

### COURSE PROFILE

Course Name	Code	Semester	Term	Theory +PS+Lab. (hour/week)	Local Credits	ECTS
Linear Algebra	MATH 200	Fall	3	3+0+0	3	5

<b>Prerequisites</b>	None
----------------------	------

<b>Course Language</b>	English
<b>Course Type</b>	Required
<b>Course Lecturer</b>	<ul style="list-style-type: none"> <li>• Dr. Fuat Ergezen</li> </ul>
<b>Course Assistant</b>	--
<b>Course Objectives</b>	This course aims to provide basic ideas and main computational techniques of linear algebra.
<b>Course Learning Outcomes</b>	<p>The students who succeeded in this course;</p> <ul style="list-style-type: none"> <li>• will be able to define matrices, special matrices and inverse of matrices.</li> <li>• will be able to analyze linear systems of equations.</li> <li>• will be able to apply determinant and its properties.</li> <li>• will be able to analyze vector spaces, subspaces, linear dependence and independence.</li> <li>• will be able to identify bases and dimensions of vector spaces.</li> <li>• will be able to employ rank of a matrix and analyze row, column, null spaces.</li> <li>• will be able to use linear transformations.</li> <li>• will be able to analyze orthogonality, orthogonal and orthonormal sets.</li> <li>• will be able to define inner product spaces.</li> <li>• will be able to identify eigenvalues and related eigenvectors.</li> </ul>
<b>Course Content</b>	Matrices. Solving linear systems. Real vector spaces. Linear spaces with inner product. Linear transformations and their matrix representations. Determinants. Eigenvalues and eigenvectors.

### COURSE CONTENT

Week	Subjects	Related Preparation
------	----------	---------------------

1	Introduction to Systems of Linear Equations; Gaussian Elimination.	Chapter 1
2	Matrices and Matrix Operations; Inverses, Algebraic Properties of Matrices.	Chapter 1
3	Inverses, Algebraic Properties of Matrices; Elementary Matrices and a Method for Finding $A^{-1}$	Chapter 1
4	More on Linear Systems and Invertible Matrices; Diagonal, Triangular, and Symmetric Matrices.	Chapter 1
5	Determinants by Cofactor Expansion. Evaluating Determinants by Row Reduction.	Chapter 2
6	Properties of the Determinants, Cramer's Rule.	Chapter 2
7	Real Vector Spaces. Subspaces. Linear Independence.	Chapter 4
8	Coordinates and Basis. Dimension.	Chapter 4
9	Change of Basis. Row Space, Column Space, and Null Space.	Chapter 4
10	Rank, Nullity. Matrix Transformations.	Chapter 4
11	Eigenvalues and Eigenvectors; Diagonalization.	Chapter 5
12	Inner Products; Angle and Orthogonality in Inner Product Spaces; Gram-Schmidt Process.	Chapter 6
13	Orthogonal Matrices; Orthogonal Diagonalization.	Chapter 7
14	General Linear Transformation.	Chapter 8

<b>Course Textbooks</b>	Howard Anton, Chris Rorres, Elementary Linear Algebra with Supplemental Applications, 10th Edition, Wiley 2010.
<b>Recommended References</b>	1) Gilbert Strang, Linear Algebra and its Applications, 2) Bernard Kolman, David R. Hill, Elementary Linear Algebra

Semester Requirements	Number	Percentage of Grade
Attendance/Participation	1	10
Laboratory	-	-
Application	-	-
Special Course Internship (Work Placement)	-	-
Quizzes/Studio Critics	-	-
Homework Assignments	14	-
Presentation	-	-
Project	-	-
Seminar/Workshop	-	-
Midterms/Oral Exams	2	50
Final/Resit Exam	1	40
<b>Total</b>	17	100

<b>PERCENTAGE OF SEMESTER WORK</b>	16	60
<b>PERCENTAGE OF FINAL WORK</b>	1	40
<b>Total</b>	17	100

<b>Course Category</b>	Core Courses	X
	Major Area Courses	
	Supportive Courses	
	Media and Management Skills Courses	
	Transferable Skill Courses	

#### COURSE'S CONTRIBUTION TO PROGRAM

#	Program Qualifications / Outcomes	* Level of Contribution				
		1	2	3	4	5
1	To have a grasp of basic mathematics, applied mathematics and theories and applications of statistics.					X

<b>2</b>	To be able to use theoretical and applied knowledge acquired in the advanced fields of mathematics and statistics,					X
<b>3</b>	To be able to define and analyze problems and to find solutions based on scientific methods,					X
<b>4</b>	To be able to apply mathematics and statistics in real life with interdisciplinary approach and to discover their potentials,				X	
<b>5</b>	To be able to acquire necessary information and to make modeling in any field that mathematics is used and to improve herself/himself,			X		
<b>6</b>	To be able to criticize and renew her/his own models and solutions,			X		
<b>7</b>	To be able to tell theoretical and technical information easily to both experts in detail and nonexperts in basic and comprehensible way,				X	
<b>8</b>	To be able to use international resources in English and in a second foreign language from the European Language Portfolio (at the level of B1) effectively and to keep knowledge up-to-date, to communicate comfortably with colleagues from Turkey and other countries, to follow periodic literature,				X	
<b>9</b>	To be familiar with computer programs used in the fields of mathematics and statistics and to be able to use at least one of them effectively at the European Computer Driving Licence Advanced Level,			X		
<b>10</b>	To be able to behave in accordance with social, scientific and ethical values in each step of the projects involved and to be able to introduce and apply projects in terms of civic engagement,			X		
<b>11</b>	To be able to evaluate all processes effectively and to have enough awareness about quality management by being conscious and having intellectual background in the universal sense,				X	
<b>12</b>	By having a way of abstract thinking, to be able to connect concrete events and to transfer solutions, to be able to design experiments, collect data, and analyze results by scientific methods and to interfere,					X
<b>13</b>	To be able to continue lifelong learning by renewing the knowledge, the abilities and the competencies which have been developed during the program, and being conscious about lifelong learning,					
<b>14</b>	To be able to adapt and transfer the knowledge gained in the areas of mathematics and statistics to the level of secondary school,				X	
<b>15</b>	To be able to conduct a research either as an individual or as a team member, and to be effective in each related step of the project, to take role in the decision process, to plan					

and manage the project by using time effectively.

\*1 Lowest, 2 Low, 3 Average, 4 High, 5 Highest

### ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Number	Duration (Hours)	Total Workload
Course Hours (Including Exams)	14	3	48
Tutorials	-	-	-
Laboratory	-	-	-
Application	-	-	-
Special Course Internship (Work Placement)	-	-	-
Field Work	-	-	-
Study Hours Out of Class	14	1	14
Presentations / Seminar	-	-	-
Project	-	-	-
Preparatory reading	13	1	13
Homework Assignments	14	1	14
Quizzes	-	-	-
Midterm Exams	2	12	24
Final / Resit Exam	1	12	12
		<b>Total Workload</b>	<b>125</b>

### COURSE CATEGORY

ISCED GENERAL AREA CODES	GENERAL AREAS	ISCED BASIC AREA CODES	BASIC EDUCATIONAL AREAS	
1	Education	14	Teacher Training and Educational Sciences	0
2	Humanities and Art	21	Art	0
2	Humanities and Art	22	Humanities	0
3	Social Sciences, Management and Law	31	Social and Behavioral Sciences	0

3	Social Sciences, Management and Law	32	Journalism and Informatics	0
3	Social Sciences, Management and Law	38	Law	0
4	Science	42	Life Sciences	0
4	Science	44	Natural Sciences	0
4	Science	46	Mathematics and Statistics	100
4	Science	48	Computer	0
5	Engineering, Manufacturing and Civil	52	Engineering	0
5	Engineering, Manufacturing and Civil	54	Manufacturing and Processing	0
5	Engineering, Manufacturing and Civil	58	Architecture and Structure	0
6	Agriculture	62	Agriculture, Forestry, Livestock, Fishery	0
6	Agriculture	64	Veterinary	0
7	Medicine and Welfare	72	Medical	0
7	Medicine and Welfare	76	Social Services	0
8	Service	81	Personal Services	0
8	Service	84	Transport Services	0
8	Service	85	Environment Protection	0
8	Service	86	Security Services	0