Dynamic Programming

Module 2, 2021-2022

Course Information

Professor: Jake Zhao

Office: PHBS 653

Email: jake.zhao@phbs.pku.edu.cn

Office Hours: Wednesday, 3:30pm-5:30pm, Thursday, 9:30am – 11:30am, or by appointment

Classes: Monday and Thursday, 3:30pm – 5:20pm

Room: T.B.A.

Teaching Assistant: T.B.A.

Email: T.B.A.

Office hours: T.B.A.

1. Course Description

1.1 Context

Course overview:

This course is designed to provide a rigorous introduction to dynamic programming.

1.2 Textbooks and Reading Materials

Required text:

Lecture notes and supplemental materials will be provided to students through the course management system.

Recommended references:

https://lectures.quantecon.org/py/

"Economic Dynamics" by John Stachurski

"Recursive Macroeconomic Theory" by Lars Ljungqvist and Thomas J. Sargent

"Dynamic Economics: Quantitative Methods and Applications" by Jerome Adda and Russell Cooper

2. Learning Outcomes

2.1 Intended Learning Outcomes

Learning Goals	**Objectives**	**Assessment**
1. Our graduates will be effective communicators.	1.1. Our students will produce quality business and research-oriented documents.	Problem sets
	1.2. Students are able to professionally present their ideas and also logically explain and defend their argument.	Problem sets, exams
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.	Class participation
4. Our graduates will have a global perspective.	4.1. Students will have an international exposure.	Lectures
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.	Lectures, problem sets, exams
	5.2. Our students will be prepared to face problems in various business settings and find solutions.	Lectures, problem sets, exams
	5.3. Our students will demonstrate competency in critical thinking.	Lectures, problem sets, exams

2.2 Course specific objectives

This course is meant to provide a solid foundation for and develop students' interest in the further study of macroeconomics. In addition, the analytical and computational methods learned in this class may aid students in thesis writing and future research in various topics related to economics and finance.

2.3 Assessment/Grading Details

Component	Weight
Problem sets	10%
Final	90%

The final is scheduled on Thursday, January 21 at 3:30pm – 5:30pm.

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

Week 1-2: introduction, dynamic programming (cake-eating problem)

Week 3: analysis in metric space

Week 4: finite-state Markov chains, dynamical systems

Week 5-6: dynamic programming (McCall)

Week 7: exchangeability and Bayesian updating

Week 8: job search with learning

Week 9: sequential analysis