lmat1237

2024

Introduction to logic: model theory

5.00 credits	30.0 h + 15.0 h	Q2

This biannual learning is being organized in 2024-2025

Teacher(s)	Vitale Enrico ;
Language :	French > English-friendly
Place of the course	Louvain-la-Neuve
Learning outcomes	
Evaluation methods	The assessment aims to test knowledge and understanding of fundamental concepts, examples and results, the ability to construct coherent reasoning, mastery of the demonstration techniques introduced during the course. The assessment consists of a final exam. Each student can choose between an oral exam and a written exam. In any case, the student proposes a first question that he or she develops and then the teacher asks other questions to test a fairly broad spectrum of skills. To establish the final grade, the final exam and active participation in the course will be taken into account (questions asked, solutions to exercises presented in class).
Teaching methods	Supervised learning activities consist of lecture sessions. Group discussion and the resolution of exercises by students are integrated into the lecture. The course aims to introduce fundamental concepts, to motivate them by showing examples and establishing results, to show the links with other courses in the Bachelor's program in Mathematical Sciences. The resolution of exercises aims to learn the basic techniques of sequent calculus, lattice theory and adjunctions between ordered sets.
Content	This activity aims to explore the mathematical formalization of logic in terms of inference rules (sequents), lattices (and, in particular, Heyting and Boolean algebras), models (topological and Kripke) and quantifier systems (for predicative logic). The following contents are covered in the course: - Propositional logic, Gentze sequents, Lindenbaum-Tarski algebra. - Lattices, Heyting algebras and Boolean algebras. - Models of propositional logic and the theorems of validity, consistency and completeness. - Dedekind and Stone representation theorems, - Ideals and filters of an ordered set, the extension-exclusion lemma and the axiom of choice. - Quantifier systems and predicative logic.
Inline resources	Moodle site. The site contains the course syllabus, including many exercises that are integrated into each chapter.
Bibliography	F. W. Lawvere, R. Rosebrugh, Sets for Mathematics, Cambridge University Press, 2003 S. Mac Lane, I. Moerdijk, Sheaves in Geometry and Logic, Springer 1992
Other infos	The course is biennial and will be activated in 2024-2025.
Faculty or entity in charge	MATH

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Additionnal module in Mathematics	APPMATH	5		🔍
Minor in Mathematics	MINMATH	5		🔍