Quantitative Methods for Finance
Alberto Plazzi
Università della Svizzera italiana
PhD in Finance, Fall 2014

Course description and aim

This course presents basic concepts of Probability Theory and Stochastic calculus. The course is split into two parts. The first part covers probability spaces, densities, and martingales. The second part aims at providing the building blocks of continuous time finance, from the concept of Brownian motion to Ito calculus and stochastic differentiation. The topics will be presented with a particular emphasis on financial applications.

Schedule of Lectures

September 2014
Monday 15; Tuesday 16; Wednesday 17
Monday 22; Tuesday 23; Wednesday 24; Friday 26
Tuesday 30

October 2014
Wednesday 1

Lectures will be held **10am-1pm** in **room 251** (main USI building).

How to reach me

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Course Content

- Probability theory
    - Information and probability spaces
    - Random variable
    - Probability distribution and densities
    - Moments
    - Independence & dependence
    - Stochastic processes
    - Conditional expectations
    - Martingales
    - Markov processes
    - Convergence
    - LLN and CLT

- Stochastic calculus
  - Brownian motion
  - Riemann & Stieltjes integrals
  - Stochastic integrals
  - Stochastic differential equations and Ito's lemma
  - Partial differential equations and Feynman-Kac representation
  - Girsanov's theorem and change of measure

Course Material

Lecture notes will be available on the course website, which can be reached at http://www.icorsi.ch/. After accessing the site using your e-course login and password, follow Courses>USI> Corsi dottorali, seminari e atelier ECO> **Quantitative Methods for Finance 2014**. The course material will mainly draw from the following textbooks:

[1] S. Neftci, *An Introduction to the Mathematics of Financial Derivatives*, Academic Press, London, 2000.
[2] S. Shreve, *Stochastic Calculus for Finance II*, Springer finance, NY, 2008.

Grading policy

Grading will be based on a final examination.