PhD401 - Continuous Time Finance (7.5 ECTS)

Course Director
Professor Tomas Björk
Department of Finance, SSE

Description

The object of this course is to provide an introduction to continuous time finance, including arbitrage theory, stochastic optimal control theory, and dynamic equilibrium theory. The course also contains an introduction to stochastic differential equations and Itô calculus, which are the main mathematical tools used in this field of research.

This course is given within the Doctoral Course Program in Finance by the Swedish House of Finance (SHoF).

Course Material

Lecture notes and the following textbook: Björk, T.: Arbitrage Theory in Continuous Time, 4th ed.

Registration

Please register in advance with the course secretary Jenny Wahlberg Andersson, Department of Finance, Stockholm School of Economics, E-mail: jenny.wahlberg.andersson@hhs.se

Location

Classes will be held in room Fama, at SHoF, Drottninggatan 98. Please check the schedule for more details.

Dates and Times

Mon January 6:	10-12, 13-15
Tue January 7:	10-12, 13-15
Wed January 8:	10-12, 13-15
Thu January 9:	10-12, 13-15
Mon January 13:	10-12, 13-15
Tue January 14:	10-12, 13-15
Wed January 15:	10-12, 13-15
Thu January 16:	10-12, 13-15

Contents

Mathematics:
Stochastic integrals, the Ito formula, stochastic differential equations, abstract conditional expectation, measure changes, the Radon-Nikodym theorem, Girsanov's theorem, the martingale representation theorem, Feynman-Kac.
Dynamic programming in continuous time.

Arbitrage Theory:
The Black-Scholes model and the PDE approach to pricing and hedging. The martingale approach to pricing and hedging for general models. Change of numeraire, FX theory, and an overview of interest rate theory.

Optimal Investment Theory:
The Merton consumption-investment problem and the Merton fund separation theorems. The martingale approach to optimal investment problems.

Equilibrium Theory:
Some simple dynamic equilibrium models in continuous time: The CIR production models. The CIR short rate model. Unit supply endowment models.