<p style="text-align:center">ECON5101A/B Review of Quantitative Methods
The Chinese University of Hong Kong
Fall 2022</p>

Professor YAO Feng
Email: yaofengyf@gmail.com
Office hour: 17:30-18:30 Wed or by appt
Lectures: Aug 1 – Aug 22, 2022

Assistant Lecturer: Dr. Michael Leung
Email: cmleung123@hotmail.com
Office hour: TBC

Course Description

This course reviews some of the mathematical methods most widely used in modern economic analysis. We shall cover the following topics: linear algebra, fundamentals of probability, elementary real analysis, one-variable calculus, multivariable differential calculus, and static optimization theories. If time allows, dynamical optimization in discrete and continuous time will be covered as well. It is assumed that the students are familiar with basic calculus and elementary linear algebra.

Learning Outcomes

The primary goal of this course is to provide solid mathematics preparation for graduate study in economics. After taking this course, the students are expected to:

   i.   master the basic mathematical methods most widely used in economic analysis;
  ii.   become comfortable with reading and analyzing research papers in economics;
 iii.   deepen the understanding of the nature and the role of mathematics in economic analysis.

Recommended Textbooks

- Simon and Blume, Mathematics for Economists, Norton, 1994. (SB)
- Alpha C. Chiang & Kevin Wainwright, Fundamental Methods of Mathematical Economics, McGraw-Hill, 2005. (CW)

Teaching Schedule

Session A

Class	Teaching Period	Face-to-face Teaching Venue
Lecture	Date: Aug 1 – Aug 22 August 1 (Mon), Aug 3 (Wed), Aug 5 (Fri), Aug 8 (Mon), Aug 10 (Wed), Aug 12 (Fri), Aug 13 (Sat), Aug 15 (Mon), Aug 17 (Wed), Aug 19 (Fri), Aug 20 (Sat), Aug 22 (Mon) Time: 09:30 – 12:15	LT3, Esther Lee Building
Tutorial	Date: (TBC) Time: (TBC)	TBC

Session B

Class	Teaching Period	Face-to-face Teaching Venue
Lecture	Date: Aug 1 – Aug 22 (August 1 (Mon), Aug 3 (Wed), Aug 5 (Fri), Aug 8 (Mon), Aug 10 (Wed), Aug 12 (Fri), Aug 13 (Sat), Aug 15 (Mon), Aug 17 (Wed), Aug 19 (Fri), Aug 20 (Sat), Aug 22 (Mon) Time: 14:30 – 17:15	LT3, Esther Lee Building
Tutorial	Date: (TBC) Time: (TBC)	TBC

Teaching Plan
1. Introduction: sets, numbers and proofs (SB chapter A1).
2. Linear models and matrix algebra (CW chapters 4-5).
3. Elementary real analysis (SB chapter 12. Focusing on Metrics and Norms, Sequences, Open and Closed Sets, Continuity, Compact Sets, Extreme Value Theorem. Fixed point Theorem as in Chapter 3 section 1 of Franklin (2002)).
4. Comparative statics and derivative (CW chapter 6).
5. Differentiation and comparative statics (CW chapter 7).
6. Comparative static analysis of general function models (CW chapter 8).
7. Univariate optimization (CW chapter 9. SB chapter 17.)
8. Multivariate optimization (CW chapters 11. SB chapter 17.)
9. Optimization with equality constraints. (CW chapter 12. SB chapter 18.)
10. Optimization with inequality constraints. (CW chapter 13. SB chapter 19.)
11. Dynamic optimization: introduction to first-order differential equation (CW chapter 15. SB chapter 24).
12. Dynamic optimization: optimal control theory (CW chapter 20).

Franklin, J. N., 2002, Methods of Mathematical Economics: linear and nonlinear programming, fixed-point theorems. Society for Industrial and Applied Mathematics, Philadelphia.

Remarks:
*All homework problems are listed on the top of each chapter's class note, and the due dates will be announced in class.
*All the course materials (including course outline, assigned homework and class notes) are available at the CUHK blackboard System.
*Depending on the progress of the class, the course materials and the topics covered might be adjusted.

Attendance Policies
Students are required to attend all the lectures. Students absent from class for any reason are responsible for the missed work.

Grading
The course grade will be determined by homework (30%) and final exam (70%).

Homework
There will be five to six homework exercises. Students are required to hand in their homework individually. We will grade one of the homework and use its grade for the homework. The rest of the homework exercises will be collected for record but will not be graded. Suggested solutions will be provided in the tutorials. Homework exercises are meant to help students be familiar with the course materials. Therefore, even though most of the homework exercises will not be graded, students are expected to work on them carefully and attend the tutorial session.
Exam Schedule
Final Exam: TBA. Location: TBA.

Academic Honesty
For guidelines on academic honesty, students are referred to Honesty on Academic Work: A Guide for Students and Teachers at the following URL: http://www.cuhk.edu.hk/policy/academichonesty/