



QUANTITATIVE FINANCE

Anno immatricolazione	2016/2017
Anno offerta	2016/2017
Normativa	DM270
SSD	SECS-P/01 (ECONOMIA POLITICA)
Dipartimento	DIPARTIMENTO DI SCIENZE ECONOMICHE E AZIENDALI
Corso di studio	ECONOMICS, FINANCE AND INTERNATIONAL INTEGRATION - ECONOMIA, FINANZA E INTEGRAZIONE INTERNAZIONALE
Curriculum	Finance
Anno di corso	1°
Periodo didattico	Secondo Semestre (20/02/2017 - 20/05/2017)
Crediti	9
Ore	66 ore di attività frontale
Lingua insegnamento	ENGLISH
Tipo esame	SCRITTO E ORALE CONGIUNTI
Docente	DE GIULI MARIA ELENA (titolare) - 9 CFU
Prerequisiti	No specific prerequisite is needed. Nonetheless, familiarity with the basic concepts of Calculus, Probability and Statistics will be helpful.
Obiettivi formativi	<p>This is a course in the applied aspects of mathematical finance, in particular derivative pricing. The theory of stochastic differential equation is the main mathematical tool used in this course. We cover the basic Black-Scholes-Merton theory and we extend it to the case of several underlying assets (including stochastic interest rate) as well as to dividend paying assets. Interest rate theory constitutes a substantial part of the course. It is expected the learning of the basic elements of quantitative finance to understand how financial markets work and how complex financial instruments can be assessed. Following a practical risk management approach to derivatives, various exercises will be discussed. MATLAB tools will be used for the computational work.</p>

- Option markets and contracts: basic definitions and illustrations of option contracts, types of options (financial options, options on futures, commodity options, other types of options)
- Discrete time option pricing: the Binomial Model
- Stochastic calculus (Itô integral, martingales, Itô formula)
- Stochastic Differential Equations (Geometric Brownian Motion, the Kolmogorov equations (backward and forward))
- Continuous time option pricing: the Black-Scholes-Merton formula, Inputs to the Black-Scholes-Merton model, the critical role of volatility (historic and implied volatility)
- Risk management application of option strategies
- Option strategies for equity portfolios: standard long and short positions, risk management strategies with options and the underlying, money spreads, combinations of calls and puts
- Interest rate option strategies
- Option portfolio risk management strategies: Delta hedging an option over time, Gamma and the risk of Delta, Vega and volatility risk
- Some aspects of derivative pricing in incomplete markets
- Forward markets: types of forwards contracts, pricing and valuation
- Futures markets: types of futures contracts, pricing and valuation
- Swap markets: types of swaps, pricing and valuation
- Bond and interest rates
- Short rate models; martingale models for the short rate, forward rate models

Theoretical lectures and laboratory with MATLAB, Seminars, Mid-term assessment

T. Bjork, Arbitrage Theory in Continuous Time, 3rd ed., Oxford University Press, 2009

Don M. Chance, Analysis of Derivatives for the CFA® Program, AIMR, United Book Press Inc., 2003

Written exam.

The course material as well as further information are available at
<http://elearning1.unipv.it/economia/>

