UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Mathematics Teaching (with Workshop)

2021-4-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.

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 for attending students

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 http://www.matapp.unimib.it/~marina/ric/usr2009.pdf)
- 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.

Programme and references for non-attending students

Same as attending students.

Assessment methods

A written test, focusing on the analysis of a didactical unit, and an oral exam, both aimed at verifying the acquired knowledge and competences, as described under the “Topics and course structure” and “Objectives” sections.

During the COVID-19 emergency exams might be held remotely. Please refer to the forum "News" on elearning.unimib.it.

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

Office hours

See www.matapp.unimib.it/~marina.

Programme validity

Standard

Course tutors and assistants