

# Syllabus

## Instructor

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## Course Outline

This course discusses numerical methods for valuing financial derivatives and equity-linked insurance products. The emphasis will be on actual implementations of Monte Carlo simulation methods in MATLAB. The course also provides introductory materials for stochastic models in risk analysis, finance and insurance.

## Reference books

1. Glasserman, P. (2004). *Monte Carlo Methods in Financial Engineering*. Springer
2. Hull, J. (2009) *Options, Futures, and Other Derivatives*, 7th ed, by Hull (Prentice Hall)
3. Hardy, M. (2003) *Investment Guarantees: Modelling and Risk Management for Equity-Linked Life Insurance*. Wiley

## Tentative topics:

1. Introduction of Matlab
2. Itô's calculus and the classical Black-Scholes-Merton theory
3. Introduction of financial derivatives and equity-linked insurance products
4. Principles of Monte Carlo
5. Generating Random Variables
6. Generating Sample Paths
7. Variance Reduction Techniques
8. Applications in Risk Management

## Assessment

Midterm	40%
Final Project	60%