UCLouvain

licar1111

2020

Mathematical structures for spaces

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits	30.0 h + 20.0 h	Q2

Teacher(s)	Buysse Martin ;Dos Santos Santana Forte Vaz Pedro ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	*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.*
Main themes	1. Euclidean geometry and its generalizations. In particular curves (curvature, torsion, special curves), surfaces (curvatures, ruled surfaces), 3D objects (regular polyhedra, convex geometry, intersection of 3D objects) 2. The projective extension of euclidean geometry (projective space, projective transformations, duality, ...) 3. Introduction to other geometries : non-euclidean geometry and the axiom of parallels, topological classification of surfaces (Klein bottle, Euler characteristic, orientation), hyperbolic geometry (Escher paintings), ... 4. Forms and numbers in nature : the golden ratio and the Fibonacci numbers (properties, geometrical interest), fractals objects (constructions, fractal dimension)
Aims	1 1) To describe a set of mathematical tools that enable the technical geometric calculations (lengths, areas, volumes, angles,...) 2) To help students to visualize, imagine and construct new spaces - - - - *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".*
Content	The different chapters of the course are : - euclidean geometry - affin geometry - projective geometry - metric curve theory - metric theory of surfaces - topology and surfaces - fractal geometry - axiomatic geometry
Other infos	FSAB 1101 or an equivalent course FSAB 1102 or an equivalent course
Faculty or entity in charge	LOCI

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Bachelor in Engineering : Architecture	ARCH1BA	5	LEPL1101 AND LEPL1102 AND LEPL1105	