

PHILOSOPHY OF MATHEMATICS

Philosophy 319, Fall 2025
Scott Hall 102, M/W 2:00–3:20
office hours M 1–2 & by appt

What is mathematics about? Is it about a realm of nonphysical, objectively real entities? Is it just about symbols? Is it about our own minds? Do we know the truth about mathematics, and if so, how? Why is mathematics so useful in science? In this course we will address these and other philosophical questions about mathematics.

Prerequisites

The official prerequisites are intro philosophy and intro logic. Comfort with mathematics will make certain parts of the course easier, but I won't presuppose any particular knowledge of mathematics. If you don't meet one of the official prerequisites but are interested in taking the class, please contact me. (For example, the relevant bits of introductory logic are covered in many mathematics and computer science classes.)

Readings

The required text is a draft of a book I am writing, which will be available on Canvas. Near the beginning of the semester it might be nice to read through *Mathematics: A Very Short Introduction*—a wonderful (and short) book on the nature and practice of mathematics. But this is only a suggestion, not a requirement.

Requirements

Two exams (40% each), plus a 6–10 page paper (20%), due on **December 10 at 10:20am**. The first exam will be in-class on **October 20**. The second exam, which will cover only the second half of the course, will be during the final exam period, in our regular classroom.

The paper must be turned in via Canvas. Late papers will be penalized as described here: https://tedsider.org/teaching/215/lateness_policy.pdf. (Short version: two day grace-period with no lateness penalty; 2.5 points per day subsequently; exceptions only for documented serious circumstances; technological mistakes are not excuses.) Please don't plagiarize, whether in the traditional way or by using ChatGPT. Missed exams will receive a grade of zero except in documented serious circumstances.

Course website

The course website (containing handouts, announcements, etc.) is here:

http://tedsider.org/teaching/math/phil_math.html

And the Canvas site is here:

<https://rutgers.instructure.com/courses/356807>

Learning goals

The goals of this course are to learn the main epistemological and metaphysical challenges raised by mathematics, to learn some historically significant attempts to meet these challenges, to thereby deepen understanding of and appreciation for mathematics, and to develop skills of critical thinking and abstract reasoning.

Schedule (tentative)

All readings are in my book draft unless otherwise noted. The schedule may be revised; please consult the latest version of the syllabus, which will always be posted on the course website.

- 9/3 *Intro.* Chapter 1
- 9/8 *Platonism.* Chapter 2
- 9/10 *Kant.* Chapter 3
- 9/15 *NonEuclidean geometry.* Chapter 4
- 9/17 ...continued
- 9/22 *Mill.* Chapter 5
- 9/24 *Abstraction.* Chapter 6.
- 9/29 *Modern logic.* Chapter 7
- 10/1 *Logicism: Frege.* Section 8.1
- 10/6 ...continued
- 10/8 ...continued
- 10/13 *Logicism: neoFregeanism.* Section 8.2
- 10/15 ...continued

10/20 **Midterm exam**

10/22 *Foundations and crisis*. Chapter 9. Optional reading: Gowers, chapter 2; <https://personal.us.es/josef/pcmCrisis.pdf>

10/27 *Term and game formalism*. Sections 10.1–10.2

10/29 ...continued

11/3 *Deductivism*. Section 10.3

11/5 *Hilbert's program*. Section 10.4

11/10 *Gödel's theorems*. Chapter 11

11/12 ...continued

11/17 ...continued

11/19 *Set-theoretic platonism*. Chapter 12

11/24 ...continued

12/1 ...continued

12/3 ...continued

12/8 *Structuralism*. Chapter 13

12/10 ...continued. **Paper due**

TBA **Second exam**