**Elementary Mathematics (with Mathematics Teaching Workshop)**

## Prof. Laura Montagnoli

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course aims to provide students with the essential contents of arithmetic, statistics and probability, and to offer future teachers some teaching hints. Thanks to the knowledges and the skills acquired during the course, future teachers should be able to guide pre-school students towards a correct approach to maths concepts and effectively teach its rudiments in primary school.

At the end of the course, students will be able to:

1. Identify the founding concepts of the discipline and grasp its meaning and role in the teaching and learning process.

2. Present the concepts learned in clear, coherent and specific language.

3. Evaluate and identify effective teaching actions.

4. Critically analyse educational proposals to identify their strengths, weaknesses and errors.

5. Know the INVALSI national mathematics surveys and how to use them as a learning stimulus for future students.

6. Sapersi muovere nella progettazione di interventi didattici a cavallo tra matematica e coding.

***COURSE CONTENT***

Based on the National Curriculum for pre-school and primary level of education Indicators, lectures will focus on the following issues:

– axiomatic method;

– symbols and languages of mathematics;

– logic and set theory;

– relations;

– classifications;

– sets of natural numbers;

– operations with natural numbers: meanings, traditional and alternative algorithms;

– arithmetic expressions;

– mental calculation;

– set of whole numbers;

– set of positive rational numbers (and decimal numbers);

– basics of statistics and probability.

* coding in relazione all’apprendimento della matematica.

***READING LIST***

Reference texts are:

* National curriculum for pre-school and primary level of education, edited by MIUR, published in the special volume of the Annals of public education in 2012 (“La conoscenza del mondo”, pp. 28-29, for pre-school; “Matematica”, pp. 60-63, for primary school).

– F. Baresi-L. Montagnoli, *Istituzioni di Matematica*, Studium Edizioni, Roma, 2019.

* L. Montagnoli, *Matematica con Scratch. Apprendere con il coding*, Morcelliana, Brescia, in fase di pubblicazione.

We also suggest consulting the texts and guidelines for reading the INVALSI surveys, available on the website: www.invalsi.it and in the database www.gestinv.it. These materials will be discussed during lectures and will be included in the assessment, with reference to the student's critical ability to analyse the most frequent mistakes made by pupils.

***TEACHING METHOD***

The course will take place in the lecture room:

– frontal or open discussion lectures supported by the projection of slides, videos and also by the use of other applications;

– tests, quizzes and group practical classes.

***ASSESSMENT METHOD AND CRITERIA***

All the contents presented in class (all materials uploaded to the Blackboard platform) and all the topics proposed in the reading list will be covered in the assessment.

The enrolment in the exam is possible only if students obtain a pass mark in the workshop activity report.

Along with workshop sessions, the lecturer will introduce the assessment grid according to which workshop teachers assess the task.

The course exam consists of a test via the Blackboard platform. The test includes some (approximately 20) closed questions and other (approximately 2) open-ended questions. The exam covers all the contents of the entire course. Pass mark for the test is at least 18 points out of 30.

The test result is increased by 2 points if the workshop assessment is A and by 1 point if it is B.

***NOTES AND PREREQUISITES***

There are no prerequisites for attending the course since the proposed contents concern basic mathematics. However, a willingness to learn the mathematical language and study systematically is required. Attendance at lectures is strongly recommended as they provide both mediation of the contents and various educational considerations. Students are advised to focus more on understanding than on memorisation when studying.

Further information can be found on the lecturer's webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG, or on the Faculty notice board.