OSTİM TECHNICAL UNIVERSITY
INSTITUTE OF SCIENCES
ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE SCHEDULE FORM
2023-2024 FALL/SPRING

Course CODE Course NAME							
Course Unit Name	**Course Unit Code**	**Semester**	**Lecture Hr**	**Practice Hr**	**Lab Hr**	**Credit**	**ECTS**
Linear Algebra	Math 201	Spring	3	0	0	3	4

Course Details	
Language of Instruction	English
Level of Course Unit	Bachelor's Degree
Program	Aerospace Engineering Computer Engineering Electrical and Electronics Engineering Industrial Engineering Material Science and Engineering Mechanical Engineering Software Engineering
Mode of Delivery	Face to Face
Type of Course Unit	Compulsory
Objectives of the Course	The aim of this course is to give the basic concepts and mathematical foundations of linear algebra. In addition, it is to emphasize the concepts encountered in engineering applications with examples and to teach them in a way that shows their interest in computer science.
Course Content	Introduction to vectors, Sistem of linear equations, Matrix operations, Vector spaces and subspaces, Determinants, Elementary Row Operations, Eigenvalues and Eigenvectors
Course Method and Techniques	1. Primarily to give the basic idea of topics and help the students to see the big picture. 2. To support the issues with a variety of examples. 3. Reinforcing learning through regular homework research and team activities. 4. Holding midterm exam and final exam.
Prerequisites and Corequisities	
Course Coordinator	
Name of Lecturer(s)	
Assistants	
Work Placement(s)	

Recommended or Required Reading

Resources: 1. Daniel Norman and Dan Wolczuk, Introduction to Linear Algebra for Sience and Engineering, 2 nd Edition, Pearson Education, 2012.

2. Bernard Kolman and David R. Hill, Elementary Linear Algebra with Applications, 9 th Edition, Pearson Education, 2008

3. S. Lipschutz and M. Lipson, Schaum's Outline of Linear Algebra, 6th Edition. New York: McGraw-Hill Education, 2017.

4. G. Strang, Introduction to Linear Algebra, 5th Ed., Wellesly-Cambridge Press, 2016.

5. Howard Anton and Chris Rorres, Elementary Lineer Algebra, Wiley, 10 th Edition

Course Category			
Mathematics and Basic Sciences	: %100	Education	:
Engineering	: %0	Science	:
Engineering Design	: %0	Health	:
Social Sciences	:	Profession	:

Weekly Detailed Course Contents		
Week No	**Topics**	**Pre-study & Materials**
1	Sistem of linear equations, Gaussian Elimination	
2	Matrices and Matrix operations, Algebraic Properties of Matrices	
3	Inverse, Diagonal, Triangular, and Symmetric Matrices.	
4	Matrix Transformations	
5	Determinants, Determinants by Cofactor Expansion	
6	Properties of Determinants; Cramer’s Rule	
7	Midterm Exam	
8	Introduction to Vectors	
9	Euclidean Vector Spaces, Orthogonality	
10	Real Vector spaces, Subspaces, Linear İndependence	
11	Coordinates and Basis, Dimension	
12	Row Space, Column Space, and Null Space, Rank	
13	Eigenvalues and Eigenvectors	
14	Diagonalization	
15	Applications of Linear Algebra	
16	Final Exam	

Course Learning Outcomes

No	Learning Outcomes
C1	Defininig basic terms and concepts of matrices, vectors and complex numbers.
C2	Applying the matrix calculus in solving a system of linear algebraic equations.
C3	Analyzing the solution set of a system of linear equations.
C4	Generalizing the concepts of a real (complex) vector space to an arbitrary finitedimensional vector space.
C5	Investigating properties of vector spaces and subspaces by using by linear transformations.
C6	Determining whether a subset of a vector space is linear dependent..
C7	Expressing linear transformation between vector spaces.
C8	Representing linear transformations by matrices.

Programme Outcomes	
No	**Outcomes**
P01	Reaches the knowledge broadly and in depth by doing scientific research in the field, evaluates, interprets and applies the knowledge.
P02	Has comprehensive knowledge about current techniques and methods applied in engineering and their constraints.
P03	Complements and applies knowledge with scientific methods, using uncertain, limited or incomplete data; can use information from different disciplines together.
P04	He is aware of the new and developing applications of his profession, examines and learns them when needed.
P05	Defines and formulates problems related to the field, develops methods to solve and applies innovative methods in solutions.
P06	Develops new and/or original ideas and methods; designs complex systems or processes and develops innovative/alternative solutions in their designs.
P07	Designs and implements theoretical, experimental and modeling research; examines and solves complex problems encountered in this process.
P08	Can work effectively in disciplinary and multi-disciplinary teams, lead such teams and develop solutions in complex situations; can work independently and take responsibility.
P09	Communicates verbally and in writing by using a foreign language at least at the B2 General Level of the European Language Portfolio.
P10	He/she conveys results of his/her studies systematically and clearly in written or verbal form in national and international environments in that field or outside the field.
P11	Knows the social, environmental, health, safety, legal aspects of engineering applications, project management and business life applications and is aware of the constraints they impose on engineering applications.
P12	Observes social, scientific and ethical values in the stages of data collection, interpretation, announcement and in all professional activities.

Assessment Methods and Criteria		
In-term studies	**Quantity**	**Percentage**
Attendance		
Lab		
Practice		
Fieldwork		
Course-specific internship (if any)		
Quiz/Studio/Criticize	1	%10
Homework		
Presentation		

Project		
Report		
Seminar		
Midterm Exam	1	%30
Final Exam	1	%60
	Total	**%100**
Contribution of Midterm Studies to Success Grade		
Contribution of End of Semester Studies to Success Grade		
	Total	**% 100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration (Hr)**	**Total Work Load**
Weekly Theoretical Course Hrs (Including the exam week: 16 x total course hours)	16	3	48
Lab			
Practice			
Course-specific internship (if any)			
Fieldwork			
Out-of-class study time	16	2	32
Presentation/Seminar Preperation			
Project			
Report			
Homework			
Quiz/Studio/Criticize	1	3	3
Midterm Exam and Preperation for Midterm	1	10	10
Final Exam and Preperation for Final Exam	1	10	10
Total Workload			**103**
ECTS Credit	**(103/25) =**		**4,12**

Contribution of Course Learning Outcomes to Programme Outcomes									
Contribution: 1: Very Slight 2:Slight 3:Moderate 4:Significant 5:Very Significant									
	P01	**P02**	**P03**	**P04**	**P05**	**P06**	**P07**	**P08**	**P09**
C1	4	4			3	4			
C2	4	4			3	4			
C3	4	4			3	4			
C4	4	4			3	4			
C5	4	4			3	4			
C6	4	4			3	4			
C7	4	4			4	3			