Linear Algebra 1

Course Name	Course type (credit/hours)	Required course(4/5)		Course code	G013
	Target students Division/major/grade	Mathematics/Sophomore		Opening semester	2018 1ST SEMESTER
	Class time and classroom	Mon 16:30~18:00 (Pal311)Wed 7(Pal311) Wed 8(Pal311)Thu 16:30~18:00 (Pal311)		English Grade	A(100%English)
Reference to this course	Prerequisite courses	Calculus 1, Calculus 2			
	Related basic courses				
	Recommended concurrent courses				
	Related advanced courses	Linear Algebra 2, Modern Algebra 1,2			
Instructor	Name (title/division)	Kijung Lee(Professor, Mathematics)			
	Office Room Number	Pal 612	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 operation of matrices and determinants
and apply them to solve a system of linear equations.
We get some related results between vector spaces and linear transformations on them.
Futhermore, we study the eigenvalues and diagonalization of a matrix.

2. Course Objectives

We study systematic methods of representing and solving systems of linear equations via matrices.

We practice the basic operations for a matrix and investigate their properties.

We study the definition of the determinant and find the method of computing it.
We link the meaning of determinant with other properties of matrices.

We study the definition and various examples of vector spaces.

We study the linear independency and dependency of vectors, and
also study the properties of the bases of a vector space.

We study the egenvalues and eigenvectors of a matirx.

3. Class types and activities

Lectures and recitations

4. Teaching Method

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

5. Support Systems in Use

- [V] AjouBb
- [ ] automatic recording system
- [ ] web-based assignment
- [ ] cyber lecture
- [ ] online content
- [ ] class behavior analyazing system
- [ ] others

6. Teaching Tools

- [ ] PBL(Problem Based Learning)
- [ ] CBL(Case Based Learning)
- [ ] TBL(Team Based Learning)
- [ ] UR(Undergraduate Research)
- [ ] FL(Flipped Learning)
- [ ] DSAL(Data Science Active 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	
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. Using elementary operations on a matrix, we get sotutions of a system of linear equations.
2. We introduce the determinant of matrix and study its applications.
3. We define a vetor space and get a basis of a vector space.
4. We study the matrix representation of Linear transformation.
5. We study the eigenvalues and eigenvectors of Matrix and their applications.

* language : K-korean, E-English

< Class Schedule >

* language : K-korean, E-English

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	Kijung Lee	Teaching and Lab		
2	Introduction to the Systems of Linear Equations Direct Methods for Solving Linear Systems, page 87-89	K/E	Kijung Lee	Teaching and Lab		
3	Spanning Sets and Linear Independence Applications Iterative Methods for Solving Linear Systems	K/E	Kijung Lee	Teaching and Lab		
4	Matrix Operations Matrix Algebra	K/E	Kijung Lee	Teaching and Lab		
5	Inverse of a Matrix The LU Factorization	K/E	Kijung Lee	Teaching and Lab		
6	Subspaces,Basis,Dimension, and Rank(First Part)	K/E	Kijung Lee	Teaching and test		
7	Subspaces,Basis,Dimension, and Rank(Second Part)	K/E	Kijung Lee	Teaching and Lab		
8	Midterm Exam	K/E	Kijung Lee	Teaching and test		
9	Introduction to Linear Transformations Applications(beginning part)	K/E	Kijung Lee	Teaching and Lab		
10	Applications(Second Part)	K/E	Kijung Lee	Teaching and Lab		
11	Introduction to Eigenvalues and Eigenvectors Determinants	K/E	Kijung Lee	Teaching and Lab		
12	Eigenvalues and Eigenvectors of n*n Matrices	K/E	Kijung Lee	Teaching and test		
13	Similarity and Diagonalization Iterative Methods for Computing Eigenvalues(First part)	K/E	Kijung Lee	Teaching and Lab		
14	Iterative Methods for Computing Eigenvalues(second Part) Applications and the Perron-Frobenius Theorem-Markov Chains	K/E	Kijung Lee	Teaching and Lab		

< Class Schedule >

* language : K-korean, E-English

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

11. Other items of notification