

ECON 5150-L3: Mathematical Foundations for Economic Analysis

Department of Economics, HKUST

Fall 2026

Course Information

Classroom: LG3009, Lift 10-12
Instructor: ZHU Tao
Class Date: Tuesday
Telephone: 23587601
Class Time: 7:00-10:20pm
Office hours: Tu 3:00-4:00pm, LSK 6028 and by appointment
Duration: 08/25-10/06
Email: taozhu@ust.hk

Course Description

This course introduces several branches of mathematics necessary for postgraduate studies in economics. It serves as a general introduction with emphasis on optimization. Topics include: Matrix algebra, Real analysis, General optimization, Dynamic optimization.

Intended Learning Outcomes

Students will:

- Gain foundational mathematical knowledge for economics
- Understand key mathematical results and approaches

- Develop skills in optimization and matrix analysis
- Apply mathematical concepts to economic problems

Resources

Main Textbook

Wang, S. (2008). *Math in Economics*. People University Publisher.

Supplemental Textbooks

- Sydsæter, K., et al. (2005). *Further Mathematics for Economic Analysis*
- Chiang, A.C. (1984). *Fundamental Methods of Mathematical Economics*

Course Outline

1. **Linear Algebra** (1.0 lectures): Vectors, matrices, determinants, eigenvalues, linear systems
2. **Real Analysis** (0.5 lecture): Sets, functions, sequences, continuity, differentiation
3. **General Optimization** (3 lectures): Definite matrices, concavity, constrained optimization
4. **Dynamic Optimization** (1.5 lectures): Discrete-time models

Prerequisites

Knowledge of calculus and basic linear algebra

Course Arrangement

- **Problem Sets:** No submission, solutions provided
- **Exams:** Midterm 30%; Final 70%

Grading Policy

- No make-up midterms except with valid medical excuse (doctor's note required)
- Special arrangements for missed midterms will be made via final exam
- In accordance with Business School and MSc policies, attendance is compulsory for MSc Economics courses. Non-compliance may result in consequences, so please ensure you are familiar with these policies

Teaching Assistant

TA: TAO Junheng

Email: junheng.tao@connect.ust.hk

Teaching Schedule

Subject to necessary adjustment

08/25 Introduction/Linear algebra

09/01 Linear algebra/Real analysis

09/08 General optimization

09/15 No class, midterm on 09/16 (7:00-10:00pm)

09/22 General optimization

09/29 General optimization/Dynamic optimization

10/06 Dynamic optimization

Final exam on 10/14 (7:00-10:00pm)