COURSE SYLLABUS

Financial Mathematics - 1 (Gruppo A-Lh)

1920-2-E1802M118-E1802M021M-T1

Learning objectives

The course aims to clarify and discuss the basic concepts of classical Financial Mathematics and their applications to financial calculus, as well as to problems of choice based on cash flows.

Through the study of bonds and their valuation we try to deepen the fundamental issues that allow us to approach the analysis of financial markets.

Contents

The course presents the basic principles of traditional financial mathematics (also known as "Theory of Credit"), both from a theoretical point of view and from an applicative point of view. The topics will be proposed following a fundamentally deductive approach of the discipline, understood as a logical continuation of the application of the notions learned in the courses of General Mathematics. The following arguments will then be presented: Laws of capitalization, Annuities, Constitution of a capital, Repayment of a loan, Financial transactions, Bonds.

Detailed program

Capitalization Laws Financial transactions. Amounts, interest, discount. Capitalization laws and discounting laws. Interest rates and discount rates. Equivalent rates. Force of interest. Decomposability.
Annuities and their classification. Value of an annuity in an instant t. Calculation of present and future values, characteristic quantities of particular types of annuities. Maturity, arithmetic average maturity, Duration.

Accrued capital. Repayment of a loan. Depreciation.

Financial operations in general: investments / financing, narrowly, side, general, pure. Selection criteria for financial

operations: Internal Rate of Return, Discounted Cash Flow, pay-back period.

Bonds and their valuation: characteristics of a bond and profitability indicators. Term structure, spot rates, forward rates. Duration.

Prerequisites

Prerequisites are considered indispensable knowledge and mastery of the typical topics of the Precorsi di Matematica and the course of General Mathematics I. It is required by the study plan the preparatory exam of General Mathematics I. The attendance of the course requires also some basic computer skills, particularly in this year of health emergency: use of communication systems, scanning of documents, web browsing, downloading and uploading of documents, participation in synchronous in-depth meetings programmed through Webex, participation in online exams through the platform https://esamionline.elearning.unimib.it (in order to proceed with the written exam remotely it is necessary to read the 'HONOR CODE and accept the conditions).
Student who do not intend to subscribe to the 'HONOR CODE, can write to their teacher to agree on an alternative exam methodology.

Teaching methods

In the Covid-19 emergency period lessons will take place remotely in asynchronous mode; Subsequently will be proposed a study path on the topic to be carried out online using the various media that will be made available (commented slides, tasks, self-evaluation quizzes, synchronous and asynchronous forums, scheduled reception on Webex).

The study of each topic will end with a tutorial programmed remotely on Webex and advertised on the e-learning website.

Assessment methods

In the emergency period Covid-19 exams will be only remotely managed. They will be carried out using the available platforms and on the e-learning page of the course there will be a public link for access to the exam itself. The exams, after the health emergency, will be delivered in ways that will be, subsequently, advertised on the e-learning website dedicated to teaching.

Emergency Covid-19
- **Two Partial Tests** (each test will consist of 16 multiple choice questions) to be performed synchronously through the platform https://esamionline.elearning.unimib.it (in order to be able to proceed with the remote written examination it is necessary to read the 'HONOR CODE and accept the conditions). Students who, in the two partial tests, reach an evaluation greater than or equal to 15/30, will be allowed to answer (always synchronously to an open question, also delivered on https://esamionline.elearning.unimib.it). This final part of the examination must be completed by February 2021.
There are no other arrangements for partial tests.
Students who want to "improve" the grade obtained with the written tests, can ask to take an oral test, which will take place in synchrony through scheduled appointments, using the Webex platform and advertised on the site dedicated to the course.

- **Single test** online (the test will consist of 16 multiple choice questions) synchronously through the platform https://esamionline.elearning.unimib.it (in order to be able to proceed with the remote written examination it is

necessary to read the 'HONOR CODE and accept the conditions). If the student achieves a result greater than or equal to 18, he is allowed to answer an open question, also delivered on https://esamionline.elearning.unimib.it. This final part of the exam is to be supported together with the conduct of multiple choice questions.
Also in this case, the oral exam will take place synchronously through scheduled appointments (using the Webex platform and advertised on the website dedicated to the course).

Textbooks and Reading Materials

S. Stefani, A. Torriero, G.M. Zambruno - "Elementi di Matematica finanziaria e cenni di programmazione lineare" Giappichelli, 5^a ed., 2017

Semester

Fall semester: October 1st, 2020 - January 15th, 2021

Teaching language

Italian