UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Basic Calculus - 2

2223-1-E1801M047-T2

Learning objectives

The course aims at providing a set of analytical methods to deal with economic and social phenomena.

Students will be provided with tools useful to analyze simple mathematical models in economics.

Contents

Real functions of real variables.

Detailed program

Introduction to functions.

Functions of one variable. Domain, image, graph. Elementary functions. Monotonicity, maxima and minima. Inverse function.

Limits and related theorems.

Continuous functions: Weierstrass, Bolzano and Darboux theorems. Discontinuity points.

Indeterminate forms in the computation of limits. Landau symbols.

Differential calculus: definition of the derivative and geometric interpretation. Points of non-differentiability. Relationship between continuity and differentiability. Rolle, Lagrange and Fermat theorems.

L’Hospital rule. Taylor’s formula and its applications.

Convexity and concavity of a function: definition and characterization based on the second order derivative.

An introduction to sequences.

Functions of two variables: domain, level curves, partial derivatives, stationary points and optimization.

Prerequisites

Algebra and analytic geometry at an elementary level.

Teaching methods

Class lectures.

In case the COVID-19 pandemic situation worsens, the lectures will be delivered according to the rules recommended by the University.

Assessment methods

Written exam, consisting of practical exercises and of open theoretical questions.

Optional oral exam, possible only if the grade of the written exam is at least 18/30.

There will be a midterm written exam.

In grading the written exams, in addition to the correctness of the results, the ability in explaining the various steps will be considered as well.

The oral exam starts with a discussion of the written exam, followed by some questions regarding the topics of the course.

In case the COVID-19 pandemic situation worsens, the exams will be organized according to the rules recommended by the University.

Textbooks and Reading Materials

- Guerraggio, A. , "Matematica" , Pearson, 2014.

- Brega F., G. Messineo, "Esercizi di Matematica Generale: Funzioni, Limiti , Continuità", Giappichelli Editore, 2013.

- Brega F., G. Messineo, "Esercizi di Matematica Generale: Calcolo Differenziale in R. Studio di Funzione", Giappichelli Editore, 2013.

- Brega F., G. Messineo, "Esercizi di Matematica Generale: Ottimizzazione in R2 ", Giappichelli Editore, 2013.

Semester

First semester.

Teaching language

Italian.

Sustainable Development Goals