

Academic subject: ELEMENTS OF ADVANCED GEOMETRY n.1			
Degree Class: L-35-Scienze Matematiche		Degree Course: Mathematics	
		Academic Year: 2020/21	
		Kind of class: mandatory	
		Year: 3	
		ECTS: 7 divided into ECTS lessons: 6 ECTS exe/lab/tutor: 1	
Time management, hours, in-class study hours, out-of-class study hours lesson: 48 exe/lab/tutor: 24 in-class study: 72 out-of-class study: 103			
Language: Italian		Compulsory Attendance: no	
Subject Teacher: Verroca Francesca		Tel: 085442694 e-mail: francesca.verroca@uniba.it	
		Office: Department of Mathematics Room 19, Floor III	
		Office days and hours: Wednesday 11-13, other days by appointment.	
Prerequisites: Basic knowledge of abstract algebra, linear algebra and topology. Differential calculus			
Educational objectives: Knowledge of the basic notions of Differential Geometry. This is fundamental by the cultural point of view of a mathematical student, especially if he wants to deepen the studies.			
Expected learning outcomes (according to Dublin Descriptors)		<p>Knowledge and understanding: Knowledge the basic geometrical objects for the Differential Geometry and acquisition of the most important results</p> <p>Applying knowledge and understanding: Acquisition of the basic proof techniques for the Differential Geometry</p> <p>Making judgements: Ability to prove autonomously some small theorems and to control the consistency of the mathematical arguments</p> <p>Communication: Students should improve the mathematical language and should learn to read books regarding Differential Geometry</p> <p>Lifelong learning skills: Improve learning methods through the practice of solving problems</p>	
Course program Differentiable manifolds Local charts. Atlas of a manifold. Submanifolds and properties. Product manifold. Differential maps and properties. Tangent and cotangent space. Differential of a function. Tensor Algebra of a vector space. Basic definitions. Contraction. Simmetrizzazione and alternation. The Grassmann algebra. Tensor algebra on a differential manifold. Curves on on a differential manifold. Tensor fields. Tensor product. Differential vector fields and derivations. Differential forms and external product. The Grassmann Algebra on a manifold. Transformation groups. Integral curves and complete vector fields. Lie groups. Left invariant vector fields and their Lie Algebra. Adjoint representation. Fibre Bundle. The principal fibre bundle.			

Teaching methods:

Lectures and exercise sections

Auxiliary teaching:**Assessment methods:**

Oral exam

Bibliography:

Marco Abate - Francesca Tovena

Geometria Differenziale

Springer-Verlag Italia 2011