

TOROS ÜNİVERSİTESİ

Faculty Of Engineering
Industrial Engineering (English)

Course Information

LINEAR ALGEBRA					
Code	Semester	Theoretical	Practice	National Credit	ECTS Credit
		Hour / Week			
MAT201	Fall	3	0	3	4

Prerequisites and co-requisites	NONE
Language of instruction	English
Type	Required
Level of Course	Bachelor's
Lecturer	Prof. Dr. Adnan MAZMANOĞLU
Mode of Delivery	Face to Face
Suggested Subject	None
Professional practise (internship)	None
Objectives of the Course	An exposure to linear systems and linear relationships. Using matrices to represent linear systems, and vector spaces.
Contents of the Course	systems of linear equations. Matrices, matrix algebra determinants. Vector spaces, subspaces, orthogonal spaces. Charactersitic equation of matrix, eigenvalues, eigenvectors. Cayley-Hamilton Theorem.

Learning Outcomes of Course

#	Learning Outcomes
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied information in these areas to model and solve engineering problems.
2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.
3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose. (Realistic constraints and conditions may include factors such as economic and environmental issues, sustainability, manufacturability, ethics, health, safety issues, and social and political issues, according to the nature of the design.)
4	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.
7	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.
8	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.

Course Syllabus

#	Subjects	Teaching Methods and Technics
1	Algebra of Matrices, Why do we need linear algebra, matrices, matrix prop.	Synchronous - Asynchronous
2	Matrix addition and scalar multiplication, summation symbol.	Synchronous - Asynchronous
3	Transpose of matrix and their applications, square matrices	Synchronous - Asynchronous
4	Power of matrices, plinominals in matrices, invertible (nonsingular) matrix	Synchronous - Asynchronous

5	Special types of square matrices, complex matrices, block matrices	Synchronous - Asynchronous
6	Supplementary Exercises	Synchronous - Asynchronous
7	Midterm	Exam
8	Systems of linear equations, introduction, basic definitions, equivalent system	Synchronous - Asynchronous
9	Elementary operations, small square systems of linear equations systems.	Synchronous - Asynchronous
10	Systems in Triangular and Echelon Form, Gaussian Elimination	Synchronous - Asynchronous
11	Echelon Matrices, Row Canonical form, row equivalence, Gaussian Elimination	Synchronous - Asynchronous
12	Determinants, introduction determinants order (1, 2 and 3)	Synchronous - Asynchronous
13	Properties of determinants, minors and cofactors. Cramers Rule	Synchronous - Asynchronous
14	Block matrices and determinants and volume	Synchronous - Asynchronous
15	Determinant of a linear operator, multilinearity and determinants : Probs.	
16	Final Exam	

Course Syllabus

#	Material / Resources	Information About Resources	Reference / Recommended Resources
1	B. Kolman, D. Hill, Elementary Linear Algebra with Applications		
2			

Method of Assessment

#	Weight	Work Type	Work Title
1	30%	Mid-Term Exam	Mid-Term Exam
2	70%	Final Exam	Final Exam

Relationship between Learning Outcomes of Course and Program Outcomes

#	Learning Outcomes	Program Outcomes	Method of Assessment
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied information in these areas to model and solve engineering problems.	1	1,2
2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.	1	1,2
3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose. (Realistic constraints and conditions may include factors such as economic and environmental issues, sustainability, manufacturability, ethics, health, safety issues, and social and political issues, according to the nature of the design.)	1	1,2
4	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	2	1,2
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	3	1,2
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.	4	1,2
7	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language.	5	1,2
8	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	5	1,2

PS. The numbers, which are shown in the column Method of Assessment, presents the methods shown in the previous table, titled as Method of Assessment.

Work Load Details

#	Type of Work	Quantity	Time (Hour)	Work Load
1	Course Duration	14	3	42
2	Course Duration Except Class (Preliminary Study, Enhancement)	14	2	28
3	Presentation and Seminar Preparation	0	0	0
4	Web Research, Library and Archival Work	0	0	0
5	Document/Information Listing	0	0	0
6	Workshop	0	0	0
7	Preparation for Midterm Exam	1	8	8
8	Midterm Exam	1	1	1
9	Quiz	0	0	0
10	Homework	0	0	0
11	Midterm Project	0	0	0
12	Midterm Exercise	0	0	0
13	Final Project	0	0	0
14	Final Exercise	0	0	0
15	Preparation for Final Exam	1	10	10
16	Final Exam	1	1	1
				90