Phil 373: Introduction to Philosophy of Mathematics

Generality and Abstraction

January 4th (Wed.) - Introduction to class themes

January 9th (Mon.) - Greek Geometry and the Role of the Diagram
Readings:

- Book 1 of Euclid, *The Thirteen Books of Euclid's Elements: Books I-II*
  - Please read the Common Notions and Postulates (pages 153-155) and proofs or propositions 1, 2, 4, 7, 16, and 47. You may ignore the extensive commentary.
- Sections 1 and 2-2.1.2 of Netz, *The shaping of deduction in Greek mathematics*

January 11th (Wed.) - Aristotelian Logic
Required Readings:

- Sections 1-5.5 and 6 of Smith, "Aristotle's Logic".
- Instructor's Notes on Predicate Logic.

January 16th (Mon.) - President's Day. No Class.

January 18th (Wed.) - Locke on Abstract Ideas and Demonstration
Required Readings: Locke, *An essay concerning human understanding*

- Book II, Chapters 11 and 12.
- Book IV Chapter 2: Sections 1-11.

January 23th (Mon.) - Berkeley's Criticisms of Abstract Ideas
Required Readings:

- Introduction to Berkeley, *A treatise concerning the principles of human knowledge.*

January 25th (Wed.) - Hume's and Frege's Criticisms of Abstract Ideas
Required Readings:

- Section 1.1.7 of Hume, *A Treatise of Human Nature.*
- Pages 67-68 of Shapiro, *Thinking about mathematics.*

Geometry vs. Arithmetic, and Experience vs. Reason

January 30th (Mon.) - Plato's Theory of Recollection
Required Readings: Plato, *Complete works.*

- *Meno.* Translator's introduction (pages 870-871) and Lines 79e - 86a.
- *Phaedo.* Translator's introduction (pages 49-50) and Lines 72e - 77a.

February 1st (Wed.) - Plato's Philosophy of Mathematics
Required Readings: Republic. Translator's Introduction (pages 971-972) and Book VII. Lines 514 - 530d. In Plato, *Complete works.*

February 6th (Mon.) - Aristotle's Criticisms of Plato
Required Readings: Chapter 3 of Shapiro, *Thinking about mathematics.*

February 8th (Wed.) - Eudoxian Theory of Proportion and Greek Number Theory
Required Readings:

- Book V of Euclid, *The Thirteen Books of Euclid's Elements: Books III-IX*

  - Please read the definitions (pages 113-114) and proofs of propositions 1, 4, and 13. Ignore the commentary.
- Book VII of Euclid, *The Thirteen Books of Euclid's Elements: Books III-IX*
  - Please read the definitions (pages 277-279) and proofs of propositions 1 and 2. Ignore the commentary.
- Book X of Euclid, *The Thirteen Books of Euclid's Elements: Books X-XIII*
  - Please read the commentary on pages 1-3, and the definitions on page 10.

February 10th (Fri.) - **First Paper Due at Midnight**

February 13th (Mon.) - Analysis, Arithmetic, and Geometry *Required Readings:*
- Bos, *Redefining geometrical exactness*. Sections 1.1 -1.4, 1.6; Chapter 3 pages 37-41; Sections 3.4-3.5, 3.7; Section 5.1, 5.3; Chapter 6

February 20th (Mon.) - MLK Day. No class.

February 22nd (Wed.) - Leibniz's Logic
Required Readings:
- "Preface to a universal characteristic" and "Samples of the Numerical Characteristic." Pages 5-18 of Leibniz, "Philosophical Essays".
- "A Study in the Early Logical Calculus." Pages 371-373 of Leibniz, "Philosophical Papers and Letters".

February 27th (Mon.) - Kant on geometry
Required Readings:
- Excerpts from Kant, *Prolegomena to any future metaphysics*. Preamble (pages 15-22) and Sections 6-13 (pages. 32-38).
- Excerpts from *Critique of Pure Reason*. Page 197 in same book.

March 1st (Wed.) - Kant on algebra and arithmetic
Required Readings:
- Shabel, "Kant on the symbolic construction of mathematical concepts".

March 6th (Mon.) - Kant's influence on mathematics
Required Readings:
- TBD.

March 8th (Wed.) - Class Review and Preview

March 10th (Fri.) - **Second Paper Due at Midnight**

References

[1] G. Berkeley. *A treatise concerning the principles of human knowledge*. Ed. by J. Dancy. New York: Oxford University Press, 1998.

[2] H. J. Bos. *Redefining geometrical exactness: Descartes' transformation of the early modern concept of construction*. Springer, 2001.

[3] Euclid. *The Thirteen Books of Euclid's Elements: Books I-II*. Ed. by T. L. Heath. Vol. 1. Cambridge University Press, 1908.

[4] Euclid. *The Thirteen Books of Euclid's Elements: Books III-IX*. Ed. by T. L. Heath. Vol. 2. Cambridge University Press, 1908.
[5] Euclid. *The Thirteen Books of Euclid's Elements: Books X-XIII*. Ed. by T. L. Heath. Vol. 3. Cambridge University Press, 1908.
[6] D. Hume. *A Treatise of Human Nature*. Courier Dover Publications, 2003.
[7] I. Kant. *Prolegomena to any future metaphysics: with selections from the Critique of pure reason*. Ed. by G. Hatfield. Cambridge: Cambridge University Press, 2004.
[8] G. W. Leibniz. "Gottfried Wilhelm Leibniz: philosophical papers and letters". In: (1969). Ed. by L. E. Loemker.
[9] G. W. Leibniz. "G.W. Leibniz: Philosophical Essays". In: *Indianapolis and Cambridge: Hackett Publishing Company* (1989). Ed. by R. Ariew and D. Garber.
[10] J. Locke. *An essay concerning human understanding*. English. Ed. by P. H. Nidditch. Oxford: Clarendon Press, 1975.
[11] R. Netz. *The shaping of deduction in Greek mathematics: A study in cognitive history*. Cambridge University Press Cambridge, 1999.
[12] Plato. *Complete works*. Ed. by J. M. Cooper and D. S. Hutchinson. Hackett Publishing, 1997.
[13] L. Shabel. "Kant on the symbolic construction of mathematical concepts". In: *Studies in History and Philosophy of Science Part A* 29.4 (1998), pp. 589–621.
[14] S. Shapiro. *Thinking about mathematics: The philosophy of mathematics*. Oxford University Press, 2000.
[15] R. Smith. "Aristotle's Logic". In: *The Stanford Encyclopedia of Philosophy*. Ed. by E. N. Zalta. Spring 2014. 2014.