



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Interest Rate Derivatives

2122-2-F1601M064-F1601M075M

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#### Learning objectives

The course has a practitioner approach, presenting the current market best practices, often not yet documented in textbooks. Lecturers from the street are invited: traders, risk-managers, quants, consultants. The course aims to provide the students with the knowledge usually tested when applying for investment banks in the interest rate derivatives area.

#### Contents

The course is about the valuation of derivative products (linear, plain vanillas, and exotics) and presents the main Interest Rate and Credit models, with special emphasis on rate/credit curve construction and collateralization issues.

- FRA, Futures, and Swaps
- Rate curve bootstrapping in multi-curve regimes
- Black Model and its shifted log-normal variants
- Interest rate volatility: par, forward, no-arbitrage, and SABR model
- Term structure models: equilibrium, no-arbitrage, short rate, and market models
- Caps and Floors, Swaptions, and Bermudan Swaptions
- Credit Default Swaps
- Credit curve bootstrap
- Counterparty risk: clearing, collateralization, and XVA valuation adjustments
- Market risk management: greeks and static replica of structured products

## Detailed program

- Interest Rate Basics
- Rate Curves Calibration
- Black Model
- Volatility
- Caps and Floors
- Swaptions
- Structured Products
- Greeks and Hedging
- Interest Rate Models
- Bermudan Swaption
- Credit Derivatives
- Counterparty Risk, Collateral Protection and Central Clearing
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- Credit Curve Bootstrapping
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- The Reform of Benchmark Interest Rate Indexes and Its Impact on Derivative Pricing

## Prerequisites

Derivatives, stochastic processes, risk measures

## Teaching methods

- Slide based lessons
- QuantLibXL (<https://www.quantlib.org/quantlibxl/>) programming assignments using Excel.

## Assessment methods

Students attending the lessons are asked \_\_\_\_\_

Assignments can be tackled cooperatively by team of students, \_\_\_\_\_

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## Textbooks and Reading Materials

- John Hull, Options, Futures and Other Derivatives, 10th edition
- Paul Wilmott, on Quantitative Finance

## **Semester**

First semester, October-January

## **Teaching language**

English didactical material, Italian lessons.

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