Philosophy 405: Knowledge, Truth and Mathematics
Spring 2008
M, W: 1-2:15pm

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Course Bibliography

Note: For many of the historical sources, I have provided just one among several comparably good translations or editions, usually an inexpensive one.

Readers that cover several topics:

Benacerraf, Paul, and Hilary Putnam, eds. Philosophy of Mathematics: Selected Readings, second edition. Cambridge: Cambridge University Press, 1983.
A collection, including many of the papers on our syllabus.

Ewald, William. *From Kant to Hilbert*. Oxford: Clarendon Press, 1986.
Source material for anything from Berkeley to Brouwer.

Hart, W.D. ed. *The Philosophy of Mathematics*. Oxford, 1996.
Another good reader, a bit more contemporary than Benacerraf and Putnam.

Van Heijenoort, Jean. *From Frege to Gödel: A Source Book in Mathematical Logic, 1879-1931*. Cambridge: Harvard University Press, 1967.
Source material for the foundations of mathematics in its key period.

I. Introduction

For further reading:

Barker, Stephen. *Philosophy of Mathematics*. Prentice Hall, 1964.

II.A: Pythagoras and the Pythagoreans

On the syllabus:

Kline, "The Creation of Classical Greek Mathematics" and Kline, "The Greek Rationalization of Nature" are from Chapters 2 and 7, pp 24-37 and 145-154, of: Kline, Morris. *Mathematical Thought from Ancient to Modern Times*. New York: Oxford University Press, 1972.

For further reading:

Heath, Thomas. *A History of Greek Mathematics*. Oxford: Clarendon Press, 1921.
Heath, Thomas. *A Manual of Greek Mathematics*. Oxford: Clarendon Press, 1931.
Russell, Bertrand. *A History of Western Philosophy*. Routledge: 2004.

II.B: Plato's Platonism

On the syllabus:

Selections from Plato on Mathematics are all in: Hamilton, Edith, and Huntington Cairns, eds. *The Collected Dialogues of Plato*. Princeton: Princeton University Press, 1985. *Timaeus* 27d-29d; *Phaedo* 100b-105c; *Theaetetus* 184b-187b; *Republic* 507b-517c, 523e–527d; *Meno* 81b-85c.

For further reading:

Heath, Thomas. *A Manual of Greek Mathematics*. Oxford: Clarendon Press, 1931.
Katz, Jerrold J. *Realistic Rationalism*. Cambridge: The MIT Press, 1998. Pp 14-15.
Wedberg, Anders. *Plato's Philosophy of Mathematics*. Greenwood Press, 1977.

II.C: Aristotle

On the syllabus:

Aristotle, "Books XIII and XIV" are from his *Metaphysics*, in: Barnes, Jonathan. *The Complete Works of Aristotle*. Princeton: Princeton University Press, 1984.

For further reading:

Annas, Julia. *Aristotle's Metaphysics, Books M and N*. Oxford: 1976.

Bostock, D. "Aristotle, Zeno and the potential infinite" in Proceedings of the Aristotelian Society vol 73 (1972-3), pp 37-51

Lear, J. "Aristotle's Philosophy of Mathematics" *Philosophical Review* v 91 (1982): pp 161-92.

II.D: Modern Rationalism

On the syllabus:

Descartes, "Third Meditation" and Descartes, "Fifth Meditation" are AT34-36 and AT63-71, and may be found in: Cottingham, John, Robert Stoothoff, and Dugald Murdoch, eds. *The Philosophical Writings of Descartes*. Cambridge: Cambridge University Press, 1984.

Leibniz, "Meditations on Knowledge, Truth, and Ideas" is pp 22-27 in: Leibniz, G.W. *Philosophical Essays*. Indianapolis: Hackett, 1989.

Leibniz, Selections from *New Essays* can be found in: Leibniz, G.W. *New Essays on Human Understanding*. Cambridge University Press, 1996. Preface, 43-51, 77-88, 156-160, 406-415.

Locke's essay is widely available. Here's one reference: Locke, John. *Essay Concerning Human Understanding*. Indianapolis: Hackett, 1996.

Kline, "The Mathematization of Science" and Kline, "The Creation of the Calculus" are Chapters 16 and 17 in: Kline, Morris. *Mathematical Thought from Ancient to Modern Times*. New York: Oxford University Press, 1972.

For further reading:

Mancosu, Paolo. *Philosophy of Mathematics and Mathematical Practice in the Seventeenth Century*. Oxford University Press, 1996.

II.E: Modern Epiricism

On the syllabus:

Selections from Berkeley's *Principles* can be found in: Berkeley, George. *A Treatise Concerning the Principles of Human Knowledge*. Indianapolis: Hackett, 1982. Introduction §§11-17; Main Text §§118-132. (Actually, I took the selection from the Ariew and Watkins reader in modern philosophy, vol. 1.)

Some of the Selections from Hume on Mathematics come from the *Enquiry:* Hume, David. *An Enquiry Concerning Human Understanding*. Indianapolis: Hackett, 1993. §IV Part I and §XII Part III.

The rest of the Selections from Hume on Mathematics come from the *Treatise*: Hume, David. *A Treatise on Human Nature*. Oxford University Press, 2001. Book 1, Part 1, §VII and Book 1, Part iii, §I

For further reading:

Ewald contains Berkeley's *Analyst*, in which Berkeley attacks the calculus and its infinitessimals, and selections from *A Treatise on Fluxions,* a reply to Berkeley from Colin MacLaurin.

II.F: The Synthetic A Priori

On the syllabus:

Selections from Kant's *Critique* are from: Kant, Immanuel. *Critique of Pure Reason*, translated by Norman Kemp Smith. New York: St. Martin's Press, 1984. Bx-xii, A6-11 (B11-24), A19-22 (B33-36), A137-147 (B176-187), A712-738 (B740-766), A162-176 (B202-218), A218-225 (B265-273).

Kant, Immanuel. *Prolegomena to Any Future Metaphysics That Will Be Able to Come Forward as a Science*. Indianapolis: Hackett, 2002.

For further reading:

Friedman, Michael. *Kant and the Exact Sciences.* Harvard University Press, 1992.

Kitcher, Philip. "Kant and the Foundation of Mathematics." *Philosophical Review* v. 84 (1975): 23-50.

Sutherland, "Kant's Philosophy of Mathematics and the Greek Mathematical Tradition." *Philosophical Review* v. 113 (2004): 157-201.

II.G: Radical Empiricism

On the syllabus:

Mill, John Stuart. *A System of Logic*. New York, Harper and Brothers, 1893.

Frege, from *The Foundations of Arithmetic*, I is §7-§10 of: Frege, Gottlob. *Foundations of Arithmetic*. Evanston: Northwestern University Press, 1980.

For further reading:

Balaguer, Mark. "Against (Maddian) Naturalized Platonism." *Philosophia Mathematica* (3), v. 2 (1994): 97-108.

Maddy, Penelope. *Realism in Mathematics*. Oxford: Clarendon Press, 1990.

II.H: Cantor's Paradise

On the syllabus:

Tiles, "Cantor's Transfinite Paradise" and Tiles, "Numbering the Continuum" are Chapters 4 and 5, respectively, in: Tiles, Mary. *The Philosophy of Set Theory: An Historical Introduction to Cantor's Paradise*. Mineola: Dover, 2004

Dauben, Joseph Warren. *Georg Cantor: His Mathematics and Philosophy of the Infinite*. Princeton: Princeton University Press, 1979.

For further reading:

Cantor, Georg. *Contributions to the Founding Theory of Transfinite Numbers*. Dover, 1955.

See the Boolos, Parsons, and Wang articles on the concept of set in Benacerraf and Putnam.

There are lots of fine set theory texts. I prefer, because it was the text I first used: Enderton, Herbert. *The Elements of Set Theory*. Academic Press, 1977.

III.A: Logicism

On the syllabus:

Frege, from *The Foundations of Arithmetic*, II, is §§1-6, §§12-17, and §§45-91 of: Frege, Gottlob. *Foundations of Arithmetic*. Evanston: Northwestern University Press, 1980.

Russell, "On Our Knowledge of General Principles" and Russell, "How *A Priori* Knowledge is Possible" are Chapters 7 and 8 of: Russell, Bertrand. *The Problems of Philosophy*. London; Oxford University Press, 1959.

The letters from Frege and Russell are in van Heijenoort.

For further reading:

Burgess, John. *Fixing Frege*. Princeton: Princeton University Press, 1995.
Russell, Bertrand. *Introduction to Mathematical Philosophy*. London; Routledge, 1993.
Russell, Bertrand. *The Principles of Mathematics*. New York: Norton, 1996.

III.B: Formalism and Incompleteness

On the syllabus:

Hilbert, "On the Infinite" and Johann (John) von Neumann, "The Formalist Foundations of Mathematics" are both in Benacerraf and Putnam.
Smullyan, "The General Idea Behind Gödel's Proof" is the first chapter in: Smullyan, Raymond. *Gödel's Incompleteness Theorems.* New York: Oxford University Press, 1992.

For further reading:

Mancosu, Paolo. *From Brouwer to Hilbert: The Debate on the Foundations of Mathematics in the 1920s*. New York: Oxford University Press, 1998.
Curry, H.B. *Outlines of a Formalist Theory of Mathematics.* North-Holland, 1951.
Hintikka, Jaakko. *On Gödel*. Wadsworth, 2000.
Hofstadter, Douglas. *Gödel, Escher, Bach: An Eternal Golden Braid*. Basic Books, 1999.

III.C: Intuitionism

On the syllabus:

Heyting, "Disputation;" Brouwer, "Intuitionism and Formalism;" and Brouwer, "Consciousness, Philosophy, and Mathematics" are all in Benacerraf and Putnam.

For further reading:

Gentzen, Gerhard. "The Concept of Infinity in Mathematics." In *The Collected Papers of Gerhard Gentzen*, M.E. Szabo, ed. North-Holland Publishing Company, 1969.
Körner, Stephen. *The Philosophy of Mathematics.* Dover, 1986.
Dummett, Michael. *Elements of Intuitionism*. Oxford University Press, 1977.

III.D: Carnap

On the syllabus:

Carnap, "Empiricism, Semantics and Ontology" is reprinted in Benacerraf and Putnam, but also in: Carnap, Rudolph. *Meaning and Necessity: A Study in Semantics and Modal Logic*. Chicago: The University of Chicago Press, 1988

For further reading:

Quine, "Truth by Convention." In Benacerraf and Putnam.

III.E: Wittgenstein's Conventionalism

Ayer, "The A Priori: is Chapter 4 of: Ayer, A.J. *Language, Truth and Logic. New York: Dover, 1952.*
The Wittgenstein selections are all from: Wittgenstein, Ludwig. *Remarks on the Foundations of Mathematics*. Cambridge: The MIT Press, 1991.
Part 1: §§3-5, 33-35, 61, 63, 113, 116-118, 143, 148-150, 156, 168;
Part III: §§16, 25-27, 39, 66-67, 82, 85, 87;
Part IV, §§56-57;
Part V: §§9, 10, 12, 14, 16;
Part VI: §§7, 8, 16, 21, 24, 30, 38-39, 41, 46-49;
Part VII: §§11, 15, 29, 34-35, 43, 61, 66-67, 74

For further reading:

Dummett, Michael. "Wittgenstein's Philosophy of Mathematics" *Philosophical Review* v 68 (1959): 324-348.

Kripke, Saul. *Wittgenstein on Rules and Private Language*. Harvard University Press, 1982.

Wright, Crispin. *Wittgenstein on the Foundations of Mathematics*. Harvard University Press, 1980.

III.F: Gödel Platonism

On the syllabus:

The two versions of the Gödel paper, as well as the Feferman et al. introductory note are all in: Feferman, Solomon et al., eds. *Kurt Gödel: Collected Works*, Vol. II. New York: Oxford University Press, 1995.

IV.A: The Problem

On the syllabus:

Benacerraf, "Mathematical Truth" is in *The Journal of Philosophy*, Vol. 70, No. 19, (Nov. 8, 1973), pp. 661-679. It is also reprinted in the Hart collection. A pdf is available in the handouts section of the course website.

Field, "Knowledge of Mathematical Entities" is from the introduction to: Field, Hartry. *Realism, Mathematics, and Modality*. Oxford: Basil Blackwell, 1989.

For further reading:

Hart, "Access and Inference" in the Hart collection.

Steiner, Mark. *Mathematical Knowledge*. Cornell University Press, 1975.

IV.B: Quineans

On the syllabus:

Quine, "On What There Is" and Quine, "Two Dogmas" are in: Quine, W.V. *From a Logical Point of View*. Cambridge: Harvard University Press, 1980.

Quine, "Existence and Quantification" is in: Quine, W.V. *Ontological Relativity and Other Essays*. New York: Columbia University Press, 1969.

Grice, H.P. and P.F. Strawson. "In Defence Of A Dogma." *Philosophical Review* 65: 141-58.

My two papers are unpublished, and available in the handouts section of the website.

For further reading:

Azzouni, Jody. 1998. "On 'On What There Is'." *Pacific Philosophical Quarterly* 79: 1-18.

Colyvan, Mark. *The Indispensability of Mathematics*. Oxford University Press, 2001.

Resnik, Michael. *Mathematics as a Science of Patterns*. Oxford: Oxford University Press, 1997.

IV.C: Structuralism

On the syllabus:

Benacerraf, "What Numbers Could Not Be" is in Benacerraf and Putnam.

Shapiro, "Structure" is Chapter 3 of: Shapiro, Stewart. *Philosophy of Mathematics: Structure and Ontology*. New York: Oxford University Press, 1997.

For further reading:

Hellman, Geoffrey. *Mathematics Without Numbers: towards a modal-structural interpretation*. Oxford University Press, 1989.

Resnik, Michael D. "A Naturalized Epistemology for a Platonist Mathematical Ontology." In, *Math Worlds: Philosophical and Social Studies of Mathematics and Mathematics Education*. Sal Restivo, et. al., eds. Albany: SUNY Press, 1993. Originally appeared in *Philosophica*.

Resnik, Michael. *Mathematics as a Science of Patterns*. Oxford: Oxford University Press, 1997.

IV.D: Fictionalism

On the syllabus:

Field, "Introduction: Fictionalism, Epistemology, and Modality" is Chapter 1, pp 1-14, of: Field, Hartry. *Realism, Mathematics, and Modality*. Oxford: Basil Blackwell, 1989.

For further reading:

Kitcher, Philip. "Arithmetic for the Millian." *Philosophical Studies* v 37 (1980), pp 215-36.

IV.E: Contemporary Platonism

On the syllabus:

Balaguer, "A New Platonist Epistemology" is chapter 3 of: Balaguer, Mark. *Platonism and Anti-Platonism in Mathematics*. New York: Oxford University Press, 1998.

Katz, "The Epistemic Challenge to Realism" and Katz, "Toward a Realistic Rationalism" are from Chapters 2 and 6 (pp 23-51, 177-187), respectively, of: Katz, Jerrold J. *Realistic Rationalism*. Cambridge: The MIT Press, 1998.

Katz, "Conclusion: The Problems of Philosophy" is Chapter 8 of: Katz, Jerrold J. *The Metaphysics of Meaning*. Cambridge: The MIT Press, 1990.

For further reading:

Bonjour, Laurence. *In Defense of Pure Reason*. Cambridge University Press, 1997.

IV.F: Modalism

On the syllabus:

Chihara, "The Constructibility Theory" is Chapter 7 of: Chihara, Charles. *A Structural Account of Mathematics*. Oxford: Clarendon Press, 2004.

Putnam, "Mathematics without Foundations" is in *Mathematics, Matter, and Method: Philosophical Papers, Vol. I*, Cambridge: Cambridge University Press, 1975.

For further reading:

Burgess, John, and Gideon Rosen. *A Subject with No Object*. New York: Oxford, 1997.

IV.G: Computer Proofs

On the syllabus:

Tymoczko, Thomas. "The Four Color Problem and its Philosophical Significance." *The Journal of Philosophy*, Vol. 76, No. 2. (Feb., 1979), pp. 57-83. A pdf is available in the handouts section of the course website.

V: Epitaph

On the syllabus:

Putnam, "Philosophy of Mathematics: Why Nothing Works" is in:
Putnam, Hilary. *Words and Life*. Harvard University Press, 1995.