Capital University of Economics and Business
Overseas Chinese College
Course Syllabus

Year and Semester	**Fall Semester, September 8, 2025— January 18, 2026**
Course Name	Linear Algebra
Course Code	MAT 221
Course Type	☑ General Education (Required) ☐ General Education (Elective) ☐ Professional Course (Required) ☐ Professional Course (Elective) ☐ Basic Disciplinary Course
Course Credits	3
Course Hours	48
Prerequisites	MAT111, MAT112
Instructor	Jianming Huang
Contact Information	Office: C217 TEL: 010-83951082 Email: huangjianming@cueb.edu.cn, limeng@cueb.edu.cn
Office Hour	TBA
Learning Centre	TBA
Grade/Section	2024IT, 2024CFA, 2024BA1, 2024BA2, 2024ACCA1, 2024ACCA2
Course Time/Place	2024IT: TH 9:55:12:20/A102 2024CFA: W 9:55:12:20/B112 2024BA1: W 9:55:12:20/A108 2024BA2: T 9:55:12:20/A106 2024ACCA1: M 9:55:12:20/A204 2024ACCA2: T: 9:55:12:20/A101

Textbook

Lee W. Johnson, R. Dean Riess, Jimmy T. Arnold. *Introduction to Linear Algebra,5th Edition*. China Machine Press, ISBN: 7-111-10628-8

Reference Book

1. Gilbert Strang. *Linear Algebra and Its Applications*, *4th Edition*. Brooks Cole, ISBN: 978-0030105678
2. Carl D. Meyer. *Matrix Analysis and Applied Linear Algebra*. Society for Industrial and Applied Mathematics (SIAM), ISBN: 978-0898714548

Course Description

Linear algebra studies linearity, the simplest form of quantitative relationship and provides a basis for the study of many areas of pure and applied mathematics, as well as key applications in the physical, biological and social sciences. Topics include systems of linear equations, vectors, vector equations, matrices, determinants, vector spaces, bases, and linear transformations. This course also helps students develop a basic understanding of linear algebra theories and provides them basic linear algebra methods

and tools for applications.

Student Learning Outcomes

After learning this course, the students will be able to:

Knowledge:

- solve any system of linear equations
- grasp matrix operations and compute determinants
- understand vector spaces and linear transformations
- resolve the eigenvalue problem and diagonalization

Capability

- Establish the connection between linear algebra and geometry
- apply diagonalization to quadratic forms.
- demonstrate effective professional communication skills

Mindset

- be logical, ethical, methodical, consistent and accurate
- apply critical thinking in the process of problem solving

Website Source

1. http://planetmath.org/encyclopedia/LinearAlgebra.html
2. http://ocw.mit.edu/OcwWeb/Mathematics/18-06Spring-2005/VideoLectures/index.htm
3. http://mathworld.wolfram.com/topics/LinearAlgebra.html

Teaching Method

This course consists of lectures, discussions and student presentations. Students will be divided into small groups with a group leader helping others in the group. Students must be prepared to finish some small questions and small quizzes during the class.

Grade Criterion

Component	Weight	Description
Final Exam	20%	A cumulative final examination will be given based on all of the contents of the class. A minimum of 25% of the exam (5 of the 20%) will consist of questions utilizing the application of critical thinking.
Mid-Term Test	20%	A cumulative midterm examination will be given based on all of the contents of the first half of the class. A minimum of 25% of the exam (5 of the 20%) will consist of questions utilizing the application of critical thinking.
Homework	15%	Homework problems will be assigned throughout the term, including but not limited to: terminologies, research project, and reading assignments.
Quizzes	15%	There will be at least 2 quizzes during the semester. The purpose of the quizzes is to ensure that students keep up with the readings. It may also be used as a way to check the attendance. Quizzes will test your knowledge of both concepts and the application of those concepts.
Presentation	10%	The students will be divided into several groups to prepare a

		presentation. Each student is required to be involved in the presentation. The topics can be selected from the textbook or lectures. Each group need to finish a PPT related to the topic which is given and hand in the related resources to the teacher before the presentation. The percentage is : content50%+organization10%+language15%+performance25%
Participation	10%	Individuals will be asked to participate individually in questions during the semester. Students are required to meet with their teachers every week. Their performances should be counted in their participation.
Attendance	10%	Refer to attendance policy listed below
Total	100%	

Detailed Grade Computation

	Before Midterm	After Midterm
Attendance	5%	5%
Participation	5%	5%
Homework	5%	10%
Quizzes	5%	10%
Presentation		10%
Midterm test	20%	
Final exam		20%
Total	40%	60%

Grading Policy

A+ 97-100	A 93-96	A- 90–92	B+ 87-89	B 83-86	B- 80–82
C+ 75-79	C 70-74	C- 67–69	D+ 63–66	D 62-60	F 0- 59

Exam Schedule

Midterm Test: Nov. 3 – Nov. 7, 2025

Final Exam: Jan.12- 16, 2026

Assessment of Student Performance

☞ ***Self-Study and Reading ability Practice***

Instructor will give out the chapters or the reference books to read and use class hours to have discussion; students should be able to show a proactive attitude and ability for self-study and reading. Knowledge and oral English will be elements of homework or presentation score.

☞ ***Homework***

Students should finish their homework by themselves. Copying from others will be treated as cheating and the homework scores will be lowered. Students should hand in all assignments on time. Late assignments will be accepted at the discretion of the instructor (i.e., when the student was ill or had an excused absence). Late assignments without reasonable proof will be reduced in score by 50%.

☞ ***Attendance***

Because the course covers a great deal of material, attending every class session is very important for

performing well.

- Being late for 15 minutes or more is considered an absence.
- Five hours or above of unexcused absences will result in the lower level of the final grade by one grade band (e.g. from C – to D +). Any excused absence must be discussed directly with the teacher.
- Absence which is more than 1/3 of the total teaching hours will cause an F (a failing grade) directly, but students are welcome to continue attending classes.
- An incomplete grade (I) will be considered in case of medical or family emergencies.

☞ ***Participation***

- Students should participate in classes actively. Half of participation grade is determined by their presentation in class. They are encouraged to ask questions relevant to the subject and express their own opinions. Every student should respect the ideas, opinions, and questions of their classmates.
- Students should also use office hours to ask questions or talk with the instructor for good communication and effective learning.
- Frequent visiting the instructor and chatting in English during office hours is highly recommended.
- Any misbehavior and non-class related activities in class will result in the lower level of the participation grade, including ringing cell phones.
- All above behaviors will be solely evaluated by the instructor for scoring.

☞ ***Textbook***

Students must bring the textbook to class.

Topical Course Outline

Week	Date	Topics	Homework
1		● Chapter 1 1. Introduction to matrices and systems of linear equations 2. Echelon form and Gauss-Jordan elimination	——
2		● Chapter 1 1. Consistent systems of linear equations 2. Matrix operations 3. Algebraic properties of Matrix operations	——
3		● Chapter 1 1. Linear independence and nonsingular matrices 2. Matrix inverses and their properties	——
4		● Chapter 6 1. Cofactor Expansions of Determinants 2. Elementary Operations and Determinants 3. Cramer's Rule 4. Inverses	——

5		● Chapter 3 1. Introduction to Vector Spaces of $\boldsymbol{R^n}$ 2. Examples of Subspaces	——
6		● Chapter 3 1. Bases for Subspaces 2. Dimensions	——
7		● Chapter 5 1. Linear independence, bases and coordinates 2. Orthogonal Bases for Subspaces	——
8		● Chapter 3, 5 1. Linear transformations 2. Operations with linear transformations 3. Matrix representations for linear transformations	——
9		● Chapter 4 Eigenvalues and the Characteristic Polynomials	——
10		● Chapter 4 Eigenvectors and Eigenspaces	——
11		● Chapter 4 Similarity Transformations	——
12		● Students' presentation	——
13		● Chapter 5 Change of basis	——
14		● Chapter 5 Diagonalization	——
15		● Chapter 5 Orthogonal Matrices	——
16		● Chapter 5 Diagonalization of real symmetric matrices	——
17		● Final Review	

Notes: *1. Some chapters or sections may leave for self-study and may be included on quizzes or exams. It is the students' duty to learn and grasp them.*

2. A Chinese review session may be held during L.C. and O.H.

Teacher's Office Hour

- The instructor's office hour is shown in the front of the office door.
- Students are suggested to use the instructor's office hour and learning center to ask questions or talk with the instructor once at least per week for good communication and effective learning, which is recorded in the students' participation.
- The time can be scheduled by instructors or students, or both.

Cheating and Plagiarism

Cheating is not tolerated. Any student caught cheating on a quiz; test or exam will be given a mark of zero (0) for the particular work. At the beginning of the semester the definition of plagiarism will be carefully explained, when any thoughts or writings of another person are used, they must be clearly identified (usually one uses quotation marks) and the source notes. **If any student is caught cheating on**

any homework assignment, the highest score the student can earn in that course is a "C".

Instructor: Prof. Jianming Huang **Department Head: Prof. Jingning Li**