HASAN KALYONCU UNIVERSITY
Faculty of Engineering
Course Description Form

COURSE: Linear Algebra				
CODE: MATH211	**SEMESTER:** FALL			
LANGUAGE: ENGLISH	**TYPE:** COMPULSORY			
PRE-REQUISITES:- **CO-REQUISITES:-**	**THEORY**	**PRACTICAL**	**CREDIT**	**ECTS**
WEEKLY HOURS:3	3	0	3	5

CONTENT OF THE COURSE:
Systems of linear equations. Matrices. Algebraic properties of matrix operations. Special types of matrices. Echelon form of a matrix. Solving linear systems by Gauss-Jordan reduction. Finding the inverse of a matrix by row reduction. Equivalent matrices. Determinants. Properties of determinants. Cofactor expansion. Inverse of a matrix (via its determinant). Other applications of determinants (Cramers rule). Vectors in the plane and in 3-space. Vector spaces. Subspaces. Span and linear independence. Basis and dimension. Row space. Null space. Nullity and rank of a matrix. Homogeneos systems. Change of basis. Transition matrices. Orthogonalization. Linear transformations. Kernel and range of a linear transformation.

OBJECTIVE OF THE COURSE:
The course is standard first year course on linear algebra providing basic definitions, concepts and methods. Discussion and proofs are given in form of algorithms whenever is possible. The objective Concepts of basic operations in Linear algebra: Introduction to Systems of Linear Equations, Gaussian Elimination, Matrices and Matrix Operations. Inverses; Rules of Matrix Arithmetic, Elementary is twofold: 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.

WEEKLY SCHEDULE	
Week	**Topics**
1	Introduction to Systems of Linear Equations
2	Matrices and Matrix Operations, Inverses; Diagonal, Triangular and Symmetric Matrices, Rules of Matrix Arithmetic
3	Gaussian Elimination., Gauss- Jordan reduction, a method for finding inverse of a matrix
4	Solutions of system of linear equations
5	The Determinant Function, Evaluating Determinants by Row Reduction, Properties of the Determinant Function
6	Cofactor Expansion
7	Cramer’s Rule
8	MIDTERM
9	Real Vector Spaces, Subspaces
10	Linear Independence, dependence
11	Spanning set of vector spaces
12	Basis and Dimension Rank and nullity , Orthogonal Bases; Gram-Schmidt Process
13	Eigenvalues and Eigenvectors
14	Diagonalization

TEXTBOOK: Elementary Linear Algebra with Applications, 9 ed. B.Kolman, D.Hill, Person Inc. **REFERENCE BOOKS:** Elemantary Linear Algebra with Applications, 2nd ed., R.O.Hill, HBJ Pres.

INSTRUCTOR(S):	Assoc. Prof. Dr. Ece Yetkin ÇELİKEL
FORM PREPARATION DATE:	02.03.2020

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
LO1	3	2	0	0	0	0	0	0	0	0	0
LO2	3	2	0	0	0	0	0	0	0	0	0
LO3	2	3	0	0	0	0	0	0	0	0	0
LO4	2	3	0	0	0	0	0	0	0	0	0
LO5	3	2	0	0	0	0	0	0	0	0	0
	PO: Program Outcomes | LO: Learning Outcomes Values: 0: None | 1: Low | 2: Medium | 3: High										

LEARNING OUTCOMES OF THE COURSE:
LO1: A comprehension of mathematics (algebra, differential, integration …) and fundamentals of science **LO2:**Ability to apply knowledge of mathematics, science and engineering to problems in electronics engineering. **LO3:**Ability to recognize the needs and challenges of our age and to assess the global and social impact of engineering solutions **LO4:** Ability to identify, formulate and solve engineering problems. **LO5:** Ability to effectively communicate knowledge and opinions via written, oral visual means.

CONTRIBUTION OF THE COURSE TO VOCATIONAL EDUCATION
With the help of this course, students gain advanced mathematics knowledge for solving problems involving mathematics and formulas in the field of engineering.