UCL **Faculté des sciences philosophiques**
Institut supérieur de philosophie

ISP

FILO1170	Notions de mathématiques

[30h+15h exercises] 2 credits

Language: french
Level: 1st cycle course

Aims

By the end of the course, the student should be able to cast a critical glance at the role and the status of mathematics in the quest for truth or, more modestly, for scientific knowledge. More specifically, the student should be able:
to test the merits of mathematics as the paradigm of rigorousness;
to situate and discuss the role of mathematics in the history of science;
to probe into the limits of mathematics: both the contextual and the internal limits;
to understand how mathematics contributed to the evolution of thought, both through its certainties and through its doubts
To this end, the student should be able to manipulate, in a restricted context, both the language and the usual methods of mathematics. The student must master certain basic concepts at the foundation of mathematical inquiries: number, space, forms, structures #

Main themes

The foreseen objectives depend less on the content of the course than on the approach we bring to it.
Nevertheless, some topics among these are privileged:
the concept of number: natural numbers ; integers; rationals; real; constructible; algebraic; complex. We shall pay particular attention to understanding the historical stages of these successive extensions of the concept and the need that led to their conceptualization.
Euclidean geometry and the debate concerning non-Euclidean geometry. This subject will allow us to address the concept of axiomatic systems and to introduce the problem of the completeness of these systems.
Topology.
Cardinal numbers.

Content and teaching methods

There will be more importance on the method of the study than on the content.
The topics discussed in the course are those indicated in the course description, but the emphasis may vary from year to year.
For each of the topics, we shall begin by examining the issues that motivated their introduction into the scene, focusing primarily on the speculative questions rather than on the utilitarian aspects. Having done this, we shall return to the answers given, the surprises and unexpected discoveries, to put these into the more global and historical perspective of the evolution of the sciences.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Pre-requisites: no pre-requisites other than the general knowledge of mathematics acquired by the end of secondary education.
Assessment: Oral exam with written preparation.
Supporting material:
Reference books:
Courant and Robins: What is Mathematics?
Michael Guillen: Invitation aux mathématiques
M.W. Liebeck: A Concise Introduction to Pure Mathematics
Photocopied notes on particular subjects.
Course holder/Course supervision: lecturer.