UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Mathematical Methods - 1

2223-2-E3301M131-T1

Learning objectives

Aim of this course is to provide financial and mathematical tools useful to applications in economic field. Students should be able to define and then solve the proposed mathematical models.

Contents

Numeric and power series. Riemann integration theory. Linear algebra. Linear Programming. Financial Mathematics.

Detailed program

Numeric series: character and sum of a series; series of nonnegative terms; convergence tests; alternating series; absolute and non-absolute convergence. Power series: Taylor / Mac Laurin power series expansions.

Integration theory: Riemann integral; indefinite integral, primitives; fundamental theorem of calculus; integration methods; generalized integral. Linear algebra: Euclidean vector spaces; matrices and operations; determinant; inverse matrix; range; simultaneous linear equations; Cramer rule; Rouché/Capelli theorem; solving simultaneous linear equations; applications to economics.

Linear Programming: definition; duality theory.

Financial Mathematics: Principles of financial calculus. Simple and compound interest, trade discount. Present and future values. Annuities and perpetuities. Amortization plans. Financial flows analysis: DCF. Investment appraisal. Bond pricing. Yields. Duration. Term structure of interest rates. Forward rates.

Prerequisites

Basic maths (Calculus)

Teaching methods

Lessons in presence. Anyway, the teaching method will be modified in progress, according to the guidelines of the University, if the epidemiological conditions will require it. The teaching methods will be consistent with the University guidelines, for the lessons in the classrooms well as the tutoring in preparation for the exam.

Assessment methods

Written exam separated into two parts. In each appeal, one or both parts of the exam can be taken. To be considered passed, both parts of the written must be passed during the same academic year. The two parts can be taken in any order.

Part of Mathematics: open questions of theory and exercises, for the purpose of extensively assessing the learning of all topics that are part of the exam program

Part of Financial Mathematics: Closed questions, for the purpose of extensively assessing the learning of all topics that are part of the exam program.

The written test assesses the formal correctness of the passages, the adequacy of the mathematical language adopted, and the skills and knowledge acquired during the course.

Textbooks and Reading Materials

Scovenna Marina, Scaglianti Luciano, Torriero Anna, Manuale di Matematica - Metodi e applicazioni, Editore: Cedam, 2010

S. Stefani, A. Torriero, G. Zambruno, Elementi di matematica finanziaria e cenni di programmazione lineare, Giappichelli Editore, V

Semester

First Term

Teaching language

Italian

Sustainable Development Goals