



**ESOGU ELECTRICAL-ELECTRONICS ENGINEERING DEPARTMENT  
COURSE INFORMATION FORM**

Course Title	Course Code
LINEAR ALGEBRA	15122....

Semester in Program	Number of Course Hours per Week		ECTS Credit
	Theory	Practice	
2	3	0	3

Course ECTS Credit Distribution				
Basic Sciences	Engineering Sciences	Design	General Education	Social
3	0	0	0	0

Language of Instruction	Course Level	Course Type
English	Undergraduate	Required

<b>Prerequisite</b>	-
<b>Objectives of the Course</b>	Teaching fundamentals about matrices, methods to solve systems of linear equations, vector spaces, solving eigenvalues and eigenvectors, diagonalization and orthogonality.
<b>Brief Course Content</b>	Matrices. Dimension and rank. Determinants. Systems of linear equations. Row reduction and echelon forms. Solution Sets of Linear Systems. Applications of Linear Systems. Linear Independence. Vector Spaces and Subspaces. Null Spaces, Column Spaces and Linear Transformations. Linearly Independent Sets. Bases. The Dimension of a Vector Space. Eigenvalues and Eigenvectors. Diagonalization. Orthogonality and Least Squares.

Learning Outcomes of the Course	Contributed POs	Teaching Methods *	Assessment Methods **
1 Applying basic operations on matrices.	1a	1, 10	A, B
2 Solving systems of linear equations.	1a	1, 10	A, B
3 Defining linear independence.	1a	1, 10	A, B
4 Defining vector spaces.	1a	1, 10	A, B
5 Solving eigenvalues and eigenvectors.	1a	1, 10	A, B
6 Applying diagonalization.	1a	1, 10	A, B
7 Defining orthogonality.	1a	1, 10	A, B
8			

\*Teaching Methods 1:Lecture, 2:Discussion, 3:Experiment, 4:Simulation, 5:Question-Answer, 6:Tutorial, 7:Observation, 8:Case Study, 9:Technical Visit, 10:Problem Solving, 11:Individual Work, 12:Team/Group Work, 13:Brain Storm, 14:Project Design / Management, 15:Report Preparation and/or Presentation

\*\*Assessment Methods A:Exam, B:Quiz, C:Oral Exam, D:Homework, E:Report, F:Article Examination, G:Presentation, I:Experimental Skill, J:Project Observation, K:Class Attendance; L:Jury Exam

<b>Main Textbook</b>	David C. Lay, Steven R. Lay, Judi J. McDonald, Linear Algebra and Its Applications, Pearson, 5th ed., 2016.
<b>Supplementary Resources</b>	- Steven Leon, Lisette de Pillis, Linear Algebra with Applications, Global Edition, Pearson, 10th ed., 2021. - Fethi Çallıalp, Çözümlü Lineer Cebir Problemleri, Birsen Yayınevi, 2008.
<b>Necessary Course Material</b>	-

Course Weekly Schedule	
1	Matrices.
2	Dimension and rank.
3	Determinants.
4	Systems of linear equations. Row reduction and echelon forms.
5	Solution sets of linear systems.
6	Applications of linear systems.
7	Linear independence.
8	Mid-Term Exams
9	Vector spaces and subspaces.
10	Null spaces, column spaces and linear transformations.
11	Linearly independent sets. Bases. The dimension of a vector space.
12	Eigenvalues and eigenvectors.
13	Diagonalization.
14	Orthogonality and least squares.
15	Advanced problems.
16,17	Final Exams

Calculation of Course Workload			
Activities	Count	Time (Hour)	Total Workload (Hour)
Weekly classroom time	14	3	42
Weekly study time (review, reinforcing, preparation)	14	3	42
Homework	0	0	0
Taking a quiz	2	1	2
Studying for a quiz	2	2	4
Oral exam	0	0	0
Studying for an oral exam	0	0	0
Report writing (Preparation and presentation time included)	0	0	0
Project (Preparation and presentation time included)	0	0	0
Presentation (Preparation time included)	0	0	0
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	5	5
Final Exam	1	2	2
Studying for Final Exam	1	5	5
<b>Total workload</b>			<b>106</b>
<b>Total workload / 30</b>			<b>3.4667</b>
<b>Course ECTS Credit</b>			<b>3</b>

Assessment	
Activity Type	%
Mid-term	35
Quiz	20
<b>Final Exam</b>	45
<b>Total</b>	100

<b>COURSE CONTRIBUTION TO THE PROGRAM OUTCOMES</b> (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)		
<b>NO</b>	<b>PROGRAM OUTCOMES</b>	<b>Contribution</b>
<b>1</b>	a. Sufficient knowledge of mathematics	5
	b. Sufficient knowledge of basic sciences	1
	c. Sufficient basic engineering and Electrical-Electronics engineering knowledge	1
	d. Skill of applying all these knowledge and experience to complicated Electrical-Electronics engineering problems	1
<b>2</b>	Skill of defining, identifying, formulating and solving the complicated problems in Electrical-Electronics engineering and related areas by applying appropriate analysis and modelling methods.	1
<b>3</b>	Skill of designing a complicated process, system, equipment or product by applying modern design methods under realistic constraints and conditions.	1
<b>4</b>	To analyze and solve the complicated engineering problems:	1
	a. skill of developing, selecting and applying the required techniques and devices	1
<b>5</b>	To study the complicated on the complicated Electrical-Electronics engineering problems and research subjects:	1
	a. skill of experimental design	1
<b>6</b>	b. skill of performing the experiments, collecting the data and analyzing and interpreting the results	1
	a. Skill of performing individual studies	1
<b>7</b>	b. Skill of performing intra and interdisciplinary and multidisciplinary teamwork and studies	1
	a. Skill of effective oral and writing communication in Turkish and English	1
	b. Skill of improving and using foreign language knowledge	1
	c. Skill of effective reporting, understanding the reports and preparing the design and production reports	1
<b>8</b>	d. Skill of effective presentation and giving and getting clear and understandable instructions.	1
	Awareness of the necessity of life-long learning and skill of accessing to information and following the improvements in contemporary science and technology	1
<b>9</b>	a. Awareness of necessity of behaving in accordance with the ethical principles and awareness of the importance of having professional ethical responsibilities	1
	b. Knowledge about legal regulations and standards of engineering	1
<b>10</b>	a. Knowledge about project management, risk management and change management	1
	b. Awareness of the significance of entrepreneurship and innovation	1
	c. Knowledge about sustainable development	1
<b>11</b>	Knowledge about the effects of engineering applications and practices on the global and social health, ecology and safety, knowledge about the current problems in relation to the working areas of Electrical-Electronics engineering; and awareness of the legal issues resulting from engineering solutions	1
<b>12</b>	Knowledge about modern problems in local and universal scale	1

<b>INSTRUCTORS</b>				
<b>Prepared by</b>	Özge YANAZ ÇINAR			

**Date:** 06.07.2024