

**NATIONAL TAIWAN UNIVERSITY**  
**Department of International Business**  
**Mathematics for Management**

**Associate Professor Jr-Yan Wang** **Fall 2012**  
**Room 305, Building 2, College of Management** **Wednesday 14:20-17:20**  
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**COURSE DESCRIPTION**

This course is essentially designed to teach the linear algebra, which is a basic but important subject since linear applications arise in many fields such as engineering, chemistry, ecology, biology, psychology, and **economics and business**. The major objectives of this course are twofold. First, students who take this course will study some basic knowledge of the linear algebra. The linear algebra is a branch of mathematics concerned with the study of **systems of linear equations** (線性系統), **matrix operations** (矩陣運算), **vector spaces** (also called linear spaces) (向量空間), **linear mappings** (also called linear transformations) (線性轉換), **eigenvalues and eigenvectors** (特徵值與特徵向量), etc. Second, equipped with the knowledge of the linear algebra, several techniques to deal with management problems are introduced, including the **least squares regression** (最小平方迴歸), the **linear programming** (線性規劃), the **principal component analysis** (主成分分析), the **Monte Carlo simulation** (蒙地卡羅模擬), etc. It is my hope that you can learn some quantitative techniques in this course, which can be the foundation for many advanced courses in the future.

**TEXT AND LECTURE NOTES**

Lecture Notes: <http://homepage.ntu.edu.tw/~jryanwang/> → Course Information →  
[Mathematics for Management \(undergraduate level\)](#)

(Note: DO NOT access CEIBA for the syllabus and lecture notes.)

Required Text: Elementary Linear Algebra, by Larson, 2012, 7<sup>th</sup> ed.

(The representative bookstore of this book in Taiwan is 高立圖書. If you decide to purchase the text book together, you can contact Mr. 郭吉祥 via (02) 2290-0318 ext. 231.)

## **EXAMS AND GRADINGS**

Midterm Exam	40% (on Nov. 7 <sup>th</sup> )	Final Exam	40% (on Jan 9 <sup>th</sup> )
Homework 1 (CAPM)	10%	Homework 2 (Portfolio frontier)	10%

- \* The exam dates are regulated by NTU. Please ensure that you will be available to attend these two exams before you decide to take this course.
- \* To maintain the fairness in the class, there are no make-up exams or other alternatives for exams.
- \* The need of travel cannot be the excuse to miss the exams.
- \* If you cannot attend the exams due to other reasons, you need to notify me in advance and get my permission. A late notification is not acceptable.
- \* The dishonesty in the exams will lead to a failed result for this course.
- \* The range for each exam depends on the speed of my lecture. The range is not accumulative for the final exam.
- \* The format of both exams: 30% for term explanation and 70% for calculation problems. All calculation problems are collected from the quiz and questions at the end of each chapter in the required text.
- \* I will curve your final grades such that the average and standard deviation of the grades in this class are comparable to other classes offered by College of Management of NTU.

## **RULES IN CLASS**

1. DO NOT distract other students from listening to my lecture.
2. If you have any questions about my lecture, just raise your hand to interrupt me.

## **COURSE OUTLINE**

- Systems of Linear Equations (Ch1) (Polynomial curve fitting)
- Matrices (Ch2) (Least squares regression)
- Determinants (Ch3) (Cramer's rule to solve systems of linear equations)
- Vector Space (Ch4) (Change of basis and rotation)
- Inner Product Space (Ch5) (Least squares approximation) (HW 1)
- Linear Programming (Ch9) ((Managerial) optimization problems) (HW 2)

- Eigenvalues and Eigenvectors (Ch7) (Principal component analysis)
- Linear Transformations (Ch6) (Computer graphics)

### **OFFICE HOURS**

Thursday 13:30-15:30

Room 513, Building 2, College of Management

- \* It is not suggested to ask academic questions in emails. The face-to-face communication is the best way to make me understand your questions and give you the most precise instructions or accurate answers for solving your problems.
- \* Try to fully utilize the office hours before making an individual appointment.

### **TEACHING ASSISTANT**

王筱娟 d00723003@ntu.edu.tw

- \* When you face difficulties of solving questions in the text book, please ask the TA first.

### **SPECIAL CLASS SCHEUDULE**

Oct. 10<sup>th</sup> (a national holiday)