Course Information

Instructor: Xianhua Peng
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Office Hour: Monday and Tuesday, 3:30pm-5:30pm, and by appointment

Teaching Assistant: TBA

Classes:
Lectures: Tuesday and Friday, 1:30pm-3:20pm
Venue: PHBS Building, Room TBA

Tutorial:
Time: Thursday, 7:00pm-9:00pm
Venue: PHBS Building, Room TBA

Course Website:
PHBS school CMS website: cms.phbs.pku.edu.cn

1. Course Description

1.1 Context

Course overview:
The course covers two subjects in real analysis: set theory and analysis on metric spaces. (1) Topics in set theory include elements of set theory, real numbers, real sequences, real functions, countable and uncountable sets, linearly ordered sets, the set of rational numbers, the cardinality ordering, and applications in ordinal utility theory. (2) Topics in analysis on metric spaces include basic notions of metric spaces, connectedness and separability, compactness, sequential compactness, completeness, Banach fixed point theorem, applications to functional equations, products of metric spaces, 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.

Prerequisites: N/A

1.2 Textbooks and Reading Materials

Textbook:
Real Analysis with Economic Applications, Efe A. Ok, 2007, Princeton University Press.

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	Yes. The students

	competency in critical thinking.	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%).

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 on each Tuesday before the lectures. The midterm exam is scheduled on December 22, 2020. The final exam is scheduled on January 22, 2021.

4. Miscellaneous