

# 0701M340

## Linear Algebra

**Instructor:** Hyněk Boril

**Time:** Monday through Friday (June 15, 2020 - July 17, 2020)

**Office Hours:** 2 hours (according to the teaching schedule)

**Contact Hours:** 60 (50 minutes each)

**Credits:** 4

**Location:** Huiquan Building

**Office:** Huiquan Building 518

### Course Description

Systems of linear equations, vector spaces and subspaces, bases, linear transformations, determinants, eigenvalues and eigenvectors, diagonalization of symmetric matrices, orthogonality, inner product spaces and quadratic forms, and application.

### Required Textbook(s)

*Linear Algebra and Its Applications*, by David C. Lay, 5th edition, 2015.

### Prerequisites

0701M110.

### Course Hours

The course has 25 sessions in total. Each class session is 120 minutes in length. The class meets from Monday to Friday.

### Course Goals

Develop an understanding of the theory of systems of linear equations, matrices, determinants, vector spaces, and linear transformations. Develop ability to handle abstract mathematics.

## Course Schedule

The schedule gives an overview of the major concepts in this course. The actual days on which the topics will be covered are subject to change at the discretion of the course instructor. Numbers in parentheses refer to the related textbook chapters.

### Week 1:

- Mon* Systems of linear equations (1.1)  
*Tue* Row reduction, echelon forms and vector equations (1.2 & 1.3)  
*Wed* The matrix equation of  $Ax = b$  and solutions sets of the linear systems (1.4 & 1.5)  
*Thur* Linear independence and introduction to linear transformations (1.7 & 1.8)  
*Fri* A case study

### Week 2:

- Mon* The matrix of a linear transformation (1.9)  
*Tue* Matrix operations (2.1)  
*Wed* Inverse matrix and the characteristic of invertible matrices (2.2)  
*Thur* The Leontief I/O model, subspaces of  $R^n$ , dimension and rank (2.6, 2.8, & 2.9)  
*Fri* A case study

### Week 3:

- Mon* Introduction to determinants and properties of determinants (3.1 & 3.2)  
*Tue* Cramer's rule, volume and linear transformations, and vector spaces and subspaces (3.3 & 4.1)  
*Wed* **Midterm exam**  
*Thur* Null spaces, column spaces, linear transformations, and linearly independent sets and bases (4.2 & 4.3); The dimension of a vector space and rank (4.5 & 4.6)  
*Fri* A case study

### Week 4:

- Mon* Change of basis, eigenvalues, and eigenvectors (4.7 & 5.1)  
*Tue* The characteristic equation (5.2)  
*Wed* Diagonalization (5.3)  
*Thur* Eigenvectors and linear transformations, and complex eigenvalues (5.4 & 5.5)  
*Fri* A case study

### Week 5:

- Mon* Inner product and orthogonality (6.1)  
*Tue* Orthogonality sets and orthogonality projections (6.2 & 6.3)  
*Wed* Gram–Schmidt process (6.4)  
*Thu* **Final exam**  
*Fri* Final review

## **Course Requirements**

### ***Required Computing Accessories***

The course will contain case studies/lab sessions that will require the use of a free online Octave interpreter. Students enrolled in the class are required to bring their own Internet-enabled laptops or tablets to those sessions. Exact schedule will be announced on the first day of classes.

### ***About Assignment Submission***

Every homework assignment must be submitted before class on the day it is due. Late work will be penalized one grade notch (e.g., B- to C+) for each day it is late. The weekend counts as one day. Only late work can be submitted electronically to the instructor's official email address.

### ***How to Dispute a Grade for an Assignment or Exam?***

If you wish to dispute the grade given to a project/ homework assignment, you must do so by coming to the office hours and disputing the grade in person within a day after the assignment is graded and returned.

If you wish to dispute the grade assigned to a paper or a question on an exam, you must do so IN WRITING within a day after the exam or paper has been returned. You must include a specific rationale for why your answer is correct, or why the paper deserves a higher grade. "I think I deserve a better grade" does NOT constitute a rationale.

## **Grading Policy**

Midterm is worth 30% of the final course grade, the homework is worth 40%, and the final exam is worth 30%.

### ***Homework***

There will be an assignment due at the beginning of each class covering the material from the previous day and introducing some of the material from the day on which it is due. No late homework will be accepted, except for the last one. You are encouraged to make use of the following resources: your classmates, course assistants and the textbook. When you work in a team, you should write down all persons' names in your paper.

### ***Exams***

There will be one midterm and one final exam. No notes may be brought into the exams. The times will be posted or announced later. If you must miss a midterm exam because of an approved conflict, please contact me as soon as possible, and no later than one week before the exam.

***Attendance and in-class work***

Attendance is mandatory in the class. It would be recorded each class and forms part of students' participation record. Students should inform the instructor at the earliest opportunity if they need to ask for a leave. All absences may have negative effect on students' final grades. Any students with more than three unexcused absences will automatically fail the course.

**Grading Scale**

The instructor will use the grading system as applied by JNU:

<b>Definition</b>	<b>Letter Grade</b>	<b>Score</b>
Excellent	A	90~100
Good	B	80~89
Satisfactory	C	70~79
Poor	D	60~69
Failed	E	Below 60

**Academic Integrity**

As members of the Jinan University academic community, students are expected to be honest in all of their academic coursework and activities. Academic dishonesty, includes (but is not limited to) cheating on assignments or examinations; plagiarizing, i.e., misrepresenting as one's own work any work done by another; submitting the same paper, or a substantially similar paper, to meet the requirements of more than one course without the approval and consent of the instructors concerned; or sabotaging other students' work within these general definitions. Instructors, however, determine what constitutes academic misconduct in the courses they teach. Students found guilty of academic misconduct in any portion of the academic work face penalties that range from the lowering of their course grade to awarding a grade of E for the entire course.