

# Introduction to the Philosophy of Mathematics

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Spring 2023

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Class schedule: Thursdays 10-12, Les Philosophes 113  
Website: [http://wuthrich.net/teaching/\\_MA2\\_PhilMath\\_2023.html](http://wuthrich.net/teaching/_MA2_PhilMath_2023.html)  
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What is the nature of mathematical knowledge, as compared to knowledge of the natural world? What, if any, is the connection between the two? What role does mathematics play in empirical sciences such as physics? What role does philosophy play in clarifying the foundations of mathematics? Do abstract objects, such as numbers, exist? Is mathematics somehow true of our world, or is it merely an ingenious language devised by humans to address all sorts of problems?

In this class, we will address these questions and study how leading philosophers and mathematicians have attempted to answer them, giving special attention to the influential schools of logicism, formalism, and intuitionism.

*Accessibility and Prerequisites.* No prior university-level mathematics or philosophy is presupposed, although both will be helpful. Since it offers a focal point for many issues raised in the class, I will give a self-contained introduction to set theory. I will presuppose the notation of first-order logic with quantifiers. If you ever took a logic class, you've seen this; if you haven't, don't worry: you'll quickly pick it up. As for the mathematics, I hope you can count. Nothing more will be presupposed, and even the counting will be carefully introduced.

This course will be conducted entirely in English. I plan to be giving lectures throughout, even though there will be the possibility of giving presentations in case someone needs them to obtain credit.

## Recommended texts

- Stewart Shapiro, *Thinking about Mathematics: The Philosophy of Mathematics*, Oxford University Press, 2000.
- Most readings are available at Moodle at <https://moodle.unige.ch/course/view.php?id=14467>.
- The handout on set theory as well as all lecture slides will be available on the course website.

## Course requirements and evaluation

If this seminar is taken for credit, please let me know. For credit in philosophy you will have to fulfill requirements, depending on the module for which you are taking this course:

- BA7, module 7:

- Evaluation: petit mémoire en philosophie dactylographié (30 à 40 pages, 60'000 à 80'000 signes, espaces non-compris) sur un sujet en relation avec un CR ou SE ou sur un sujet soumis et approuvé par un enseignant du Département de philosophie qui supervise le travail, et soutenance orale d'environ 30 minutes.
- MA2, demi-module 2b, or MA5, demi-module 5b:
  - Attestation: travail écrit de 12 pages d'environ 24'000 signes; ou présentation orale et complément écrit.
  - Evaluation: examen oral (env. 45 min.) portant sur le contenu du CR ou du SE et sur le travail du séminaire.

Contact me if you need credit in another programme.

## Tentative schedule

**Readings:** for each session, please read the listed readings in advance; the readings with an asterisk are background reading.

Date	Topic and reading assignments
23 Feb	Introduction: What is philosophy of mathematics? <i>Shapiro, Ch 1 and Ch 2</i>
2 March	Set Theory: Counting all the way to infinity <i>Handout on Set Theory (for all sessions on Set Theory)</i>
9 March	Set Theory: Paradoxes and the foundations of set theory * <i>Joan Bagaria (2019). Set Theory. Stanford Encyclopedia</i>
16 March	Set Theory: finishing up * <i>Andrew D Irvine and Harry Deutsch (2020). Russell's paradox. Stanford Encyclopedia</i>
23 March	Transfinite mathematics <i>Moore, Ch 10</i>
30 March	Logicism <i>Shapiro, Ch 5</i>
6 April	Formalism <i>Shapiro, Ch 6</i>
13 April	No seminar (semaine de lecture)
20 April	Intuitionism <i>Shapiro, Ch 7</i>
27 April	Numbers exist <i>Shapiro, Ch 8</i>
4 May	No they don't <i>Shapiro, Ch 9</i>
11 May	Structuralism <i>Shapiro, Ch 10</i>
18 May	Ascension Day
25 May	Rapporteur session