



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Istituzioni e Didattica della Matematica con Laboratorio

2425-2-G8501R012

Course title

G8501R012 -- ISTITUZIONI E DIDATTICA DELLA MATEMATICA CON LABORATORIO

Topics and course structure

The aim of the course is to give students a good knowledge – through lectures, exercise sessions and laboratories – of the foundations of mathematics as it is taught in primary school or in the pre-mathematical activities of kindergarten, completing the necessary background in order to teach mathematics effectively and suggesting some ways through which the teaching can unfold. We will focus particularly on themes in geometry.

Topics will include:

- elements of euclidean geometry;
- measure and proportionality;
- elements of the geometry of transformations (in particular similarities and isometries);
- constructions on graph paper;
- introduction to Problem-Based Learning and Problem-Solving.

This list might be supplemented by the instructor with topics available in the reference texts.

Objectives

After completing the course the student should be able to

- understand basic concepts of arithmetic, algebra and geometry;
- demonstrate skill in mathematical reasoning and in explaining mathematical procedures and results;
- describe the role of problem-solving in mathematics teaching.

Methodologies

-Lectures 49 hours, Delivered Didactics (24 2-hours lectures and one 1-hour lecture, in presence).
 -Six exercise e-learning sessions of two hours in small groups in interactive teaching.

- Pedagogical-didactic laboratory in interactive teaching (the course includes a pedagogical-didactic laboratory with compulsory attendance in presence, 3 4-hours meetings).

Online and offline teaching materials

Reference books.

Online: interactive exercises on the wims platform and exercises for pen and paper resolution available on the e-learning page of the course
<http://elearning.unimib.it/>

Programme and references

Reference text:

- M. Cazzola, *Matematica per scienze della formazione primaria*, Carocci, 2017.
- Euclide, *Elements Book 1*

Teaching materials:

- AAVV, *Conorovesciato: un esperimento di didattica per problemi nella scuola primaria*, Materiale per i Quaderni a Quadretti, Mimesis, Milano, 2007.

Further readings:

- M. Dedò, *Galleria di metamorfosi*, Quaderni a Quadretti, Mimesis, 2010.
- M. Cazzola, *Per non perdere la bussola*, Quaderni a Quadretti, Decibel/Zanichelli, Bologna, 2001.
- Euclides, *Les éléments, Extraits des livres I, II et VI, Textes choisis, présentés et commentés par André Deledicq, Les éditions du KANGOUROU*, 2011 (or any other edition of Euclides' Elements).
- A. Millan Gasca, *All'inizio fu lo scriba*, Quaderni a Quadretti, Mimesis, Milano, 2004.
- V. Villani, *Cominciamo dal punto*, Pitagora, 2006.
- G. Polya, *La scoperta matematica*, vol 1 e 2, Feltrinelli, Milano.

Assessment methods

A preliminary computerized test (with open-ended questions and multiple-choice questions), a written test (with open-ended exercises). The written test is considered passed if a score of 18/30 or higher is achieved. For those who obtain a score between 18/30 and 21/30 (including the extrema), a mandatory oral exam is required. The oral exam is optional for those who obtain a score of 22/30 or higher in the written test. The oral exam must be taken in all cases where requested by the teacher or the student. The exam is intended to verify the knowledge and skills acquired, as described in the sections **Course Topics and Structure** and **Objectives**.

Office hours

By appointment, writing an email to the teacher.

Programme validity

two academic years

Course tutors and assistants

Sustainable Development Goals

QUALITY EDUCATION | REDUCED INEQUALITIES
