UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

ELEMENTS OF MATHEMATICS FOR TEACHING

Enrollment year	2019/2020
Academic year	2021/2022
Regulations	DM270
Academic discipline	MAT/04 (COMPLEMENTARY MATHEMATICS)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	BIOLOGICAL SCIENCES
Curriculum	PERCORSO COMUNE
Year of study	3°
Period	2nd semester (01/03/2022 - 14/06/2022)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	MAFFIA ANDREA (titolare) - 6 ECTS
Prerequisites	Mathematical knowledge and compentencies developed in the upper secondary schools
Learning outcomes	The course addresses mainly those students who intend to become mathematics teachers at the lower secondary school. It provides theoretically grounded elements for designing didactical activities in Arithmetic, Algebra, Probability, and Geometry, consistent with the national curricula, and for interpreting students' possible difficulties. To this end, it will be needed to revise and consolidate theoretical knowledge concerning the matematical contents at stake.
Course contents	We will discuss a selection of mathematical topics in Arithmetic, Algebra, Probability, and Geometry, consistent with the Italian national curricula both from the mathematical and from the didactical point of view. We will introduce and discuss specific theoretical notions helpful for

	designing and interpreting didactical activities: the idea of mathematical laboratory and the use of artefacts, elements of a socio-constructivist approach to teaching, the notion of didactical contract, the notion of figural concept, Van Hiele's theory of the levels of development geometrical thinking, the early algebra. As for mathematical topics, the course will deal with the following themes: Number systems; Representation of numbers; Divisibility; Algorithms; Standard operation algorithms; Functions and their representation; Fundamental entities and axioms of Plane and Space Geometry; Definitions and properties of the main geometrical figures; Introduction to classical probability.
Teaching methods	Lectures, interactive lessons and group discussions aimed at making possible errors and misunderstanding come to light, and experiencing innovative teaching modalities.
Reccomended or required readings	Didactical material will be made available online by the teacher. Material consists in texts elaborated starting from scientific journal articles and from the following bibliography: Villani, Cominciamo dal punto, Pitagora, 2006 Villani - Berni, Cominciamo dallo zero, Pitagora, 2014
Assessment methods	The achievement of the learning objectives will be ascertained through a written and an oral examination. The written examination will include mathematical tasks and open questions. The examinations will aim at assessing the level of knowledge of the contents of the course and the ability to autonomously re-elaborate these contents.
Further information	
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile