



**ECON 4999L: Foundation Workshop in Economics**  
Spring 2019 Syllabus

Department of Economics  
HKUST Business School

**Duration:** February 1 – May 29, 2019  
**Schedule:** TBA  
**Venue:** TBA

**Course Web Site:** <https://canvas.ust.hk/>

<b><u>Instructor:</u></b>  Professor Xiaoxuan Meng Email: <a href="mailto:xxmeng@ust.hk">xxmeng@ust.hk</a>	<b><u>Teaching Assistant:</u></b>  
<b>Office Hours:</b> TBA <b>Venue:</b> TBA	<b>Office Hours:</b> TBA <b>Venue:</b> TBA

**Course Registration**

Interested students please seek approval from the instructor or Ms. Leonna Tong ([leonna@ust.hk](mailto:leonna@ust.hk)).

**Course Description**

This course provides students with basic mathematical tools frequently used in economic analysis. Topics covered include linear algebra, multivariate calculus, and unconstrained and constrained optimization. Teaching will be conducted through large number of economic applications. The main objective of the course is to prepare students for higher-level required and elective economics courses.

### **Learning outcomes**

On completion of this course, you will be able to

1. solve a system of linear equations to conduct comparative-static and dynamic analyses and solve optimization problems.
2. apply the knowledge and technique of matrix algebra in economic analysis.
3. set up economic problems using vector and vector space.
4. use multi-variable calculus to conduct comparative statics in economic problems
5. solve common unconstrained optimization problems such as profit maximization
6. solve common constrained optimization problems such as derivation of consumer demand given utility function and budget constraint
7. solve system of nested optimization problems such as Cournot equilibrium (simultaneous move) and wholesaler-retailer pricing (sequential move)

### **Format of Delivery**

There is a 3-hour lecture and a 1-hour hands-on problem-solving tutorial each week.

### **Required Textbook**

There is no required textbook for the course. All materials will be provided by the instructor.

### **Optional Reference**

*Fundamental Methods of Mathematical Economics* by A.C. Chiang and K. Wainwright (2005), McGraw-Hill HKUST bookstore

### **Grades**

The grades will be based on problem sets (30%), midterm (30%), and final exam (40%).

### **Topics Covered**

1. Basic knowledge and technique of matrix algebra and its economic applications.
2. Solving economic models characterized by a system of linear equations.
3. Vector and Vector space and economic applications.
4. Review of single-variable calculus through common economic applications
5. Comparative-static analysis in multi-variable economic models
6. Multi-variable *unconstrained* optimization problem and economic applications
7. Multi-variable *constrained* optimization problem and economic applications
8. System of nested optimization problems and economic applications