# Models for Financial Markets (Derivatives instruments)

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***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

This course intends to supply the necessary background for an efficient management in derivative instruments positions, starting from the underlying ideas to the most popular pricing models and risk management. In a first institutional part markets and specific derivative contracts are discussed. In the following, principal pricing models are presented, together with a risk analysis with respect to changes in the underlying variables (greek analysis).

At the end of the course, students:

* Will have the necessary knowledge to understand and analyse the basic models of quantitative finance
* Will be able to apply those models to solve pricing problems and to manage tipical financial market risks
* Will be able to analyse even new situations, understanding the framework and identifying the best approach to manage them
* Will be able to clearly communicate their choices to other, being able to fully support them
* Will acquire, through the study of basic models, a method allowing them to extend in autonomy their knowledge deepening more specific subjects

***COURSE CONTENT***

* Zero coupon bonds and coupon bonds.
* Term structure of interest rates, spot and forward rates. Duration, convexity and immunization.
* Forward and Futures contracts
* Forward rate agreements (FRAs) and their pricing. Interest rate Swaps: use and pricing.
* Options: introduction, elementary strategies, binomial pricing model with implications.
* Introduction to stochastic processes.
* Black-Scholes model with implication.
* Greeks and complex positions risk management.

***READING LIST***

J. Hull, *Opzioni,futures e altri derivati*, Pearson Education Prentice Hall, 9ª ed. (during the course the details of chapters covered will be available on Blackboard).

Notes, exercise sets and additional materials are available on *Blackboard*.

***TEACHING METHOD***

Lectures, tutoring hours.

***ASSESSMENT METHOD AND CRITERIA***

The final exam is composed of open questions, including theory and practical applications, possibly in subitems. Each question/subitem is assigned a score (clearly indicated in the text of the exam), maximum in case of correct answer. The maximum total score is 32/30. The scores 31 and 32 correspond to the honors. The score attributed to each subitem depend on the complexity of the question.

In particular, an open question allows to check not only the correct answer but also to evaluate how the final answer is reached and the related comments added by the student.

The theoretical questions are conceived to test knowledge and, the harder ones, to test the competence in model development and critical thinking, the impact of underlying hypotheses, the comparison among alternative models.

The practical applications, from the simpler to the harder, check the capacity to apply the basic principles. Harder exercises require an analysis of the best model to choose.

The exam can also be taken through two partial tests: first partial test during the class period and second partial test at the end. The two partial exams have the same weight in the final evaluation.

For more details, please refer to information available on Blackboard.

***NOTES AND PREREQUISITES***

The knowledge of the concepts given in the course of Mathematics and Financial Mathematics is required.

In case the current Covid-19 health emergency does not allow frontal teaching, remote teaching will be carried out following procedures that will be promptly notified to students.