lmat2945

2022

Advanced topics in mathematics 8

| 5.00 credits | 0 h + 22.5 h | Q1 |

This biannual learning is being organized in 2022-2023

Teacher(s)	Lederle Waltraud ;
Language :	English
Place of the course	Louvain-la-Neuve
Prerequisites	Depending on the subject, mathematics skills at the level of the end of the Bachelor in Mathematics or first year Master in Mathematics.
Main themes	The topic considered varies from year to year depending on the research interests of the course instructor.
Learning outcomes	**At the end of this learning unit, the student is able to :**

	1 Contribution of the course to learning outcomes in the Master in Mathematics programme. By the end of this activity, students will have made progress in:
	
	 • Show evidence of independent learning.
	 • Analyse a mathematical problem and suggest appropriate tools for studying it in depth.
	 • Begin a research project thanks to a deeper knowledge of one or more fields and their problematic issues in current mathematics. He will have made progress in:
	
	    • Develop in an independent way his mathematical intuition by anticipating the expected results (formulating conjectures) and by verifying their consistency with already existing results.
	    • Ask relevant and lucid questions on an advanced mathematical topic in an independent manner.
	
	 Learning outcomes specific to the course.
	
	 The course aims to initiate research in the field under consideration. Specific learning outcomes vary depending on the field.

Content	We will treat finitely generated groups as geometric objects. We will look at them from "far away" and study properties that give information about this large-scale perspective. Our main goal is to prove the following result: If a group is quasi-isometric to a free group, then it contains a free group of finite index. We will cover group presentations and free groups, groups acting on trees (Bass-Serre theory), Cayley graphs, quasi-isometry, Milnor-Schwarz Lemma and ends of groups. If time permits, and depending on the interest of the audience, we will talk about growth, Gromov hyperbolicity or some other quasi-isometry invariants.
Bibliography	I expect that everything that we'll cover is contained in the book by Drutu and Kapovich
Faculty or entity in charge	MATH

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Mathematics	MATH2M	5		🔍