UNIVERSITÀ DI PAVIA

Anno Accademico 2020/2021

QUANTITATIVE FINANCE

Anno immatricolazione	2020/2021
Anno offerta	2020/2021
Normativa	DM270
SSD	SECS-S/06 (METODI MATEMATICI DELL'ECONOMIA E DELLE SCIENZE ATTUARIALI E FINANZIARIE)
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 (22/02/2021 - 22/05/2021)
Crediti	6
Ore	44 ore di attività frontale
Lingua insegnamento	English
Tipo esame	SCRITTO
Docente	DE GIULI MARIA ELENA (titolare) - 3 CFU AHELEGBEY DANIEL FELIX - 3 CFU
Prerequisiti	Knowledge of the key concepts of Linear Algebra, Statistics, Probability and Stochastic Processes will be helpful
Obiettivi formativi	This is a course in the applied aspects of mathematical finance, in particular derivative pricing. The theory of stochastic differential equations 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 rates) as well as to dividend paying assets. Interest rate theory constitues a substantial part of the course. Following a practical risk management approach to derivatives, various exercises will be discussed. MATLAB tools will be used for the computational analysis.

	It is expected the learning of the fundamental elements of quantitative finance to understand how financial markets work and how complex financial instruments can be assessed. At the end of the course, students will be able to handle the main techniques employed to price derivatives and a vast array of other financial contracts, evaluating the accuracy of the results economically and/or in business settings.
Programma e contenuti	- 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, 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) - 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: the Greeks, Delta and Gamma hedging - 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 - Bonds and interest rates - Short rate models; martingale models for the short rate, forward rate models
Metodi didattici	Lectures
Testi di riferimento	- T. Bjork, Arbitrage Theory in Continuous Time, 3rd edition., Oxford University Press, 2009 - P. Brandimarte Numerical methods in finance and economics: a MATLAB-based introduction 2nd edition, John Wiley & Sons, NY, 2006
Modalità verifica apprendimento	Written and oral exam
Altre informazioni	Additional material and information are available on e-learning platform
Obiettivi Agenda 2030 per lo sviluppo sostenibile	$lbl_legenda_sviluppo_sostenibile