UCL Université catholique de Louvain

LMAT1235

2012-2013

Some notions of mathematical logic

5.0 credits	30.0 h + 15.0 h	2q

Teacher(s) :	Van der Linden Tim ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	We start with a naive point of view on sets. In this framework we introduce ordinals and cardinals, and we develop an elementary theory which shows very clearly why this naive point of view is untenable. Then we look at the axiomatic set theory of Zermelo and Fraenkel. We are especially concerned with independence and inconsistency problems, taking as examples the axiom of choice and the continuum hypothesis. In parallel with this we develop a base of propositional and predicate calculus, i.e. the general properties of first order structures and languages, which we need to fully understand the problems which appear in set theory.
Aims :	We aim at making explicit the laws of mathematical reasoning, when it is presented as a formalised theory. We examine the peculiarities of the languages that are used, the propositions that are taken as starting points, the deduction rules that are usually admitted. As an example we consider naive set theory with its formalisation ZF. We focus on the limitations of the formalisation process, e.g. the impossibility to guarantee a definitive rigour. The spirit and the presentation are of the same kind as for any mathematics course: we give definitions, we construct chains of propositions, we prove theorems. *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”.*
Evaluation methods :	The exam consists of a written part (exercises, 40%) and an oral part (theory, 60%).
Teaching methods :	Combination of a series of lectures on theoretical aspects and of a series of exercises about examples and applications.
Content :	Contents 1. Introduction 2. Naive set theory: ordinals and cardinals 3. Axiomatic set theory: ZF, the axiom of choice, consistency 4. Propositional and predicate logic
Cycle and year of study :	> Bachelor in Mathematics
Faculty or entity in charge:	MATH