UCLouvain

lmat1241

2023

Geometry II

6.00 credits	45.0 h + 30.0 h	Q2

Teacher(s)	Bieliavsky Pierre ;
Language :	French > English-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	Prerequisites: LMAT1141 ' Geometry 1, LMAT1122 ' Mathematical Analysis 2, LMAT1131 ' Linear Algebra (or equivalent courses). The prerequisite(s) for this Teaching Unit (TU) are specified at the end of this sheet, in relation to the programs/ training courses that offer this TU.
Main themes	Theory of plunged surfaces in the euclidean space of dimension three. Gauss-Bonnet formula. Elements of plane hyperbolic geometry.
Learning outcomes	**At the end of this learning unit, the student is able to :** **Contribution of the course to the learning outcomes of the bachelor's degree program in mathematics.** **At the end of this activity, the student will have progressed in his/her ability to know and understand a fundamental base of mathematics.** **In particular, he/she will have developed the ability to :** I. Select and use fundamental computational methods and tools to solve mathematical problems. II. Recognize the fundamental concepts of some current mathematical theories. III. Establish the major connections between these theories, explain and motivate them with examples. **Course Specific Learning Outcomes.** 1 **By the end of this activity, the student will be able to become familiar with the basic concepts of differential geometry, specifically :** (a) Conceive the notion of a plunging surface in a global context, equipped with an atlas. (b) Use the notion of map change to conceive globally of the notions of fundamental shapes and curvature. (c) Use the techniques of solving differential equations in a concrete geometrical framework: calculation of vector field flows and calculation of geodesics. (d) Conceive the notion of Euler-Poincaré characteristic as a topological invariant. The contribution of this course to the development and mastery of the skills and knowledge of the program(s) is available at the end of this document, in the section "Programs/training courses offering this course".
Bibliography	• M. do Carmo, Differential geometry of curves and surfaces. • P. Malliavin, Géométrie différentielle intrinsèque. • M. Berger, B. Gostiaux, Géométrie différentielle : variétés, courbes et surfaces. • J. Milnor, Topology from a differentiable viewpoint.
Faculty or entity in charge	SC

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Minor in Mathematics	MINMATH	6		🔍
Additionnal module in Physics	APPHYS	6		🔍
Bachelor in Mathematics	MATH1BA	6		🔍