

Phil 319: Introduction to Philosophy of Mathematics

Fall 2010

Instructor: Ben Levinstein
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Office Hours: Tues 3:30-4:30 and by Appt.
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Textbooks

Philosophies of Mathematics, by Alexander George & Daniel J. Velleman (GV).
Thinking about Mathematics, by Stewart Shapiro (SS).

Resources

Most of the readings will come from the textbooks. Others will be available on Sakai.

Requirements

- Daily quizzes (15%): There will be quizzes each class on the readings. Students will get one point for answering incorrectly and two points for answering correctly. The lowest three grades will be dropped.
- Problem sets (5%): I'll give two or three problem sets early in the course to help students become familiar with the relevant technical material we'll cover. Group work is permitted.
- 5-7 page paper (20%): Students will have the option of proposing a topic of their own or choosing from a list of prompts. The paper will be due midway through the course.
- 12-15 page paper (40%): This paper will be due on the last day of class. Students will have the option of either using their first paper as a basis for their term paper or writing on a new topic.
- Take-home final (20%): The final will be a comprehensive (short) essay exam covering the major themes from the course. If there's interest, there will be an optional technical section.

Strong class participation will also be taken into account when assigning grades.

Prerequisites

PHIL 201: Introduction to Logic or permission of the instructor. Recommended: PHIL 215: Introduction to Metaphysics and/or PHIL 220: Theory of Knowledge. This course satisfies Area 5 requirements for the philosophy major.

The course will be kept as non-technical as possible. However, given the nature of the subject, some technical competence is necessary to understand the issues involved.

Very Tentative Schedule

Weeks 1-2: I will cover most of the mathematics necessary to understand the issues that we'll cover in the rest of the course and provide some historical background.¹ Readings: Introduction to GV and Chs. 1-4 of SS.

Weeks 3-4: Mathematical Knowledge. Readings:

¹This section of the course may spill over into the third week. If so, we'll cut out or shorten the discussion of formalism.

1. Chs. 8-9 of SS.
2. Benacerraf, P. "Mathematical Truth." *Journal of Philosophy*, 70, 661-679 (1973).
3. Maddy, P. "Perception and Mathematical Intuition." *Philosophical Review*, 89, 163-196 (1980).
4. Parsons, C. "Mathematical Intuition." *Proceedings of the Aristotelian Society*, 80, 142-168 (1979).
5. Burgess, J. "Why I Am Not a Nominalist." *The Notre Dame Journal of Formal Logic*, 24, 93-105 (1983).

Weeks 5-6: Logicism. Readings:

1. Chs. 2-3 of GV and Ch. 5 of SS.
2. Frege, G. *Foundations of Arithmetic*. Sections TBD.

Weeks 7-8: Intuitionism. Readings: Chs. 4-5 of GV and Ch. 7 of SS.

Weeks 9-10: Formalism. Readings: Chs. 7-8 of GV and Ch. 6 of SS.

Weeks 11-12: Structuralism and Mathematical Ontology. Readings:

1. Benacerraf, P. "What Numbers Could Not Be." *Philosophical Review*, 74, 47-73 (1965).
2. Resnik, M. "Mathematics as a Science of Patterns: Ontology and Reference." *Nous*, 15, 529-550 (1981).
3. Resnik, M. "Mathematics as a Science of Patterns: Epistemology." *Nous*, 16, 95-105 (1982).
4. Putnam, H. "Mathematics without Foundations." *Journal of Philosophy*, 64, 5-22 (1967).

Weeks 13-14: Mathematics and Natural Science. Readings:

1. Putnam, H. "Philosophy of Logic" in *Mathematics, Matter, and Method* (1979). Cambridge University Press.
2. Field, H. (1980). Selections from *Science without Numbers*. Oxford: Blackwell.
3. Field, H. (1991). Introduction to *Realism, Mathematics, and Modality*. Oxford: Blackwell.
4. Field, H. "The Conceptual Contingency of Mathematical Objects." *Mind*, 102, 285-299 (1993).
5. Hale, R. & C. Wright. "A *Reductio ad Absurdum*: Field on the Contingency of Mathematical Objects." *Mind*, 103, 169-184 (1994).