ECON 5100: Math for Business and Econ (L1)

Department of Economics, HKUST

Fall 2025

Course Information

Classroom:	Lecture Theater G (132)
Instructor:	ZHU Tao
Class Date:	We/Fr
Telephone:	23587601
Class Time:	WeFr 7:00PM - 9:50PM
Office hours:	Fr 3:45PM-4:45PM, LSK 6028 and by appointment
Duration:	Sep 3-Oct 17
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

- Ordinary differential equations (time permitting)

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*

- Greene, W.H. (1993). *Econometric Analysis*

- Kamien & Schwartz (1991). *Dynamic Optimization*

- Sargent, T.D. (1987). *Dynamic Macroeconomic Theory*

- Takayama, A. (1993). *Analytical Methods in Economics*

Course Outline

1. **Linear Algebra** (1.5 lectures): Vectors, matrices, determinants, eigenvalues, linear systems

2. **Real Analysis** (0.5 lecture): Sets, functions, sequences, continuity, differentiation

3. **General Optimization** (4 lectures): Definite matrices, concavity, constrained optimization

4. **Dynamic Optimization** (4 lectures): Discrete/continuous-time models, phase diagrams

Prerequisites

Knowledge of calculus and basic linear algebra. Primary references: Wang (2008), Sydsæter (2005), and Chiang (1984).

Course Arrangement

- **Problem Sets**: One per chapter (no submission, solutions provided)
- **Exams**:
  - Midterm: October 2 (30%)
  - Final: (70%)

Grading Policy

- Midterm Exam: 30%
- Final Exam: 70%
- 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: CHEN, Chutian
Email: cchencs@connect.ust.hk

Teaching Schedule

Subject to necessary adjustment

    09/03 Introduction/Linear algebra
    09/05 Linear algebra
    09/10 Real analysis/General optimization
    09/12 General optimization
    09/17 General optimization
    09/19 General optimization
    09/24 General optimization/Dynamic optimization
    09/26 Dynamic optimization
    Midterm exam (19:00PM-22:00PM, 10/02, LTG + G012)
    10/03 (no class, midterm 10/02)
    10/08 Dynamic optimization
    10/10 Dynamic optimization
    10/15 Dynamic optimization
    10/17 (no lecture)
    Final exam (19:00PM-22:00PM, 10/17, LTG + G012)