Capital University of Economics and Business
Overseas Chinese College
2018-2019 Academic Year Fall Semester

SYLLABUS OF MAT221

Semester and Year **Fall Semester**

September 3, 2018— January 13, 2019

Course Name **Linear Algebra**

Course Number **MAT 221**

Section **Y01/Y03/Y04**

Course Credits **3**

Teaching Hours **3*17=51 Hours**

Instructor **Prof. Lemon Li**

Contact Information **Office: C217 Email: occ_limeng@cueb.edu.cn**

Office Hour **TBA**

Leaning Center **TBA**

Textbook

Introduction to Linear Algebra, 5th Edition, ISBN: 7-111-10628-8

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. Prerequisite: MAT 111 & MAT112 Calculus

Student Learning Objectives

- To learn important concepts of linear algebra, such as vector spaces, basis, linear transformations, projections, least squares method, eigenvalues, and eigenvectors.
- To understand the importance of linear algebra and learn its applicability to practical problems, i.e., how the linear equations and eigenvalue problems appear in some practical applications.
- To enhance your understanding of the above concepts through occasional MATLAB-based homework problems.

Library Source

Students can find reference books in the library or related materials on the Internet.

Reference materials

- Strang, Gilbert (July 19, 2005), *Linear Algebra and Its Applications* (4th ed.), Brooks Cole, ISBN 978-0030105678
- Meyer, Carl D. (February 15, 2001), *Matrix Analysis and Applied Linear Algebra*, Society for Industrial and Applied Mathematics (SIAM), ISBN 978-0898714548.
- Shores, Thomas S. (December 6, 2006), *Applied Linear Algebra and Matrix Analysis*, Undergraduate Texts in Mathematics, Springer, ISBN 978-0387331942

Some websites

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

Teaching methods

This course consists of lectures, discussions and individual presentations. Students will be divided into small groups with a group leader to help other students in the group with their study. Students must be prepared to finish some small questions and small quiz during the class. After each chapter there will be some mini presentations which should be held by individuals.

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 Exam	20%	A cumulative mid term 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.
Quiz	20%	There will be several times quizzes during the semester. The purpose of the quizzes is to ensure that students keep up with the readings.
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.
Presentation	5%	Refer to the handouts.
Attendance	10%	Refer to attendance policy listed below.
Total	100%	

Detailed Grade computation

In a semester, the grade of attendance, participation, assignment/homework, and quiz accounts 60 percent in final grade, the midterm exam and final exam accounts 20 percent in final grade, respectively. 40 percent before midterm, and 60 percent after midterm. That is shown as in the following table:

	Before midterm	After midterm
Attendance	5%	5%
Participation	5%	5%
Homework/assignment	5%	10%
Quiz	5%	15%
Midterm exam	20% (5% for critical thinking)	
Final exam		20%(5% for critical thinking)
Presentation		5%
Total	40%	60%

Grading Policy

A+ 97-100 A 93-96 A- 90–92B+ 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

Homework

Students should finish their homework (except for group projects) by themselves. **Copying from others will be treated as cheating. Students' homework scored will be lowered.** Students should hand in all assignments promptly and on time. Late assignment will be accepted at the discretion of the instructor (i.e., when the student was ill or had an excused absence). Assignment turned in late without proof of illness or had an excused absence will be reduced in score by 50%.

Assignment should be printed out. Anything that cannot be read will be marked wrong. Printing requirements are as followed: single space between lines, double space between paragraphs, font size is 12 (maximum).

Attendance

Being late for 15 minutes will result in unexcused absence. Each unexcused absence will result in 10% reduction of attendance grade. Five hours of unexcused absences will result in the lowering of grade by one level, i.e. A to A-. **17 class hours** of absences under any circumstances forces a withdrawal from the course and get a grade of "F". An excused absence must be discussed directly with the teacher. An incomplete

grade (I) will be considered in case of medical or family emergencies. **Students must bring their textbook to class.**

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 hour to ask questions or talk with the instructor for good communication and effective learning. Any misbehavior and non-class related activities in class will result in the lowering of the participation grade, including ringing beepers and cell phones. Student better frequent visit their instructors and chat in English everyday. All above behaviors will be solely evaluated by the instructor for scoring.

Topical Course Outline

Date	Week	Topics
0903-0921	Week 1-3	**Syllabus & Orientation** **Chapter 1 Matrices and Systems of Linear Equations** ○ Section 1.1: Introduction to matrices and systems of linear equations ○ Section 1.2: Echelon form and Gauss-Jordan elimination
0924-0928	Week 4	**Chapter 1 Matrices and Systems of Linear Equations** ○ Section 1.3: Consistent systems of linear equation ○ Section 1.5: Matrix operations ○ Section 1.6: Algebraic properties of Matrix operations
1001-1007	Week 5	**National Holiday**
1008-1012	Week 6	**Chapter 1 Matrices and Systems of Equations** ○ Section 1.7: Linear independence and nonsingular matrices ○ Section 1.9: Matrix inverses and their properties **Review & Exercise**
1015-1019	Week 7	**Chapter 3 The Vector Space R^n** ○ Review for chapter 2 ○ 3.1 Introduction 3.2 Vector Space Properties of R^n ○ 3.3 Examples of Subspaces
1023-1026	Week 8	Review for Quiz I and Quiz I
1029-1102	Week 9	**Midterm Test**
1105-1109	Week 10	**Chapter 3 The Vector Space R^n** ○ Section 3.4: Bases for Subspaces ○ Section 3.5: Dimention ○ Section 3.6: Orthogonal Bases for Subspaces
		Chapter 3 The Vector Space R^n

1112-1116	Week 11	○ Section 3.7: Linear transformations from R^n to R^m ○ Section 4.1: The Eigenvalue problem for (2 x 2) matrices ○ Section 4.2: Determinants and the Eigenvalue problem
1119-1123	Week 12	**Chapter 4 The Eigenvalue Problem** ○ Section 4.3: Elementary Operations and Determinants Review for mid exam
1126-1130	Week 13	**Chapter 4 The Eigenvalue Problem** ○ Section 4.4: Eigenvalues and the Characteristic Polynomial ○ Section 4.5: Eigenvectors and Eigenspaces Section 4.7: Similarity Transformations and Diagonalization
1203-1207	Week 14	**Chapter 5 Vector Space and Linear Transformations** ○ Section 5.1: Introduction ○ Section 5.2: Vector spaces ○ Section 5.3: Subspaces
1210-1214	Week 15	Quiz II
1217-1221	Week 16	PRESENTATION
1224-1228	Week 17	PRESENTATION
0102-0111	Week 18-19	**Final Examination**

Note: Self-Study contents will be also included in your quiz and examinations.

Teacher's Office Hour

The instructor's office hour is shown in the front of the office door. Students are required to use the instructor's office hour 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.

Note: *This syllabus is tentative and may be changed or modified throughout the semester. All students will be notified and a new syllabus will be given.*

Instructor : Prof. Lemon Li **Department Head: Prof. Jingning.Li**