

COURSE OF STUDY: Primary teacher education
ACADEMIC YEAR: 2023-2024
ACADEMIC SUBJECT: Mathematics Education

General information	
Year of the course	<i>IV year</i>
Academic calendar (starting and ending date)	<i>Second semester</i>
Credits (CFU/ETCS):	<i>8 (6+2)</i>
SSD	<i>MAT 04 – Matematiche Complementari</i>
Language	<i>Italian</i>
Mode of attendance	Not mandatory, mandatory only for the laboratory's CFU

Professor/ Lecturer	
Name and Surname	Antonella Montone
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Telephone	/
Department and address	Dipartimento di For.Psi.Com UNIBA, room 204 second floor
Virtual room	TEAMS:
Office Hours (and modalities: e.g., by appointment, on line, etc.)	Thursday 15:00-16:00 (The teacher also receives on other days by agreeing the appointment via email)

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
180	45	20	115
CFU/ETCS			
6+2	8 (6+2)		

Learning Objectives
<p><i>Knowledge and understanding: possession and critical knowledge of the methodologies, theoretical foundations and languages of mathematics. Applied knowledge and understanding: designing learning paths in mathematics; know methodologies suitable for teaching-learning paths of Mathematics; read interpret and analyze articles of dissemination and research in mathematics education, demonstrating to be able to grasp, evaluate and use the results of empirical studies in order to build knowledge and improve interventions; work in groups for the design, organization and verification of educational-didactic interventions. Making judgments: recognizing correct arguments, procedures and demonstrations and identifying incorrect or incomplete reasoning, possibly correcting or completing them; interpret popular articles of competence and possibly translate and comment on mathematical texts from other languages; have experience of teamwork and also know how to work independently; be able to work with wide autonomy, also assuming scientific and organizational responsibilities.</i></p>

Course prerequisites	
Teaching strategie	<ul style="list-style-type: none"> - Lectures - Laboratorial activities - Group working - Collective discussions
Expected learning outcomes in terms of	
Knowledge and understanding on:	Dublin Descriptor 1: Possession and critical knowledge of the methodologies, theoretical foundations and languages of mathematics.-
Applying knowledge and understanding on:	Dublin Descriptor 2: Designing learning paths in mathematics. Know methodologies suitable for teaching-learning paths of Mathematics Read, interpret and analyze popular articles and research in mathematics education, demonstrating to be able to grasp, evaluate and use the results of empirical studies in order to build knowledge and improve interventions. Work in groups for the design, organization and verification of educational-didactic interventions.-
Soft skills	<p style="text-align: center;"><i>Making judgements</i></p> <p>Recognize correct arguments, procedures and proofs and identify incorrect or incomplete reasoning, possibly correcting or completing them; interpret popular articles of competence and possibly translate and comment on mathematical texts from other languages; have experience of teamwork and also know how to work independently; be able to work with wide autonomy, also assuming scientific and organizational responsibilities.</p> <p><i>Especially:</i></p> <ul style="list-style-type: none"> - analyze student processes during mathematical activities by analyzing movies or protocols - draw up reports of educational activities using materials in Italian and English - work autonomously and in groups in presence and remotely via synchronous and asynchronous platform - produce textual or multimedia teaching objects autonomously <p style="text-align: center;"><i>Communication skills</i></p> <p>Communicate and argue with clarity and relevance mathematical concepts, with formulations appropriate to the public to which they are addressed. Be able to deduce conclusions accurately in both written and oral form.</p> <p style="text-align: center;"><i>Ability to learn autonomously</i></p> <p>Acquire a flexible mindset and be able to fit promptly into the workplace, easily adapting to new issues and quickly acquiring the necessary specific skills.</p>
Syllabus	<p>The contributions of pedagogy on the evolution of the Didactics of Mathematics as a science.</p> <p>The fundamentals of constructivism.</p> <p>Teaching-learning models and their influence on the specific didactics of the discipline.</p> <p>Learning difficulties in Mathematics: analysis of affective and metacognitive aspects.</p> <p>The theory of conceptual fields.</p> <p>The theory of situations (according to Brousseau).</p> <p>The didactic transposition according to Chevallard.</p> <p>The student/teacher interaction: the didactic contract.</p> <p>Student/knowledge interaction: obstacles and errors.</p>

	<p><i>Cooperative Learning and Peer Tutoring. The Transalpine Mathematical Rally as a research tool in Teaching.</i></p> <p><i>The theory of semiotic mediation. Use of digital artifacts and manipulative artifacts to mediate the construction of mathematical meanings. Didactic design of an intervention in the classroom with the use of artifacts.</i></p> <p><i>Analysis of dynamic geometry software: potential of the digital tool for argumentation and demonstration.</i></p> <p><i>Problem teaching: problem posing and problem solving as a teaching strategy for overcoming and preventing difficulties; problem-solving activities; stereotypes of the standard school problem; the concrete/abstract contrast; the "good" problems and the level of formulation.</i></p> <p><i>The evaluation of mathematical learning.</i></p> <p><i>Communication in mathematics: characteristic aspects of mathematical discourse.</i></p>
Content knowledge	<ul style="list-style-type: none"> - Baccaglini Frank et al, <i>Didattica della Matematica</i>, Mondadori Università - M.G. Bartolini Bussi, <i>i numeri e lo spazio</i>, Edizioni Junior. - <i>Tecnologia per l'educazione</i>. A cura di P.C. Rivoltella, P.G. Rossi. Pearson - Zan, R. (2007). <i>Difficoltà in matematica. Osservare, interpretare, intervenire</i>. Springer Verlag. - Zan, R. (2016). <i>I problemi di matematica. Difficoltà di comprensione e formulazione del testo</i>. Carocci Faber. - V. Villani, <i>Cominciamo da Zero, Pitagora</i>, 2003. - V. Villani, <i>Cominciamo dal punto, Pitagora</i>, 2006.
Texts and readings	<p><i>The texts recommended in the bibliography are often the source used by the teacher to deepen the topics covered in class. Therefore the consultation is at the discretion of the student.</i></p>
Notes, additional materials	<p><i>Slides and materials by the teacher.</i></p>
Repository	<p><i>The contributions of pedagogy on the evolution of the Didactics of Mathematics as a science.</i></p> <p><i>The fundamentals of constructivism.</i></p> <p><i>Teaching-learning models and their influence on the specific didactics of the discipline.</i></p> <p><i>Learning difficulties in Mathematics: analysis of affective and metacognitive aspects.</i></p> <p><i>The theory of conceptual fields.</i></p> <p><i>The theory of situations (according to Brousseau).</i></p> <p><i>The didactic transposition according to Chevallard.</i></p> <p><i>The student/teacher interaction: the didactic contract.</i></p> <p><i>Student/knowledge interaction: obstacles and errors.</i></p> <p><i>Cooperative Learning and Peer Tutoring. The Transalpine Mathematical Rally as a research tool in Teaching.</i></p> <p><i>The theory of semiotic mediation. Use of digital artifacts and manipulative artifacts to mediate the construction of mathematical meanings. Didactic design of an intervention in the classroom with the use of artifacts.</i></p> <p><i>Analysis of dynamic geometry software: potential of the digital tool for argumentation and demonstration.</i></p> <p><i>Problem teaching: problem posing and problem solving as a teaching strategy for overcoming and preventing difficulties; problem-solving activities; stereotypes of the standard school problem; the concrete/abstract contrast; the "good" problems and the level of formulation.</i></p> <p><i>The evaluation of mathematical learning.</i></p> <p><i>Communication in mathematics: characteristic aspects of mathematical discourse.</i></p>

Assessment	
Assessment methods	<i>Evaluation of the proposed activities during the course and final oral exam</i>
Assessment criteria	<i>The learnings will be evaluated at various levels, through the final oral exam, and possibly exercises administered in itinere. The student will have to demonstrate mastery in the use of teaching methodologies and theories of mathematics teaching, the relationships between the different theories studied, communicate and argue clearly.</i>
Final exam and grading criteria	<i>Vote in thirtieths</i>
Further information	
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