

<b>Academic subject:</b> Elementary Mathematics from ad Advanced Point of View			
<b>Degree Class:</b> LM-40 Mathematics		<b>Degree Course:</b> Mathematics	
		<b>Academic Year:</b> 2017/2018	
		<b>Kind of class:</b> Optional	
		<b>Year:</b>	
		<b>Period: 1</b>	
		<b>ECTS: 7</b> divided into <b>ECTS lessons: 52</b> <b>ECTS</b> <b>exe/lab/tutor: 8</b>	
<b>Time management, hours, in-class study hours, out-of-class study hours</b> lesson: 52    exe/lab/tutor: 8    in-class study: 60    out-of-class study: 115			
<b>Language:</b> Italian		<b>Compulsory Attendance:</b> no	
<b>Subject Teacher:</b> Eleonora Faggiano		<b>Tel:</b> <b>e-mail:</b> eleonora.faggiano@uniba.it	
		<b>Office:</b> Department of Mathematics Room 27, Floor II	
		<b>Office days and hours:</b> Tuesday 10-12; By appointment in other days and times	
<b>Prerequisites:</b> Knowledge of classical Euclidean geometry and, knowledge that usually are acquired during the geometry degree courses of a L-35 class. In particular, the concepts of group of transformations and of vectorial space.			
<b>Educational objectives:</b> The aim of the course is to provide advanced knowledge on elementary geometry. It presents, Geometry as a formal system focusing, in particular, on the Choquet's and the Prodi's axiomatics and comparing them.			
<b>Expected learning outcomes (according to Dublin Descriptors)</b>		<p><b>Knowledge and understanding:</b> Acquiring advanced knowledge in Geometry. Understanding the notion of Geometry as a formal system. Acquiring elements of an historical view of Geometry and its teaching.</p> <p><b>Applying knowledge and understanding:</b> Performing a critical vision of the contents. Reporting on specific subjects under study. Discussing point of views on educational applications of the course contents.</p> <p><b>Making judgements:</b> Understanding the differences among the studied axiomatics and choosing the most appropriate in relation with the aims.</p> <p><b>Communication:</b> Ability to present mathematical arguments and the conclusions from them with clarity and accuracy and in forms that are suitable for the audiences being addressed.</p> <p><b>Lifelong learning skills:</b> Facility with abstraction including the logical development of formal theories and the relationships between them. Ability to communicate about Geometry at different levels and for different audiences.</p>	
<b>Course program</b> The role of Geometry in the teaching of Mathematics at school level. Euclidean Geometry and Hilbert's axiomatics for Geometry. The Klein's Erlangen Program. Choquet's axiomatics for Geometry: axioms of incidence, axioms of order; axioms of orthogonality and consequent properties; symmetries; the structure of real vector space for a line; isometry group and similarity group of a line; isometry group and translation group of a plane; similarity group of a plane; characterizations of angles and their relationship with isometries; congruence criteria for triangles; the structure of real vector space for a plane; homotheties; dilations; scalar product; structure of field for a plane; similarity criteria. Geometry axioms in the Prodi's project "Matematica come scoperta" and their comparison with Choquet's axioms.			
<b>Teaching methods:</b> Lectures, analysis and discussion of journal papers and other type of texts			
<b>Auxiliary teaching:</b> - Geometria elementare ed Algebra, photostat notes by I. Candela - L'assiomatica della Geometria del Progetto Prodi, notes by A. Pesci - Journal papers and other texts selected by the teacher			

**Assessment methods:**

Evaluation of the group and individual activities performed during the course and final oral examination.

**Bibliography:**

- Choquet, G., L'insegnamento della geometria, Ed. FELTRINELLI
- Linati, P., L'algoritmo delle occasioni perdute, Ed. Erickson, Trento
- Villani, V., Cominciamo dal punto, Pitagora Editrice, Bologna
- Agazzi E., Palladino, D., Le geometrie non euclidee e i fondamenti della geometria, ed. La Scuola 1998.