

Syllabus

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Course Name: Continuous-Time Finance

Faculty:

Teaching Assistants:

2024 FIRST SEMESTER

COURSE OUTLINE

A basic introduction to stochastic calculus applied to continuous-time finance.

COURSE PROGRAM

1. Basic notions of Probability Theory
 - a. Measurable space and Measure
 - b. Independence and Conditioning
 - c. Expectations and Martingale
2. Discrete Time Dynamic Trading
 - a. Assets and portfolio
 - b. Arbitrage
 - c. Fundamental Theorem of Finance
3. Continuous Time
 - a. Brownian motion
 - b. Itô's integral and Itô-Doeblin Formula
 - c. Black-Scholes-Merton Formula
 - d. Martingale Representation Theorem

BIBLIOGRAPHY

- Main Reference
 - Shreve, S.: "Stochastic Calculus for Finance II – Continuous-Time Model," Springer, 2004.
 - Martins-da-Rocha, V. F.: "Introduction to Stochastic Calculus for Economists", lecture notes, 2023.

- Additional References:

- Williams, D.: "Probability with Martingales," Cambridge University Press, 1991.
- Steele, J. M.: "Stochastic Calculus and Financial Applications", Springer, 2000.
- Dana, R. and Jeanblanc, M.: "Financial Markets in Continuous Time," Springer, 2003.

GRADING

Students are required to choose an article from a renowned economics journal that aligns with the course material. Specifically, the article's model should be based on continuous time. Acceptable topics include finance, macroeconomics, and contract theory. Each student is expected to prepare a presentation, lasting approximately 30 minutes, to be delivered online via Zoom. The presentation should focus on the benefits of using a continuous time approach in the model presented in the chosen article.

CONTACT