



Course description

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| Course No. | 1900806W | College | Science | Dept. | Mathematics |
| Teacher | Zhang Juan | | | | |
| Time | 2018.06.25—2018.07.27 | | | | |
| Course Name | English | Applied Linear Algebra | | | |
| | Chinese | 线性代数 | | | |
| Course credits hours | Total | Theory | Office Hour or Practice | Credits | |
| | 60 | 50 | 10 | 4.0 | |
| Course description: Describe the nature, academic status, and aims of the course (theory, ability and technique) | | | | | |
| <p>1. Course nature and academic status</p> <p>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.</p> <p>2. Course aims (theory, ability and technique)</p> <p>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.</p> | | | | | |
| 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 |
| | Name | Publisher | Author | Year | Price |
| References | | | | | |

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