Linear Algebra 1

Course Name	Course type (credit/hours)	전필(4/5)		Course code	G049
	Target students Division/major/grade	Mathematics/Natural Sciences/Engineering/Sophomore		Openning semester	2019 1ST SEMESTER
	Class time and classroom	월16:30~18:00 (팔311) 수7(팔311) 수8(팔311) 목16:30~18:00 (팔311)(팔311)		English Grade	A(100%English)
Reference to this course	Prerequisite courses	Calculus 1, Calculus 2			
	Related basic courses				
	Recommanded concurrent courses				
	Related advanced courses	Linear Algebra 2, Modern Algebra 1,2			
Instructor	Name (title/division)	이기정 (교수/자연과학대학 수학과)			
	Office Room Number	팔달관 612호	Office phone Number	1936	e-mail	
	Office hours		Homepage address		
Teaching Assistant	Name (title/division)				
	Office Room Number		Office phone Number		e-mail	

1. Introduction

- We study the basic operations of matrices and determinants. Then we and apply them to solve systems of linear equations.

- We study the relations between linear transformations on Euclidean spaces and the corresponding matrices.

- Futhermore, we study the eigenvalues and diagonalization of square matrices and the applications.

2. Course Objectives

- Representing and solving systems of linear equations via matrices

- Working with matrices, finding inverse matrices, factorizing matrices(LU)

- Euclidean spaces : subspaces, bases, dimensions

- Rank theorem

- Understanding the relation between linear transformations on Euclidean spaces and the corresponding matrices

- Understanding square matrices including determinants, eigen vlaues/eigen vectors/eigen spaces, diagonalization,spectral decomposition, and applications

3. Class types and activities

Lectures and recitations

4. Teaching Method

☑ lecture	☐ discussion and debate
☐ team project(presentation and case studies)	☑ experiments(role-playing,etc)
☐ designing and production	☐ on-site learning(on-site training)
☐ others	

5. Support Systems in Use

☑ e-class	☐ automatic recording system	☐ web-based assignment
☐ cyber lecture	☐ blended learning(combination of online and offline teaching)	
☐ class behavior analyazing system	☐ others	

6. Teaching Tools

☐ PBL(Problem Based Learning)	☐ CBL(Case Based Learning)
☐ TBL(Team Based Learning)	☐ others

7. Knowledge and ability required for taking this course

Basic knowledges of Calculus 1 and Calculus 2

8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance		10	
midterm exam		35	
final exam		35	
quiz			
presentation			
discussion			
homework		20	퀴즈 포함
etc			
study hours			

9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Sub	Elementary Linear Algebra	Anton & Rorres	John Wiely	1994
Sub	Linear Algebra	Steven J. Leon	Prentice Hall	2005
Main	Linear Algebra A Modern Introduction, 3rd edition	David Poole	Brooks/Cole	2006

10. Class system and Class shedule

1. We use elementary operations on a matrix and find the sotutions of systems of linear equations.

2. We study matrix operations, inverse, and LU factorization of square matrices.

3. We study subspaces of Euclidean spaces, bases, dimensions.

4. We study the rank theorem of matrices.

5. We study the matrix representation of Linear transformation.

6. We study the eigenvalues and eigenvectors of Matrix and their applications.

< Class Schedule >

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	The Geometry and Algebra of Vectors Length and Angle:The Dot Product and etc. Chap 1 Review(at most 1 1/2 classes including 1.4)	K/E	이기정	Teaching and Lab		
2	Introduction to the Systems of Linear Equations Direct Methods for Solving Linear Systems, page 87-89	K/E	이기정	Teaching and Lab		
3	Spanning Sets and Linear Independence Applications Iterative Methods for Solving Linear Systems	K/E	이기정	Teaching and Lab		
4	Matrix Operations Matrix Algebra	K/E	이기정	Teaching and Lab		
5	Inverse of a Matrix The LU Factorization	K/E	이기정	Teaching and Lab		
6	Subspaces,Basis,Dimension, and Rank(First Part)	K/E	이기정	Teaching and test		
7	Subspaces,Basis,Dimension, and Rank(Second Part)	K/E	이기정	Teaching and Lab		
8	Midterm Exam	K/E	이기정	Teaching and test		
9	Introduction to Linear Transformations Applications(beginning part)	K/E	이기정	Teaching and Lab		
10	Applications(Second Part)	K/E	이기정	Teaching and Lab		
11	Introduction to Eigenvalues and Eigenvectors Determinants	K/E	이기정	Teaching and Lab		
12	Eigenvalues and Eigenvectors of n*n Matrices	K/E	이기정	Teaching and test		
13	Similarity and Diagonalization Iterative Methods for Computing Eigenvalues(First part)	K/E	이기정	Teaching and Lab		
14	Iterative Methods for Computing Eigenvalues(second Part) Applications and the Perron-Frobenius Theorem-Markov Chains	K/E	이기정	Teaching and Lab		

< Class Schedule >

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
15	Population Growth - Discrete Linear Dynamical Systems	K/E	이기정	Teaching and Lab		
16	Final Exam	K/E	이기정	Teaching and test		

11. Other items of notification