

0205104 LINEAR ALGEBRA

Normal Education

Evening Education

Fall 2018-2019

**Course Format:** face-to-face

**INSTRUCTOR INFORMATION**

**Instructor:**

**Title:**

**Office:**

**Phone:**

**Office Hours:**

**E-mail:**

**COURSE DESCRIPTION**

**Credit hours:** *3 credit (3+0)*

**ECTS**: *6*

**Required or elective:** *Required for Computer Engineering Students*

**Catalog Description:** *This course covers matrix theory and linear algebra, emphasizing topics useful in other disciplines. Linear algebra is a branch of mathematics that studies systems of linear equations and the properties of matrices. The concepts of linear algebra are extremely useful in physics, economics and social sciences, natural sciences, and engineering. Due to its broad range of applications, linear algebra is one of the most widely taught subjects in college-level mathematics.*

**Prerequisites:** *None*

**Textbook(s) and/or required materials:**

*Linear Algebra and Its Applications, D. C. Lay.*

*Elementary Linear Algebra with Applications, B. Kolman ve D. Hill*

**Course Objectives**

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| --- |
| ***The objectives of this course are to:*** |
| *1* | *Linear equation systems can be expressed and solved with matrices* |
| *2* | *Solving linear systems with rank, matrix and determinants* |
| *3* | *Learning of linear transformation methods* |

**Course Topics**

|  |  |
| --- | --- |
| ***No*** |  |
| *1* | *Systems of linear equations. Matrices* |
| *2* | *Echelon form of a matrix. Nonsingular matrices* |
| *3* | *Elementary matrices* |
| *4* | *Determinants* |
| *5* | *Vector spaces. Subspaces* |
| *6* | *Linear independence. Basis and dimension* |
| *7* | *General repetition and practices* |
| *8* | *Midterm Exam* |
| *9* | *Coordinates. Homogeneous systems* |
| *10* | *Rank of a matrix. Standard inner product* |
| *11* | *Inner product spaces, Gram-Schmidt process* |
| *12* | *Orthogonal complement, Linear transformations* |
| *13* | *Kernel and range of a matrix, Similarity* |
| *14* | *Diagonalization. Eigenvalues and Eigenvectors* |

**Course Learning Outcomes**

*At the end of the course, students;*

* *Solve application problems of systems of linear equations.*
* *Calculate determinants using row operations, column operations.*
* *Use effectively the relationships between the invertibleness , determinant and the rank of a matrix.*
* *Find the kernel, rank, range and nullity of a matrix and the associated linear transformation.*
* *Calculate eigenvalues, eigenvectors and eigenspaces.*
* *Determine if a matrix is diagonalizable, and if it is, diagonalize it.*

**Evaluation methods**

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| --- | --- |
| *1. Midterm Exam* | 40% |
| *2. Final Exam* | 60% |

**Professional component**

|  |  |
| --- | --- |
| *Engineering topics* | 100% |
| *General education* | 0% |
| *Mathematics and basic sciences* | 0% |

**Person(s) who prepared this description and date of preparation**

*Emre DENİZ, April 2018*

**Date of last revision**

*May 2018*