



Course name: MATH104 Linear Algebra

Department: EE, CE, CENG, SENG, IE,

Semester

4

Methods of Education

Credit (ECTS)

Lecture	Recitation/ (Etud)	Lab	Field Study	Homework	Other	Total
42	0	0	0	0	138	180

6

Language English

Compulsory/Elective Compulsory

Prerequisites None

Course Contents

Weeks	Subjects
1	Introduction to systems of linear equations and Gaussian elimination (1.1-1.3)
2	Matrix algebra (1.4-1.6)
3	Gaussian elimination on matrices and triangular factors (1.5)
4	Echelon forms, solving $Ax=b$ (2.2)
5	Vector spaces, linear independence (2.1-2.3)
6	The four fundamental spaces of a matrix (2.4)
7	Inner product, projections, orthogonal matrices (3.1-3.2)
8	Gram-Schmidt process, Least-squares approximation (3.3-3.4)
9	Properties of determinant (4.1-4.2)
10	Formulae for determinant, applications of determinant (4.3-4.4)
11	Eigenvalue equation, characteristic polynomial (5.1)
12	Complex numbers and complex matrices (5.5)
13	Diagonalization, powers, exponentials (5.2-5.3-5.4)
14	Matrix similarity, unitary matrices, Hermitian matrices (5.6)

Course Objectives

- To provide the knowledge of solving linear equations.
- To provide understanding of linear geometry.
- To provide familiarity with special matrices and their properties.
- To give an ability to apply knowledge of Mathematics on engineering problems.

Learning Outcomes and Competences

- By the end of this course, a student will be able to:
1. perform matrix algebra (addition, multiplication)
 2. use Gaussian elimination to solve systems of linear equations
 3. find least-squares approximate solutions to overdetermined systems
 4. find the diagonalization of a diagonalizable square matrix
 5. transform vector and matrices under a change of basis
 6. set up linear models to describe engineering processes

Textbook and /or References

Linear Algebra and Its Applications 4th Edition by Gilbert Strang, Publisher: Brooks/Cole/Cengage; (2006)

Assessment Methods and Criteria	In-Term Studies	Quantity	Percentage%	
	Mid-terms	1	40	
	Quizzes	0	0	
	Assignments	0	0	
	Attendance	0	0	
	Practice	0	0	
	Project	0	0	
	Final Examination	1	60	
	Total	2	100	
ECTS Allocated Based on Student Workload	Activities	Quantity	Duration	Total Work Load
	Course Duration	14	3	42
	Hours for off-the-c.r.study	14	6	84
	Assignments	0	0	0
	Mid-terms	1	24	24
	Project	0	0	0
	Final Examination	1	30	30
	Total	30	63	180
Instructors				