

**COURSE OF STUDY**                      **TWO-YEAR MASTER OF SCIENCE PROGRAMME  
IN MATHEMATICS**

**ACADEMIC YEAR**                      **2023-2024**

**ACADEMIC SUBJECT**                **METHODOLOGY AND TECHNOLOGY FOR  
MATHEMATICS EDUCATION 2**

<b>General information</b>	
Term	Second semester (February 26, 2024 – May 31, 2024)
European Credit Transfer and Accumulation System credits (ECTS)	7
SSD	MAT/04 – Complementary Mathematics
Language	Italian
Mode of attendance	Not mandatory

<b>Lecturers</b>		
Name and surname	Eleonora Faggiano (instructor of record)	Roberto Capone
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Department and office	Department of Mathematics room 4 second floor	Department of Mathematics room 3 second floor
Virtual meeting room		
Web page	<a href="https://www.dm.uniba.it/it/members/faggiano">https://www.dm.uniba.it/it/members/faggiano</a>	<a href="https://www.dm.uniba.it/it/members/capone">https://www.dm.uniba.it/it/members/capone</a>
Office hours		

<b>Work schedule</b>				
	Total	Lectures	Hands-on learning	Self-study
<b>Hours</b>	175	56		119
<b>ECTS credits</b>	7	7		

<b>Learning objectives</b>	
	<p>The aim of the course is to provide advanced knowledge on Mathematics Education. It presents the purposes and the methods of research in Mathematics Education and, in particular, it provides knowledge of different theoretical frameworks and associated methodological approaches. Moreover, it focuses in particular on the study of the teaching-learning processes in technologically rich-environment. Finally, it aims to provide knowledge and understanding on how to design, develop and analyse effective mathematics teaching and learning activities at the high school level.</p>

<b>Course prerequisites</b>	
	Knowledge that is generally acquired in the courses of an L-35 class degree.

<b>Syllabus</b>	
Course contents	Main theoretical frameworks and methodologies developed within the research field on Mathematics Education: a critical analysis.

	<p>An insight on principles and methods to design teaching activities, and more in general math curricula, in agreement with the institutional aims at the high school level.</p> <p>Mathematical teaching-learning processes mediated by the use of technologies: analysis of potentialities and constraints.</p> <p>Design, development and analysis of teaching activities and learning processes in mathematics with a particular focus on the specific role of the teacher, on the cognitive, epistemological, linguistic and didactical issues.</p>
Reference books	<p>- European Traditions in Didactics of Mathematics. W. Blum, M. Artigue, M. A. Mariotti, R. Sträßler, M. Van den Heuvel-Panhuizen (Eds.) Springer Nature, 2019.</p> <p>- Dreyfus et al. (2018) Developing Research in Mathematics Education, Routledge</p> <p>- Noss &amp; Hoyles (1996). Windows on Mathematical Learning, Kluwer Academic Publisher</p>
Additional course materials	Indications relating to the reference texts will be provided during the course.
Repository	Any additional supporting materials will be provided during the course.

Expected learning outcomes	
Knowledge and understanding	<ul style="list-style-type: none"> <li>○ Acquiring advanced knowledge in Mathematics Education.</li> <li>○ Understanding the the aims and the methods of Mathematics Education as a research field.</li> <li>○ Acquiring elements of a critical view of mathematics teaching and learning processes.</li> </ul>
Applying knowledge and understanding	<ul style="list-style-type: none"> <li>○ Performing a critical vision of the contents.</li> <li>○ Reporting on specific subjects under study.</li> <li>○ Discussing point of views on applications of the course contents.</li> <li>○ Designing and analysing mathematics teaching and learning activities.</li> </ul>
Soft skills	<i>Making judgements:</i> Understanding the differences among the studied frameworks, methodologies and technologies and choosing the most appropriate in relation with the aims.
	<i>Communication skills:</i> Ability to present mathematics and mathematics education arguments and the conclusions from them with clarity and accuracy and in forms that are suitable for the audiences being addressed
	<i>Learning skills:</i> Ability to communicate about Mathematics and Mathematics Education at different levels and for different audiences

Teaching methods	
	The course will be delivered face to face. Group work will be organized in moments dedicated to the critical analysis of some. Journal papers and other videos of conferences will be analysed and discussed. Teaching activities and learning processes will be analysed through videos and other protocols.

Assessment	
Assessment methods	Learning assessment will take place by means of an oral interview
Evaluation criteria	<ul style="list-style-type: none"> <li>● <i>Knowledge and understanding:</i> <ul style="list-style-type: none"> <li>○ Knowledge of the contents and of the specialized vocabulary</li> <li>○ Critical reasoning skills on the course contents</li> </ul> </li> <li>● <i>Applying knowledge and understanding:</i> <ul style="list-style-type: none"> <li>○ Ability to correctly and adequately expose the topics to the addresses</li> <li>○ Ability to design teaching applications related to the course contents</li> </ul> </li> <li>● <i>Making judgements:</i></li> </ul>



	<ul style="list-style-type: none"><li>○ Ability to analyse the change in mathematical methodologies and tools over the course of history.</li><li>○ Ability to analyse didactic applications related to the course contents</li><li>● Communication skills<ul style="list-style-type: none"><li>○ Quality of exposure with respect to different types of addressees and in terms of competence in the use of the specialist vocabulary</li></ul></li><li>● <i>Learning skills:</i> Ability to independently identify which knowledge to deepen and to acquire for the management of a problem in the mathematical field, in the teaching of mathematics and also in other work areas</li></ul>
Grading policy	<p>The final mark will be awarded taking into account the assessment criteria at the end of the oral interview on the course content. The examination is passed if the final mark is greater than or equal to 18/30. The student must show mastery of language, methodological rigour and that he/she has acquired the fundamental notions and concepts of the course. Assessment is based on the achievement of the intended learning aims. To achieve a high grade the student must have developed autonomy of judgement and adequate argumentation and exposition skills.</p> <p>Honours may be awarded in the case of further study of some topics in the programme.</p>

<b>Further information</b>	