



MARMARA UNIVERSITY - FACULTY OF ENGINEERING

2017-2018 Fall

CSE4063 Fundamentals of Data Mining

**COURSE DESCRIPTION FORM**

<b>Offering Department</b>	Department of Computer Engineering		Technical Elective						
<b>Course Code</b>	CSE4063								
<b>Course Name</b>	Fundamentals of Data Mining								
<b>Language of Instruction</b>	English								
<b>ECTS</b>	5								
<b>Contact Hours</b>	Theoretical (T): 3	Practice (P): -	Laboratory(L): -						
<b>Pre-requisites</b>									
<b>Instructor</b>	<b>Name</b>	Murat Can Ganiz							
	<b>E-mail</b>	murat.ganiz@marmara.edu.tr							
<b>Course Materials</b>	<b>Mandatory</b>	Tan, P. N., Steinbach, M., & Kumar, V. (2005). Introduction to data mining. 1st. Han, J., Pei, J., & Kamber, M. (2011). Data mining: concepts and techniques. Elsevier							
	<b>Recommended</b>	Witten, I. H., Frank, E., Hall, M. A., & Pal, C. J. (2016). Data Mining: Practical machine learning tools and techniques. Morgan Kaufmann.							
<b>Course Objectives</b>	To give information about fundamental topics and methods in data mining, to teach data mining process and stages of this process, to introduce basic machine learning algorithms and data warehouses used in data mining process, online analytical processing and business intelligence concepts.								
<b>Course Content</b>	Data mining process and its fundamental concepts, data preprocessing and cleaning, creation of ETL processes and data warehouses, online analytical processing methods and business intelligence reports, basic methods for comprehending the available data, descriptive data mining methods and unsupervised machine learning algorithms, predictive data mining methods and supervised machine learning methods, modeling with machine learning algorithms, model evaluation methods.								
<b>Learning Outcomes</b>	<b>LO1</b>	To have knowledge about how iterative data mining process works.							
	<b>LO2</b>	Data preprocessing, data cleaning, transformation and feature extraction							
	<b>LO3</b>	To have information about basic explanatory / unsupervised machine learning algorithms used in data mining.							
	<b>LO4</b>	To have knowledge about basic predictive / supervised machine learning algorithms used in data mining.							
	<b>LO5</b>	To learn the methods of evaluation of supervised and unsupervised models used in data mining							
	<b>LO6</b>	To be able to apply data mining methods on synthetic or real data sets							
<b>Program Outcomes</b>		<b>LO1</b>	<b>LO2</b>	<b>LO3</b>	<b>LO4</b>	<b>LO5</b>	<b>LO6</b>		
<b>PO2</b>	Ability to identify, formulate, and solve complex engineering problems (a); ability to select and apply proper analysis and modelling methods for this purpose (b).						b		
<b>PO4</b>	Ability to devise (a), select, and use (b) modern techniques and tools needed for engineering practice (1); ability to employ information technologies effectively (2).		a,2	a,2	a,2	a,2			
<b>PO6</b>	Ability to work efficiently in intra-disciplinary (a) and multi-disciplinary teams (b); ability to work individually (c).						a		
<b>PO10</b>	Information about business life practices such as project management, risk management, and change management (a); awareness of entrepreneurship, innovation (b), and sustainable development (c).						a		
<b>PO13</b>	Knowledge of mathematics, basic sciences (a), computer science (b) and engineering sciences (c) required for the design and analysis of complex electrical and electronic devices, software and systems including hardware and software.	b							
<b>Subjects (Knowledge, Skills and Behaviours), Contributions of Subjects to Learning Outcomes, Assessment Methods</b>	<b>No</b>	<b>Week</b>	<b>Subjects</b>	<b>LO1</b>	<b>LO2</b>	<b>LO3</b>	<b>LO4</b>	<b>LO5</b>	<b>LO6</b>
	<b>S1</b>	1-2	Introduction to data mining and fundamental features of data mining processes	MF,Q					
	<b>S2</b>	3-4	Data warehouses and OLAP technology			MF,Q			
	<b>S3</b>	5-6	Data Preprocessing and data cleaning		MF,Q				
	<b>S4</b>	7-8	Mining of frequent patterns, relationships and correlations, market basket analysis, Apriori algorithm				MF,P		
	<b>S5</b>	8-9	Classification and numerical prediction					MF,P	
	<b>S6</b>	10-11	Clustering analysis				MF,P		
<b>S7</b>	12-13	Evaluation of models						MF,P	

	<b>S8</b>	14	Course review and project presentations					P	P	P	
<b>Assessment Methods and Weights</b>	<b>No</b>	<b>Type</b>	<b>Weight</b>	<b>Implementation Rule</b>			<b>Make-up Rule</b>				
	<b>MF</b>	Midterm, Final	60%	Exams, are done by books and all course materials closed. No calculation and communication tools are allowed during exams.			Marmara University regulations will be followed for make-up exams.				
	<b>Q</b>	Quiz	10%	-			-				
	<b>H</b>	Homeworks					-				
	<b>P</b>	Project	30%	Application of data mining topics to real life or academic data sets in interdisciplinary or interdisciplinary teams							
	<b>TOTAL</b>		100%								
<b>Determining Letter Grades</b>	<ul style="list-style-type: none"> <li>The letter grades will be determined based on the midterm and final exams, quizzes and project.</li> <li>In order to determine the letter grade, a curve or catalog based method will be followed based on the total average scores of the students.</li> <li>The final exam score and the total average score of the student must be at least 35 to pass the course.</li> <li>According to Marmara University Undergraduate regulations, the weight of the final exam must be at least 40 out of 100.</li> </ul>										
	Assessment		Midterm	Project	Quizzes	Final	TOTAL				
Weight		20	30	10	40	100					
<b>Teaching Method, Student Work Load</b>	<b>Time Applied by the Instructor</b>										
	<b>No</b>	<b>Method</b>	<b>Explanation</b>						<b>Hours</b>		
	1	Lectures	Lectures are given in class using the board or via presentations. Example questions are solved to enhance the concepts.						14x3=42		
	2	Problem Session/ Practice	Problems related to the course topics are solved on the board.								
	3	Laboratory	Experiments are done in the laboratory or theoretical concepts covered during the lectures are practiced using computer exercises.								
	4	Interactive Courses	Questions are asked to students during lectures and they are encouraged to guess the answers (peer learning is also in this category)								
	5	Field Work	Students attend activities outside the campus.								
	6	Midterm	Midterm exam is given during the midterm week.						2		
	7	Final	Final exam is given during the final exam week.						2		
	<b>Estimated Time to be Allocated by a Student</b>										
	8	Project	The students carry out research about the problem given in the project, design and implement their solution and prepare a report.						35		
	9	Quiz	Quiz Preparation.						5		
	10	Pre-class learning of Course Material	The students study and learn the new subjects from course materials.								
11	Review of Course Material	Students review the course subjects from course materials to prepare for the exams and homeworks.						36			
12	Office Hour	Students ask questions to the instructor or the assistant during office hours.						2			
<b>Total</b>								124			
<b>Academic Honesty</b>	Violations of scholastic honesty include, but are not limited to cheating, plagiarizing, fabricating information or citations, facilitating acts of dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students.										
	In case academic dishonesty is observed, the first authority is the instructor of the course. The instructor may decide to give the student zero for the homework(s)/lab(s)/exam(s), give the letter grade FF, or may take disciplinary action.										