



MARMARA UNIVERSITY - FACULTY OF ENGINEERING

2017-2018 Spring

MATH2056 - Linear Algebra

**COURSE DESCRIPTION FORM**

<b>Offering Department</b>	Department of Computer Engineering		Undergraduate must course (2nd semester)					
<b>Course Code</b>	MATH2056							
<b>Course Name</b>	Linear Algebra							
<b>Language of Instruction</b>	English							
<b>ECTS</b>	4							
<b>Contact Hours</b>	Theoretical (T):3	Practice (U):0	Laboratory (L):0					
<b>Pre-requisites</b>	-							
<b>Instructor</b>	<b>Name</b>	Ali Fuat ALKAYA						
	<b>E-mail</b>	falkaya@marmara.edu.tr						
<b>Course Materials</b>	<b>Mandatory</b>	Linear Algebra and Its Applications, David C. Lay, 4th Ed., Pearson						
	<b>Recommended</b>	http://mimoza.marmara.edu.tr/~falkaya/math256						
<b>Course Objectives</b>	At the end of this course, the student is expected to be able to solve the set of linear equations, to obtain a determinant of a square matrix and its reverse (if any), to express terms such as linear dependent clusters and bases related to vector spaces, to find eigen vector and values of a square matrix, and to identify orthogonal vectors.							
<b>Course Content</b>	The course starts by teaching the systems of linear equations and how to solve them, continues with vector equations, matrix algebra, factorization and determinants. After that, concepts related to vector spaces, eigen vector and values, diagonalization are covered. Finally, orthogonality and least squares problems are taught.							
<b>Learning Outcomes</b>	<b>LO1</b>	Being able to solve a set of linear equations using matrix and vector algebra						
	<b>LO2</b>	Being able to calculate determinant of a square matrix and its reverse (if any)						
	<b>LO3</b>	Being able to express basic concepts such as bases, linear dependent clusters related to vector spaces						
	<b>LO4</b>	Being able to find eigen values and eigen vectors of a square matrix and make diagonalization						
	<b>LO5</b>	Being able to identify orthogonal vectors and solve the least squares problems.						
<b>Program Outcomes</b>								
<b>PO1</b>	Adequate knowledge in mathematics, science (a) and computer engineering subjects (b) pertaining to the relevant discipline (1); ability to use theoretical and applied information in these areas to model and solve engineering problems (2).		LO1	LO2	LO3	LO4	LO5	
<b>PO12</b>	Knowledge of advanced mathematics subjects including differential equations, integral calculus (a), linear algebra (b), statistics and probability (c), and discrete mathematics (d).				b	b	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>S1</b>	1-2	Linear Equations Systems and Solutions	M,H				
	<b>S2</b>	3	Vector Equations	M,H		H		
	<b>S3</b>	4	Matrix Algebra and Matrix Operations		M,H			
	<b>S4</b>	5	Matrix Factorization		F,H			
	<b>S5</b>	6	Determinants		F,H			
	<b>S6</b>	7-8	Vector Spaces and Subspaces			MF,H		
	<b>S7</b>	9-10	Linearly Independent Sets, Bases			MF,H		
	<b>S8</b>	11	Eigen Values and Eigen Vectors				F,H	
	<b>S9</b>	12	Diagonalization				F	
	<b>S10</b>	13	Orthogonality					F
<b>S11</b>	14	Least-Squares Problems					F	
<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%	There is one midterm and one final exam. Books and other course materials are closed during the exams.		Marmara University regulations will be followed for make-up exams.		
	<b>H</b>	Homeworks	40%	Late homeworks are not acceptable. Homeworks that are not submitted will get zero points. There are six homeworks.				
	<b>TOTAL</b>		100%					

**Determining Letter Grades**

- The letter grades will be determined based on the midterm and final exams, and homeworks.
- 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.
- The final exam score and the total average score of the student must be at least 35 to pass the course.
- According to Marmara University Undergraduate regulations, the weight of the final exam must be at least 40 out of 100.

Assessment	Midterm	Homeworks	Final	TOTAL
Weight	20	40	40	100

**Teaching Method, Student Work Load****Time Applied by the Instructor**

No	Method	Explanation	Hours
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

**Estimated Time to be Allocated by a Student**

8	Project	The students carry out research about the problem given in the project, design and implement their solution and prepare a report.	
9	Homeworks	The students solve the problems given as homework.	5x6=30
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.	14
12	Office Hour	Students ask questions to the instructor or the assistant during office hours.	2
<b>Total</b>			<b>92</b>

**Academic Honesty**

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.