UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Didattica della Matematica con Laboratorio

2324-4-G8501R023

Course title

G8501R023 - Didattica della matematica con laboratorio

Topics and course structure

The course aims to complete the analysis of the Mathematical Knowledge for Teaching (MKT), i.e. the subject knowledge necessary for effective teaching of mathematics, and to show some ways in which the teaching can unfold (both early experiences in kindergarten and educational paths for primary school).

The official language of the course is Italian. Non-Italian native-speaking students can apply for a bibliography in English, but a minimum knowledge of Italian is required as lectures deal with examples in Italian from the Italian school reality.

Objectives

After completing the course the student should be able to

- understand basic concepts of arithmetic, algebra and geometry;
- describe the role of problem-solving in mathematics teaching;
- analyze the use of new technologies for communication and teaching of mathematics;
- analyze and design learning experiences from kindergarden to primary school, with special attention to the use of new technologies.

Methodologies

Lectures and laboratories.

Online and offline teaching materials

All information related to the course (lectures, extra readings, laboratory and exams) will be available exclusively on the website http://elearning.unimib.it/. Registering to such site is compulsory.

Programme and references

Starting from the elementary mathematical concepts already studied in the previous courses (relations, numbers, functions and correspondences, geometric transformations in the plane and in the 3D space, measure, elementary probability) we will discuss what it means to experience mathematics and how to lead pupils to do it.

We will also analyze the potential of new technologies to create meaningful experiences for children.

Reference texts

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

Teaching materials

- M. Cazzola, "*Promoting a practice of active student-centred instruction into the mathematics classroom: matematita's ``turnkey laboratory'' kits*", Quaderno del Dipartimento di Matematica e Applicazioni-Bicocca, Quaderno 11-2011 (available at)
- L. Chiesa, I. Bonaiti, S. Lanfranchi, *La formica e il miele. 60 giochi per insegnanti e ragazzi svegli*, Materiale per i Quaderni a Quadretti, Mimesis, Milano, 2005.
- L. Chiesa, I. Bonaiti, S. Lanfranchi, *La formica e il miele. 30 giochi per ragazze e ragazzi svegli*, Materiale per i Quaderni a Quadretti, Mimesis, Milano, 2005.
- P. Cereda, G. Dimitolo, *La ciurma del Pirata Newton. 30 giochi per ragazze e ragazzi svegli*, Materiale per i Quaderni a Quadretti, Mimesis, Milano, 2008.
- AAVV, *L'aritmetica del Pirata Newton: dalla parte degli insegnanti*, Materiale per i Quaderni a Quadretti, Mimesis, Milano, 2010.

Revision

- M. Cazzola, *Matematica per scienze della formazione primaria*, Carocci, 2017.
- A. Deledicq, F. Casiro, *Addomesticare l'infinito*, Edizioni Kangourou Italia, 2005.
- M. Dedò, *Galleria di metamorfosi*, Quaderni a Quadretti, Mimesis, 2010.

Further readings

- E. Castelnuovo, *Didattica della matematica*, UTET, 2017.
- V. Villani, *Cominciamo da Zero*, Pitagora, 2003.
- V. Villani, *Cominciamo dal punto*, Pitagora, 2006.
- G. Polya, La scoperta matematica, vol 1 e 2, Feltrinelli, Milano.

- E. Castelnovo, Pentole, ombre, formiche, UTET, 2017.

Assessment methods

The exam consists of a **written test** and an **oral test** to be taken both in the same exam session. There are no intermediate tests.

The **written test**, structured with open questions, consists in the guided analysis of a didactic activity. Knowledge of the mathematical topics covered by the activity under analysis and the ability to identify the connections between the significant aspects, from a mathematical point of view, of these topics and the possible teaching methods that can be used to design activities on such contents will be assessed.

The **oral test** includes a discussion of the written exam, the analysis of the laboratory experience and the discussion of a topic taught in kindergarten and primary school, from a transversal perspective. The ability to re-elaborate the topics under study and the laboratory experience will be assessed, as well as the ability to independently choose a mathematical theme being taught, analyze it from the content point of view and identify the most significant aspects that can form the basis for an effective teaching of mathematics.

The attribution of the final score is not summed up by the individual parts, but expresses an overall assessment of everything that contributes to the achievement of the training objectives described above.

Prerequisites: 17 credits of undergraduate mathematics ("Elements of mathematics", or equivalent).

Office hours

See https://www.unimib.it/marina-cazzola.

Programme validity

Standard

Course tutors and assistants

Sustainable Development Goals

QUALITY EDUCATION