FE 520
Financial Calculus
Spring 2020

This course presents an introduction to stochastic models in financial decision making. We first introduce discrete time models: Martingales, risk-neutral probability measure and change-of-measure in discrete time. Then, we discuss Brownian motion, Ito's formula and change of measure in continuous time, along with the Black-Scholes model. We introduce stopping times and discuss their application to American options. The course concludes with stochastic models for interest rates and fixed income derivatives.

Topic	
1	Introduction and a binomial pricing model
2	Conditional expectation, martingales, and risk-neutral pricing
3	Pricing European options in discrete-time model
4	Construction of the Brownian Motion and its properties
5	Stochastic integral and Ito's formula
6	Black-Sholes model and extensions
7	Interest rate markets and fixed income securities

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Midterm Dates: March 14, 2020 (Midterm 1), April 25, 2020 (Midterm 2).

References: Students are strongly encouraged to attend classes and take notes. Lecture notes are mostly based on Shreve Volume I and Volume II.

1. Shreve, S. E. (2004). *Stochastic Calculus for Finance I*. Springer.
2. Shreve, S. E. (2004). *Stochastic Calculus for Finance II*. Springer.
3. Baxter, M. and Rennie, A. (1996), *Financial Calculus: an introduction to derivative pricing*, Cambridge University Press.

Grading: Midterm 1 (30 %), Midterm 2 (30%), Final (40 %).

Moodle: http://moodle.ie.boun.edu.tr/

Enrollment Key: TBA