**Quantitative Methods for Corporate Decisions**

## Prof. Guido Ceccarossi; Prof. Silvana Stefani

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

The course provides students with useful quantitative tools for managing financial business problems, project optimisation and project management. The course will cover the main models for financial decisions and, more generally, optimal choices, focusing on the methods underlying. This approach allows students to deal with most choice-based problems, even seemingly new ones, relying on their knowledge of the basic models and their ability to extend or adapt these MODELS independently.

At the end of the course, students will be able to:

* be exposed to the main quantitative models for business decisions;
* apply the above models to new situations;
* analyse independently business management problems and choose the best approach to solve them;
* communicate and explain strengths and weaknesses of the models presented, motivating the choices that may lead to the optimal strategy in a given context;
* extend their knowledge and competence in the field, having acquired a learning method that allows them to proceed independently.

***COURSE CONTENT***

*Prof. Guido Ceccarossi.*

Forward transactions and arbitrage, interest rate maturity structure (spot rates and forward rates). The main derivatives on interest rates: forward rate agreement and swap. Duration and convexity with related properties. Rate risk and its management from both a hedging and a speculative perspective. Financial choices: a critical approach to the most common choice criteria, examining their merits, defects, implications, and extensions.

*Prof. Silvana Stefani*

Introduction to decision-making problems and mathematical modelling. Linear Programming: resolution methods and applications to business management and environmental problems. Project planning and management. Reticular and PERT techniques.

***READING LIST***

L. Bellenzier-R. Grassi-S. Stefani-A. Torriero, Metodi quantitativi per il management, Esculapio Editore, Bologna, 2012.

Lecturer's notes available on the Blackboard platform.

Detailed syllabus and further study material will be available online on the dedicated Blackboard platform.

***TEACHING METHOD***

This blended course includes face-to-face activities (50%) and distance activities (50%). The face-to-face activities are based on interactive lectures to introduce and discuss topics, illustrate theoretical foundations, and give the methods for approaching problems and possible case analyses. Distance activities involve the use of video-lectures (asynchronous) and the discussion of exercises via webinars and live feedbacks (synchronous). The syllabus containing the course's analytical programme will be communicated on Blackboard.

***ASSESSMENT METHOD AND CRITERIA***

*Ongoing assessment*

For students choosing the ongoing assessment: 50% of the assessment will be based on two equally weighted tests (a test in class and group ~~tasks~~ ASSIGNMENTS) published in the Blackboard area reserved for students enrolled in the course; 50% of the assessment will be based on a final written test. The final test may only be taken after a positive assessment of the tests assigned during the course. In order to pass the exam, the final test (to be taken on just one of the 3 exam dates following the end of the course) must be passed.

*Single summative assessment*

Students choosing a single assessment during the exam session ~~they~~ will take a written exam covering all course topics.

All written exams are 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.

***NOTES AND PREREQUISITES***

A good knowledge of the basic principles of Financial Mathematics is required.

For example, the following textbook is suggested.

S. Stefani - A. Torriero - G.M. Zambruno, *Elementi di Matematica Finanziaria e cenni di Programmazione Lineare,* Giappichelli, Turin, 2017 (5th ed.).

*Office hours*

Instructors receive by appointment to be fixed sending a request by e-mail. In presence they receive in their office located in Via Necchi 9, second floor, alternatively on-line via TEAMS.