

NEAR EAST UNIVERSITY-FACULTY OF ARTS AND SCIENCES



Department of Mathematics
Course Information Sheet & Course Outline
2021-2022 Fall Semester

Course Code MTH113	Course Name Linear Algebra I	Credit 3	ECTS 5			
Pre-requisite: MTH101						
Language: English		Course Type: Compulsory		Year: 2021-2022		
Semester: FALL						
Weekly Hours	Class Hours	Laboratory	Practicum	Learning Sessions		
	3	-	-	PS	C	R T
Course Lecturer/Coordinator	Assist.Prof.Dr. Firudin Muradov					
	E-mail address	firudin.muradov@neu.edu.tr				
Learning Outcomes	After the completion of this course, the student will be able to <ul style="list-style-type: none"> - use computational techniques and algebraic skills essential for the study of systems of linear equations, matrix algebra, vector spaces, eigenvalues and eigenvectors, orthogonality and diagonalization - use visualization, spatial reasoning, as well as geometric properties and strategies to model, solve problems, and view solutions, especially in R² and R³, as well as conceptually extend these results to higher dimensions - analyze and construct mathematical arguments that relate to the study of introductory linear algebra - use technology, where appropriate, to enhance and facilitate mathematical understanding, as well as an aid in solving problems and presenting solutions 					
Course Description	System of linear equations: elementary row operations, echelon forms, Gaussian elimination method. Matrices: elementary matrices, invertible matrices, Determinants: adjoint and inverse matrices, Cramer's rule. Vector spaces: linear independence, basis, dimension. Linear mapping. Inner product spaces, Orthonormal Bases: Gram-Schmidt Process. Eigenvalues and eigenvectors, Cayley-Hamilton theorem.					
Course Objectives	The course is standard first-year course on linear algebra providing basic definitions, concepts and methods. The main objectives are two: to make students ready to see applications of linear algebra on subsequent courses and to enable them to continue their study on more advanced level.					
Textbooks and/or References	1	ELEMENTARY LINEAR ALGEBRA, 10 TH EDITION, HOWARD ANTON, CHRIS RORRES, 2010				
	2	LINEAR ALGEBRA with APPLICATIONS, 5 TH EDITION, W.KEITH NICHOLSON				
	3	ELEMENTARY LINEAR ALGEBRA, UNIVERSITY OF QUEENSLAND, K. R. MATTHEWS, 2013				
	4					
	5					
	6					
Course Content						
Methods and Techniques Used in the Course						
WEEKLY OUTLINE						
Week	Date	Topic	Activities			Reference
1	20-24 Sep	Introduction to the Course				
2	27Sep-01Oct	Introduction to Systems of Linear Equations. Gaussian Elimination				Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
3	04-08 Oct	Matrices and Matrix Operations				Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
4	11-15 Oct	Inverses; Rules of Matrix Arithmetic. Elementary Matrices and a Method for finding A^{-1}				Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
5	18-22 Oct	Further Results on Systems of Linear Equations and Invertibility				Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
6	25-29 Oct	Diagonal, Triangular, and Symmetric Matrices				Elementary linear algebra, 10 th edition,

				H.Anton, Ch.Rorres, 2010
7	01-06 Nov		Midterm Exam	
8	08-12 Nov	Determinants by Cofactor Expansion. Determinants by Row Reduction.		Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
9	15-19 Nov	Properties of the Determinant Function		Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
10	22-26 Nov	Euclidean n -Space. Vectors in 2-Space, 3-Space, and n -Space. Norm, Dot Product, and Distance in R^n .		Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
11	29Nov-03 Dec	Orthogonality. The Geometry of Linear Systems. Cross Product.		Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
12	06-10 Dec	Real Vector Spaces, Subspaces. Linear Independence. Basis and Dimension.		Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
13	13-17 Dec	Row Space, Column Space, and Nullspace. Rank and Nullity.		Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
14	20-24 Dec	Inner Products. Angle and Orthogonality in Inner Product Spaces. Orthonormal Bases		Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
15	27-30 Dec	Eigenvalues and Eigenvectors. Characteristic equation, Finding Eigenvectors and Bases for Eigenspaces.		Elementary linear algebra, 10 th edition, H.Anton, Ch.Rorres, 2010
16	03-12 Jan	Final Exam		

Attendance: Minimum 70 %

Assessment Breakdown	Type		%	Reference/ Source	Relevant Competencies
	1	Quiz	15%		
2	Home Work	15%			
3	Midterm Exam	30%			
4	Final Exam	40%			

Learning Program

Educational Tool	Amount	Student Work Load (Hours)	Educational Tool	Amount	Student Work Load(Hours)
Lesson hour	16*3	64 hours	Homework	1*2	2 hours
Quiz	3*1	3 hours	Midterm examination study	1*14	14 hours
Final examination study	1*30	30 hours	Self study	14*4	56 hours
			Total	143	

Recommended ECTS Credit (Total Hours / 30):

143/30 = ~ 5