



FOUNDATIONS OF MATHEMATICS

Enrollment year	2016/2017
Academic year	2018/2019
Regulations	DM270
Academic discipline	MAT/04 (COMPLEMENTARY MATHEMATICS)
Department	DEPARTMENT OF MATHEMATICS "FELICE CASORATI"
Course	MATHEMATICS
Curriculum	PERCORSO COMUNE
Year of study	3°
Period	2nd semester (04/03/2019 - 14/06/2019)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	ANTONINI SAMUELE (titolare) - 6 ECTS
Prerequisites	Sequences, numerical series, limits, classical numerical sets
Learning outcomes	The course aims to offer an analysis on the mathematical method, on the classical and modern axiomatic systems, on the meta-theoretical issues arisen in the 20th century, and on the attempts to solve the problem of foundations of mathematics.
Course contents	<p>Axiomatic method: primitive notions and axioms. Meta-theoretical issues in modern axiomatic systems: consistency, independence, completeness.</p> <p>Peano Arithmetic: independence of axioms; definition by induction; addition, multiplication and order.</p> <p>Cantorian set theory: comparing of infinite sets, countable and uncountable sets. Cantor's Theorem.</p> <p>Paradoxes and crisis of foundations. Frege and the Russell's antinomy.</p> <p>Foundational programmes: logicism, intuitionism, formalism.</p>

	Zermelo-Fraenkel set theory. Construction of number sets: integer, rational, real numbers through Dedekind's cuts and through Cauchy's sequences.
Teaching methods	Lectures and discussions on the theoretical part and on the solution of problems and exercises.
Reccomended or required readings	<ul style="list-style-type: none"> - Borga, M., Palladino, D. oltre il mito della crisi: fondamenti e filosofia della matematica nel 20 secolo. Brescia, La scuola, 1997. - Fiori, C., Invernizzi, S. Numeri reali. Pitagora, 1999. - Teacher's notes
Assessment methods	Written and oral examination, with the goal of evaluate the knowledge of the topics presented during the course. The access at the oral examination is possible only after a positive evaluation of the written examination.
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Sustainable development goals - Agenda 2030	Sfidi legati allo sviluppo sostenibile