Syllabus

Course No.	1900806W	College		Science	Dept.	Mathematics
Teacher	Juan Zhang					
Time	2023.06.12-2023.07.14					
Course Name	**English**	Applied Linear Algebra				
	Chinese	线性代数				

Course credits hours	Total	Theory	Office Hour or Practice	Credits
	70	60	10	4.0

Course description：Describe the nature, academic status, and aims of the course (theory, ability and technique)

1. Course nature and academic status

Linear algebra is a branch of mathematics dealing with matrices and vector spaces. Matrices are introduced as a tool for solving systems of linear equations, and they have also many applications in statistics, economics, engineering, physics, chemistry, biology and business. Concepts and practical methods for solving problems are illustrated through plenty of examples.

2. Course aims (theory, ability and technique)

The goal of this course is to let students master the knowledge of linear algebra and lay down a solid foundation for future study and work. This course focuses on helping students to develop abilities in logical thinking, space visualization, calculation, analysis, and problem solving. In addition, the students will develop ability of mathematical modeling through the study of this course.

Requirements for courses; ability and knowledge in advance

Two or three years of high school mathematics with some knowledge of calculus and algebra. They must have basic reasoning ability

Course structure explanation:

Make clear the necessary parts, optional parts, distribution of hours. Courses with experiments or practice are expected to explain credit hours needed, content, scheme and functions.

Chapter 1 Matrices and System of equations (necessary)

points and aims: system of linear equations, row echelon form, Gaussian elimination, matrix algebra, elementary matrices, partitioned matrices

distribution of hours: 12 credit hours

Chapter 2 Determinants (necessary)

points and aims: the determinant of a matrix, properties of determinants, Cramer's rule

distribution of hours: 4 credit hours

Chapter 3 Vector Spaces (necessary)

points and aims: definition of vector spaces, subspaces, linear independence, basis and dimension, row space and column space

distribution of hours: 10 credit hours

Chapter 4 Linear Transformations (optional)

points and aims: matrix representations of linear transformations, similarity

distribution of hours: 2 credit hours

Chapter 5 Orthogonality (necessary)

points and aims: Orthogonal subspaces, orthonormal sets, the Gram-Schmidt orthogonalization process

distribution of hours: 4 credit hours

Chapter 6 Eigenvalues (necessary)

points and aims: eigenvalues and eigenvectors, diagonalization, quadratic forms, positive definite matrices

distribution of hours: 8 credit hours

Teaching methods (Lectures, practice, etc)

All the concept of focus on basics and strengthen abilities must be shown in the teaching process. The multi-media techniques and internet should be sufficiently utilized.

Difficulties in course teaching are abstract concepts such as vector spaces, linear independence, linear transformations, orthogonal subspaces, students cannot understand these concepts easily. So we must use more examples and applications to illustrate these abstract concepts, do more practice, help students know the connections of all the concepts.

Forms of examination and requirements

Structure of the final grade(including presence, class performance,), focus of exam, forms of exam(test, interview, final report, etc)

The final score is composed by two parts: the final examination is 80%, homework and reports is 20%. Forms of evaluation is close-book exam.

	Name	**Publisher**	**Author**	**Year**	**Price**
Textbook	Linear Algebra with Applications	China Machine Press	Steven J. Leon	2014	69
References	**Name**	**Publisher**	**Author**	**Year**	**Price**

Website	http://202.119.71.177/eol/jpk/course/layout/page/index.jsp?courseId=1263			
Course members				
College				