



In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

5 credits

30.0 h + 30.0 h

Q1

Teacher(s)	Haine Luc ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	<i>The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.</i>
Aims	<i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i>
Evaluation methods	Due to the COVID-19 crisis, the information in this section is particularly likely to change. Assessment is made with a written final exam with theory and exercises on an equal foot. The work done during the problem sessions counts for 5 points over 20 in the final grade.
Teaching methods	Due to the COVID-19 crisis, the information in this section is particularly likely to change. Learning activities consist of lectures which aim to introduce fundamental concepts, to explain them by showing examples and by determining their results, to show their reciprocal connections and their connections with other courses in the programme for the Bachelor in Mathematics. For each problem session, some students are assigned exercises that they must prepare beforehand and present on the blackboard. These presentations count for the final note of the examination.
Content	In 2019-2020, the course will address the basic notions of differential geometry: - submanifolds of euclidean space, abstract varieties. - vector fields. - differential forms, Stokes-Cartan formula. - Cartan's method of moving frame, Poincaré-Hopf theorem, Morse theorem. One of the aim of the class is to show that a topological invariant of manifolds, the Euler-Poincaré characteristic, manifests itself via the study of the singular points of vector fields. Elements of Riemannian geometry are also presented via the theory of moving frames, originating from mechanics, as an illustration of the use of differential forms.
Inline resources	The Moodle site of the course contains the syllabus in French. The syllabus includes the statements of the exercises to be performed during the problem sessions and references.
Bibliography	
Faculty or entity in charge	MATH

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Bachelor in Mathematics	MATH1BA	5	LMAT1141 AND LMAT1241	
Additional module in Mathematics	LMATH100P	5		
Minor in Mathematics	LMATH100I	5		