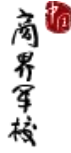




PHBS
北京大学汇丰商学院



Machine Learning in Asset Pricing Module 3, 2025

Course Information

Instructor: *Lingxiao Zhao, PhD, Assistant Professor of Finance,*
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Office Hour:

Teaching Assistant:

Classes:

Lectures:

Venue: PHBS Building

Course Website:

1. Course Description

1.1 Context

This course introduces recent advancements in machine learning (ML) as applied to financial markets, with a focus on asset pricing. Key topics include foundational finance concepts such as arbitrage pricing theory, asset pricing factor models, portfolio analysis, and return prediction, and investor learning. Building on this foundation, students will explore the expanding range of ML techniques used in financial research and quantitative investment.

A preliminary understanding of modern portfolio theory and econometrics is recommended. By the end of the course, students will understand how ML methods can solve empirical problems in finance and will be able to use R or Python packages to address these questions.

1.2 Textbooks and Reading Materials

1) Stefan Nagel; Princeton Lectures in Finance; 2021

Published by: Princeton University Press

Machine Learning in Asset Pricing

2) Bryan Kelly and Dacheng Xiu; Copyright © 2024 now publishers inc.; 2024

Financial Machine Learning

2. Learning Outcomes

2.1 Intended Learning Outcomes

2.2 Course specific objectives

2.3 Assessment/Grading Details

Attendance: 20%

Homework: 20%

Final Project: 60%

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.

AI tools requirements:

Using AI tools to complete assignments or assessments without the approval of the course instructor will be regarded as an act of academic dishonesty. Depending on the severity of the situation, penalties will be implemented in accordance with the provisions of the Peking University Graduate Student Handbook.

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

3. Topics, Teaching and Assessment Schedule (tentative)

Week 1 Basic concepts in machine learning and asset pricing

Week 2 Introduction CAPM, APT and multi-factor asset pricing models

Week 3 Factor construction

Week 4 Factor zoo and the multidimensional challenge

Week 5 Supervised learning for return prediction

Week 6 Machine learning in cross-sectional asset pricing

Week 7 Solving empirical problems using R/Python packages

Week 8 Portfolio analysis and quantitative investment

Week 9 Solving empirical problems using R/Python packages