



# PHBS

北京大学汇丰商学院



## ECON 586

## Math III

## Module 3, 2020-2021

### Course Information

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Office Hour: Tuesday, 3:30pm-5:30pm and Thursday, 3:30pm-5:30pm, and by appointment

**Teaching Assistant: TBA**

Email: TBA

Office Hour: TBA

**Classes**

Lectures: Monday and Thursday, 10:30am-12:20pm

Venue: TBA

**Tutorial**

Time: Thursday, 7pm-9pm

Venue: TBA

**Course Website**

PHBS school CMS website: [cms.phbs.pku.edu.cn](http://cms.phbs.pku.edu.cn)

## 1. Course Description

### 1.1 Context

Course overview:

The course covers three subjects in real analysis: analysis on metric spaces, linear spaces, and metric/normed linear spaces. (1) Topics on metric spaces include continuity of functions, continuity and connectedness, continuity and compactness, semicontinuity, CB(T) and uniform convergence, Brouwer fixed point theorem, correspondences, continuity of correspondences, the maximum theorem, applications to stationary dynamic programming, Kakutani's fixed point theorem, and applications to Nash Equilibrium. (2) Topics on linear spaces include linear spaces, linear operators and functionals, applications in expected utility theory, convex sets, separation and extension in linear spaces, reflections on Euclidean spaces, application to Welfare economics, and application to financial economics. (3) Topics on metric/normed linear spaces include metric linear spaces, continuous linear operators and functionals, finite dimensional metric linear spaces, convex analysis in metric linear spaces, normed linear spaces, Banach spaces, bounded linear operators and functionals, Frechet differentiation, generalization of the mean value theorem, optimization of maps, and calculus of variations.

Prerequisites: ECON 585 Math II or similar courses previously taken

### 1.2 Textbooks and Reading Materials

Textbook:

## 2. Learning Outcomes

### 2.1 Intended Learning Outcomes

Learning Goals	Objectives	Assessment (YES with details or NO)
1. Our graduates will be effective communicators.	1.1. Our students will produce quality business and research-oriented documents.	Yes. The students will learn how to express the quantitative relations in business documents using rigorous language of mathematics.
	1.2. Students are able to professionally present their ideas and also logically explain and defend their argument.	Yes. The students will learn how to express their ideas in a quantitative and logical way by using advanced mathematics.
2. Our graduates will be skilled in team work and leadership.	2.1. Students will be able to lead and participate in group for projects, discussion, and presentation.	Yes. The students will participate in group discussion of homework problems.
	2.2. Students will be able to apply leadership theories and related skills.	No.
3. Our graduates will be trained in ethics.	3.1. In a case setting, students will use appropriate techniques to analyze business problems and identify the ethical aspects, provide a solution and defend it.	No.
	3.2. Our students will practice ethics in the duration of the program.	No.
4. Our graduates will have a global perspective.	4.1. Students will have an international exposure.	Yes. The students will learn mathematical theorems and results discovered by internationally renowned mathematicians.
5. Our graduates will be skilled in problem-solving and critical thinking.	5.1. Our students will have a good understanding of fundamental theories in their fields.	Yes. The students will learn the fundamental theory and tools in advanced mathematics and economics.
	5.2. Our students will be prepared to face problems in various business settings and find solutions.	Yes. The students will need to use advanced mathematics to formulate and

		solve problems in finance and economics.
	5.3. Our students will demonstrate competency in critical thinking.	Yes. The students will learn to differentiate whether a mathematical result is based on a solid mathematical proof or not.

## **2.2 Course specific objectives**

After taking the course, the students will master the fundamental theory and tools in the covered topics.

## **2.3 Assessment/Grading Details**

There will be a homework set every week. The students are encouraged to discuss the homework problems together, but each student need to hand in his or her own copy of the solution to the homework.

There will be a midterm exam and a final exam. Both exams will be closed-book and closed-notes.

The grade of the course is given by homework(15%)+midterm(35%)+final(50%). The exam arrangement may be changed later due to the change of arrangement of the school.

## **2.4 Academic Honesty and Plagiarism**

It is important for a student's effort and credit to be recognized through class assessment. Credits earned for a student work due to efforts done by others are clearly unfair. Deliberate dishonesty is considered academic misconducts, which include plagiarism; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis.

All assessments are subject to academic misconduct check. Misconduct check may include reproducing the assessment, providing a copy to another member of faculty, and/or communicate a copy of this assignment to the PHBS Discipline Committee. A suspected plagiarized document/assignment submitted to a plagiarism checking service may be kept in its database for future reference purpose.

Where violation is suspected, penalties will be implemented. The penalties for academic misconduct may include: deduction of honour points, a mark of zero on the assessment, a fail grade for the whole course, and reference of the matter to the Peking University Registrar.

For more information of plagiarism, please refer to *PHBS Student Handbook*.

## **3. Topics, Teaching and Assessment Schedule**

Homework shall be handed in each week. The midterm exam is scheduled on April 7. The final exam date will be announced later.

#### **4. Miscellaneous**