

**The University of Hong Kong
School of Economics and Finance**

ECON6066 Mathematics and Statistics Review

General Information

Instructor: Ping Yu

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Teaching time: 6:45-8:00pm and 8:15-9:30pm, Tuesday

Teaching location: ATC-B4 (Sept 4, 11&18) / KK315 (Oct 2) / ATC-B12 (Oct 9&16)

Office Hours: 11:00-12:00pm, Tuesday

Tutor: TBA

Email: TBA

Office: TBA

Phone: TBA

Office Hours: TBA

Course Description

This 3-credit course introduces some popular mathematical and statistical tools used in modern economic and econometric analysis. We shall discuss the following topics: basic topology, single variable and multivariable calculus, unconstrained and constrained optimization, elementary convex analysis, basic probability concepts, and statistical methods.

Learning Outcomes

The main purpose of this course is to prepare necessary background knowledge for future courses such as Applied Econometrics (ECON6001), Microeconomic Analysis (ECON6021), and Econometric Theory I (ECON6005). Upon successful completion of the course a student is expected to:

- CLO1. understand and apply the basic mathematical tools in economic analysis;
- CLO2. get familiar with the probability concepts and statistical methods that are most widely used in econometric analysis; and
- CLO3. recognize the strengths and shortcomings of mathematical models in economics.

Alignment of Programme and Course Outcomes

Programme Learning Outcome (PLO)	Associated Course Learning Outcomes (CLO)
PLO1. Understanding of fundamental theories and new development in economics	CLO1, CLO3
PLO2. Mastering of skills in analyzing economic data	CLO2
PLO3. Demonstration of ability to apply	CLO1, CLO2

economic knowledge and analytical skills to address policy and business problems	
PLO4. Awareness of ethical concerns in economic issues	-
PLO5. Mastering of communication skills	CLO1, CLO2

Recommended Textbooks

The teaching is based on lecture notes and slides. Most related textbooks include the following:

- Carl P. Simon and Lawrence Blume, 1994, *Mathematics for Economists*, New York: Norton.
- Rangarajan K. Sundaram, 1996, *A First Course in Optimization Theory*, New York: Cambridge University Press.
- Rudin, Walter, 1976, *Principles of Mathematical Analysis*, 3rd edition, New York: McGraw-Hill.
- George Casella and Roger L. Berger, 2002, *Statistical Inference*, 2nd edition, Pacific Grove, CA: Thomson.

COURSE TEACHING AND LEARNING ACTIVITIES		
Course Teaching and Learning Activities	Expected contact hour	Study Load (% of study)
T&L1. Lectures	18 hours	35%
T&L2. Self study	42 hours	65%
Total	60 hours	100%

Assessment

The course grade is determined by an assignment (40%) and an exam (60%). The assignment is distributed at the beginning of the course and collected at the end of the course. The exam will be held at the end of the semester.

Assessment and Course Learning Outcomes

Assessment	Course Learning Outcomes
Assignments	CLO1, CLO2, CLO3
Examination	CLO1, CLO2, CLO3

Standards for Assessment

Course Grade Descriptors	
A+, A, A-	Strong evidence of superb ability to fulfill the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate, and synthesize.
B+, B, B-	Strong evidence of the ability to fulfill the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate, and synthesize.
C+, C, C-	Evidence of adequate ability to fulfill the intended learning outcomes of the course at low levels of learning such as describe and apply but not at high levels of learning such as evaluate and synthesize
D+, D	Evidence of basic familiarity with the subject.
F	Little evidence of basic familiarity with the subject.

Course Outline

Lecture 1:

Sets, Functions, Point-Set Topology, Single variable Calculus, Multivariable Calculus

Lecture 2:

Equality-Constrained Optimization, Existence of Optimizer, Kuhn-Tucker Necessary Conditions

Lecture 3:

Convex Sets, Concave and Convex Functions, Uniqueness of Optimizer, Sufficient Conditions

Lecture 4:

Maximum Theorem, Implicit Function Theorem, Envelope Theorem

Lecture 5:

Probability Space, Random Variables, Expectation, Conditional Distributions and Expectation, Normal and Related Distributions

Lecture 6:

Summary of A Data Set, Point Estimation, Hypothesis Testing, Confidence Intervals