apply pattern-based classification
	6	Demonstrate understanding of basic concepts, methods, and applications of cluster analysis.
	7	Apply pattern-based techniques in selected applications.
	8	Use modern data mining toolboxes and libraries.
(*) The Program learning outcome (PLOs) are listed in the appendix		

Teaching and learning methods	Development of ILOs is promoted through the following teaching and learning methods: <ul style="list-style-type: none"> • The Digital Systems Lab. is open for the students to practice the practical aspects and solve the programming homework assignments. • The student attends the class presentations and participates in the discussions. • The student joins the related online team/group and participates in its discussions. • The student studies the reference material, including books and videos. • The student solves the programming assignments in data mining. • The student carries out a term project for solving a problem using data mining techniques. • The student develops a professional report for the term report. • The student presents the term project in class. 																																																				
Learning material type	Textbook, class handouts, some instructor keynotes, selected YouTube videos, and access to a personal computer and the internet.																																																				
Resources and references	A- Required book(s), assigned reading and audio-visuals: <ol style="list-style-type: none"> 1. Han, J., Kamber, M., & Pei, J. (2011). Data mining: Concepts and techniques (3rd ed.). Waltham: Morgan Kaufmann. B- Recommended book(s), material and media: <ol style="list-style-type: none"> 2. Introduction to Data Mining (Second version 2018), P.-N. Tan, M. Steinbach, and V. Kumar, Addison Wesley, 2018. 																																																				
Topic outline and schedule	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Week</th> <th style="width: 60%;">Topic</th> <th style="width: 10%;">ILO</th> <th style="width: 20%;">Resources</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Pattern Discovery Overview</td> <td>1</td> <td>1</td> </tr> <tr> <td>2</td> <td>Data Mining Process</td> <td>1</td> <td>2</td> </tr> <tr> <td>3-4</td> <td>Association Rules</td> <td>1, 2</td> <td>2</td> </tr> <tr> <td>5</td> <td>Pattern Evaluation</td> <td>2</td> <td>1</td> </tr> <tr> <td>6</td> <td>Sequential Pattern Mining</td> <td>3</td> <td>1</td> </tr> <tr> <td>7</td> <td>Graph Pattern Mining</td> <td>4</td> <td>1</td> </tr> <tr> <td>8-10</td> <td>Pattern-Based Classification</td> <td>5</td> <td>1</td> </tr> <tr> <td>11</td> <td>Pattern Mining Applications</td> <td>7</td> <td>1</td> </tr> <tr> <td>12</td> <td>Pattern Discovery Programming</td> <td>7, 8</td> <td>1</td> </tr> <tr> <td>13</td> <td>Recommender Systems</td> <td>1, 2</td> <td>1, 2</td> </tr> <tr> <td>14</td> <td>Cluster Analysis</td> <td>6</td> <td>1</td> </tr> <tr> <td>15</td> <td>Term Project Presentations</td> <td>7, 8</td> <td>1, 2</td> </tr> </tbody> </table>	Week	Topic	ILO	Resources	1	Pattern Discovery Overview	1	1	2	Data Mining Process	1	2	3-4	Association Rules	1, 2	2	5	Pattern Evaluation	2	1	6	Sequential Pattern Mining	3	1	7	Graph Pattern Mining	4	1	8-10	Pattern-Based Classification	5	1	11	Pattern Mining Applications	7	1	12	Pattern Discovery Programming	7, 8	1	13	Recommender Systems	1, 2	1, 2	14	Cluster Analysis	6	1	15	Term Project Presentations	7, 8	1, 2
Week	Topic	ILO	Resources																																																		
1	Pattern Discovery Overview	1	1																																																		
2	Data Mining Process	1	2																																																		
3-4	Association Rules	1, 2	2																																																		
5	Pattern Evaluation	2	1																																																		
6	Sequential Pattern Mining	3	1																																																		
7	Graph Pattern Mining	4	1																																																		
8-10	Pattern-Based Classification	5	1																																																		
11	Pattern Mining Applications	7	1																																																		
12	Pattern Discovery Programming	7, 8	1																																																		
13	Recommender Systems	1, 2	1, 2																																																		
14	Cluster Analysis	6	1																																																		
15	Term Project Presentations	7, 8	1, 2																																																		

Evaluation tools	Opportunities to demonstrate achievement of the ILOs are provided through the following assessment tools:			
	Assessment tool	Mark	Topic(s)	Time
	Homework assignments	10%	Theoretical aspects	W1-W7
	Midterm exam	30%	Applications	W8-W14
	Term project report and presentation	20%	Practical and presentation aspects	W8-W15
	Final exam	40%	All material	W16
	Total	100%		
Student requirements	The student should have a computer and internet connection.			
Course policies	<p>A- Attendance policies:</p> <ul style="list-style-type: none"> Attendance is required. Class attendance will be taken every class and the university polices will be enforced in this regard. <p>B- Absences from exams and not submitting assignments on time:</p> <ul style="list-style-type: none"> A makeup exam can be arranged for students with acceptable absence causes. Assignments submitted late, but before announcing or discussing the solution can be accepted with 25% penalty. The project report must be handed in in time. <p>C- Health and safety procedures:</p> <ul style="list-style-type: none"> All health and safety procedures of the university and the school should be followed. <p>D- Honesty policy regarding cheating, plagiarism, misbehavior:</p> <ul style="list-style-type: none"> Open-book exams All submitted work must be of the submitting student. Other text or code must be properly quoted with clear source specification. Cheating will not be tolerated. <p>E- Available university services that support achievement in the course:</p> <ul style="list-style-type: none"> Moodle course page AI Lab for practicing the practical aspects and solving the programming assignments. Program announcements Facebook group 			
Additional information	None			