UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Basic Calculus

2021-1-E3101Q100

Aims

In line with the educational objectives of the Degree in Computer Science, the course aims at providing the *knowledge* about the fundamental concepts and statements about limits, and differential and integral calculus for functions of one variable, together with some elementary basic logic. It will also build the *skills* needed to understand and use the most important arguments and techniques in the theory and the *ability* to solve exercises and deal with problems exploiting them.

Contents

Real numbers. Sequences and infinite series. Differential and integral calculus in one variable.

Detailed program

1 Real numbers; least upper bound and greatest lower bound; inequalities.

2 Sequences and their limits. Existence of the limit of a monotonic sequence

3 Infinite series

4 Functions: injective, bijective, invertible. Elementary graphs. Inverse functions.

5 Limits of functions of one real variable. Asymptotes

6 The derivative and its geometric meaning. Theorems on differentiable functions (Fermat, Rolle, Lagrange)

7 L’Hôpital’s theorem and Taylor’s Formula. Convex functions.

8 Riemann integral. The fundamental theorem of calculus; calculation of some antiderivatives.

Prerequisites

Elementary algebra: symbolic algebra, equations and inequations of first and second degree; elementary trigonometry; logarithms and exponentials.

Teaching form

Lectures on the blackboard. The course is taught in Italian.

The attendance of the lessons in classroom will be subject to the instructions of the health authorities and the possibility of carrying them out under suitable safety conditions for all participants.

Textbook and teaching resource

G. Anichini, G. Conti. Analisi Matematica 1, Pearson.

Semester

First semester

Assessment method

Examination type: written examination (oral examination optional)

Written part: maximum mark 30/30. The written part is divided in two:

first part: 8 multiple choice questions (simple theoretical and practical exercises). Each answer: 1.5 points, if correct, -0.5 points, if wrong, 0 points, if not given.

scond part: exercises, together with a theoretical question (the student is asked to provide, for instance, definitions, statements of theorems, examples).

If the total score of the first part is less than 7, the second part is not corrected and the student must repeat the written part of the exam.

The final mark of the written part is obtained by adding the mark of the first and the second part.

If the mark of the written part is more than, or equal to 18, the student can conclude the exam with the mark of the written part, without undergoing an oral exam, or, else, undergo an oral examination.

There will be a written test '*in itinere'* restricted to first year students. *This 'in itinere' test will take place only in case the students can do it in the classroom.*

Oral part: If the mark of the written part is more than, or equal to 18, the student may as well decide to undergo the oral exam (this choice must be communicated in due time).

The final mark can be greater, equal or lower than the mark of the written part.

*Due to the **Covid-19 emergency situation**, both written and oral tests could be done via Internet.*

Office hours

By appointment.

During the Covid-19 emergency period the student reception will be carried out using the WebEx platform.