HKUST-Department of Economics
Course Outline Fall 2020
ECON5100 – Math review

Class meetings   **Zoom**
Date/Time   Tu/Th 9:00 – 11:50, Sept 1 – Oct 20

Lecturer: **Zhou Lingzhi**
Email: lzzhou@ust.hk
Tel: 2358-7598
Office: Room 6056, LSK Building
Office hours: 4:00 – 5:30pm on Wednesdays or by appointment

TA: **TBD**

Course Description

Advanced economics makes extensive use of formal mathematical models. This course will develop the mathematical tools that are necessary for post graduate studies in economics. It is intended as a general introduction of mathematics with special emphasis on linear algebra and optimization.   Topics that will be covered include linear algebra, a brief introduction of real analysis and differential equations, a detailed coverage of static and dynamic optimization. Students are expected to have some basic knowledge of mathematics and understand intuitively some main math results and approaches.

Course intended learning outcomes

- Students will demonstrate competence with the basic ideas of linear algebra including concepts of linear systems, independence, theory of matrices, linear transformations, bases and dimension, eigenvalues, eigenvectors and diagonalization.
- Students will be equipped with optimization methods and economic insights to construct theoretical models analyzing economic and business problems
- Solve advanced economic models using mathematical methods related to real analysis, static optimization, and dynamic optimization

Assessment

Midterm Exam (take home)	30%
Final Exam	70%

Reference books:

Book 1 (Further Math): *"Futher Mathematics for Economic Analysis"* by K. Sydsæter, et al. (2005), Prentice Hall

Book 2 (Simon&Blume): *"Mathematics for Economists"* by Carl P, Simon-Lawrence Blume (1994), Norton.

Book 1 covers all the topics that you learn in this course, but it is not cheap (over US$100). Book 2 is easier to read and cheaper (around US$50), but it does not cover the last topic on dynamic optimization. Both books can be found in HKUST library reserve for this course.

Arrangement

- At least for the first two weeks, lectures will be conducted in zoom.
- **Problem sets:** There is one problem set for each topic (except Topic 1 on Linear algebra). They will be posted on CANVAS. No need to hand in, answers are provided.
- **Midterm exam**: There will be a take-home midterm on Linear algebra.
- **Final exam**: The final exam is on Tuesday, Oct 20, (in zoom or classroom). Final exam is not cumulative: subjects tested in midterm will not appear in final

Communication

- When you send emails to me, please make email title start with **[EC5100].**
- Lecture notes and announcements will be posted on CANVAS.

Topics covered in the course

1. **Linear algebra (approx. 3 weeks)**
   References: Further Math (Chapter 1); Simon&Blume (6-11, 16, 23, 26, 27)

2. **Real analysis (approx. 2 weeks)**
   References: Further Math (Appendix A, Chapters 2); Simon&Blume (12-15, 20)

3. **Static optimization (approx. 3 weeks)**
   References: Further Math (Chapter 3); Simon&Blume (Chapters 17-19)

4. **Dynamic Optimization (approx.. 4 weeks)**
   References: Further Math (Chapters 5, 6, 8, 9, 10, 12)