Academic subject: Methodological and Technological Tools for Mathematics Education

Degree Class: LM-40 Mathematics		**Degree Course:** Mathematics	**Academic Year:** 2018/2019
		Kind of class: Optional	**Year:** / **Period: 1**
			ECTS: 7 divided into **ECTS lessons: 52** **ECTS exe/lab/tutor: 8**

Time management, hours, in–class study hours, out–of–class study hours
lesson: 52 exe/lab/tutor: 8 in–class study: 60 out–of–class study: 115

Language: Italian	**Compulsory Attendance:** no		
Subject Teacher: Eleonora Faggiano	**Tel:** **e–mail:** eleonora.faggiano@uniba.it	**Office:** Department of Mathematics Room 25, Floor III	**Office days and hours:** Tuesday 10-12; By appointment in other days and times

Prerequisites: Students joining this course will normally have achieved a good level of performance in a bachelor course in mathematics. Moreover, together with the knowledge that usually are acquired during the degree courses of a L-35 class, they should have gained some basic knowledge concerning mathematics history and foundations.

Educational objectives:
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 and 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.

Expected learning outcomes (according to Dublin Descriptors)	**Knowledge and understanding:** Acquiring advanced knowledge in Mathematics Education. Understanding the the aims and the methods of Mathematics Education as a research field. Acquiring elements of a critical view of mathematics teaching and learning processes. **Applying knowledge and understanding:** Performing a critical vision of the contents. Reporting on specific subjects under study. Discussing point of views on applications of the course contents. Designing and analysing mathematics teaching and learning activities. **Making judgements:** Understanding the differences among the studied frameworks, methodologies and technologies and choosing the most appropriate in relation with the aims. **Communication:** 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. **Lifelong learning skills:** Ability to communicate about Mathematics and Mathematics Education at different levels and for different audiences.

Course program:
Main theoretical frameworks and methodologies developed within the research field on Mathematics Education: a critical analysis.
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.
Mathematical teaching and learning processes mediated by the use of technologies: analysis of potentialities and constraints.
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.

Teaching methods:
Lectures. Analysis and discussion of journal papers and other type of texts. Analysis of teaching activities and learning processes through videos and other protocols. Design and analysis of small research studies and teaching activities.

Auxiliary teaching:
Journal papers and other texts selected by the teacher

Assessment methods:
Evaluation of the group and individual activities performed durign the course and final oral examination.

Bibliography:
- Dreyfus et al. (2018) Developing Research in Mathematics Education, Routledge
- Baccaglini-Frank et al. (2018) Didattica della Matematica, Mondadori Università
- Noss & Hoyles (1996) Windows on Mathematical Learning, Kluwer Academic Publisher