The Philosophy of Logic

PHL 430-001
Spring 2003
MW: 10:20-11:40
EBH, Rm. 114

Instructor Information

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Required Texts


In the interest of keeping the financial burden of students to a minimum, the many readings outside of these two texts will be accessible without the need for significant outlays of money. See below.

Course Overview

The primary aim of the course is to introduce students to different conceptions of the nature of logic, and to explore the interplay between logic, metaphysics and epistemology, and philosophy of language. So we want to understand what logic is and what it is about. Also, certain issues arise in the course of conducting the business of logic that demand philosophical discussion (e.g., What is a logical constant? What is logical possibility? What is truth?). As will be highlighted in the course, thinking about these issues typically leads one to thinking about deep issues in metaphysics, epistemology, the philosophy of language, and the philosophy of mathematics among other fields of inquiry. This semester our thinking about logic will be confined to deductive (and not inductive) logic. The course divides up into three parts.

We begin by studying the history of logic through selected readings from the work of Aristotle, Boole, and Frege. Aristotle is considered the founder of formal logic, Boole’s work advances Aristotelian logic in ways that points to modern logic. Modern logic is thought to begin with Frege’s monumental Begriffsschrift. The work of these three logicians offers the barest of outlines of the development of modern, classical logic (the logic studied in PHL 330 and PHL 331). Our study will, among other things, not only offer an important historical context for thinking about logic in general, but also the different visions of the rhyme and reason of logic we encounter will color and inform much of what is to come.

In the second part of the course, we modernize the discussion and sharpen our inquiry into the nature of logic. We start by investigating the Rationalism vs. Conventionalism debate, which will get us thinking explicitly about what exactly makes an argument valid and a sentence logically true. Also, we’ll focus on the foundations of our knowledge about what is valid and logically true. One aim here is to clarify the intuitive, ordinary (non-mathematical) concepts of validity
and logical truth and then use them to evaluate Tarski’s well-known characterization of logical consequence (i.e., validity). Also, we examine criteria for logical constancy. Understanding what makes a term a logical constant (e.g., ‘or’, ‘and’, ‘all’) is critical to understanding validity and logical truth. For example, we say that an argument is intuitively valid if and only if it is not possible for all the premises to be true and the conclusion false. This concept is typically unpacked in such a way that the validity of an argument turns on its logical form i.e., an argument is valid only if it has a valid argument form. It is standard to represent the logical form of an argument by translating its components into sentences from an artificial language. The form of an argument is a function of the logical constants that appear and the pattern of the remaining expressions. But what are the logical constants? If we are unable to answer this question, then any explanation of what makes an argument valid will be shallow at best. Can we get criteria for logical constancy from the ordinary, informal concept of logical consequence?

In the third part of the course we first read some pieces on the foundations of justifying deduction (e.g., Is there a non-circular justification for the validity of Modus Ponens?), which focus on the conceptual framework underlying debates over the correct treatment of given logical constants. For example, both the classical logician and the relevance logician think that if….then… is a logical constant. Their disagreement about the meaning of the connective results in their disagreement about the validity of the inference represented by p, so if q then p. Foundational articles locate key presuppositions of the debate and offer avenues for resolving it. After sampling some extensions of and deviations from classical logic, we close by considering the legitimacy of a plurality of logics (e.g., ought there to be just one logic?).

Although the course does not presuppose familiarity with formal logic, students stand to gain more from course content if they come to class with at least a rudimentary understanding of classical logic (e.g., the logic studied in PHL 330 and PHL 331). To brush up, check out (among other goodies) the relevant entries dealing with propositional and quantificational logic at the Factasia Logic website-- http://www.rbjones.com/rbjpub/logic/index.htm.

Course Requirements

- One class presentation, approximately 3,000 words in length, on required reading. There may be no more than one presentation per reading, and there will be no more than one presentation per class. There will be no presentations given in the last two classes. Presenters will be expected to entertain questions if any from the class. Your grade on your presentation is worth 20% of your final grade. Failure to present as scheduled without prior consultation with me results in a zero.

- Three non-cumulative, take-home tests. Each consists of short answer and short essays questions. A short answer question is one that can be successfully answered in two to three sentences. A short essay question can be done in two to three paragraphs. Students will have the opportunity to submit test questions beforehand. If your short answer or short essay question is used, then I will add three or five points, respectively, to your test score. The most that you can earn this way on a test is eight points. Your test average is worth 50% of your final grade. The distribution and return dates for the tests are as follows: Test #1 [2/5,2/10], Test#2 [3/12, 3/17], Test#3 [4/23-4/28].

- A term paper of approximately 5,000 words worth 30% of your grade. A rough draft of your paper is due by class on April 9th. If I don’t get a rough draft by this date, then there will be a full grade deduction. The final copy of the paper is due by 3:00pm on Friday, the 25th of April. The final paper will be evaluated in part by how effective you are in responding to my criticisms. Your grade is worth 30% of your final grade.
I will accept work that is one class period late, but there will be a full grade deduction. Only in the most exceptional circumstances will late work be accepted after that. Please do not ask me to make an exception to this policy unless you have a VERY special reason. This is a fairly comprehensive syllabus, so please plan your itinerary around the class schedule and the listed due dates.

Grading

Grades will be on a 100-pt. scale. Your final grade will be first determined on a 100-pt. scale, and then converted to a 4.0 scale according to the below tabulations. For example, a final grade of an 83% corresponds to a 3.0 and a 77% corresponds to a 2.5.

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<th>Final Grades</th>
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<td>4.0=90% and above</td>
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<td>3.5=85--89%</td>
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Tentative Reading and Class Schedule

Part I: Historical Snapshots: Aristotle, Boole, and Frege [1/6-2/5]

Lack of historical sense is the family failing of all philosophers...what is needed from now on is historical philosophizing, and with it, the virtue of modesty. –F. Nietzsche

Aristotle

On Interpretation: 17a-20b
Prior Analytics: 24b-29b
Posterior Analytics: 89b-94b
Topics: 100a-104a
Sophistical Refutations: 164a-184b
Metaphysics: 1005b-end of Bk.IV

Commentary & assessment:

Beaney, M. “The Logical Background” and Appendix 1 “Syllogistic Theory” both from Frege: Making Sense.

Mill, J.S., “Ratiocination, or Syllogism” and “Of the Functions and Logical Value of the Syllogism” from A System of Logic: Ratiocinative and Inductive.

Russell, B. “Aristotle’s Logic” from A History of Western Philosophy.

Boole

An Investigation Of The Laws of Thought: Chapter 1, sections 1-11
Commentary and assessment:


**Frege**

*Begriffsschrift* (1879): Selections (Preface and Part I)
Letter to Marty, 29.8.1882
Logic

All can be found in *The Frege Reader* ed. by M. Beaney (Oxford: Blackwell Publishers, 1997).

**Commentary and Assessment**

Beaney, M. “Frege’s Begriffsschrift”, Chapter 2 from *Frege: Making Sense.*

**Part II: What is logic? [2/10-3/12]**

“Contrariwise,” continued Tweedledee, “if it was so, it might be; and if it were so, it would be; but it as it isn’t, it ain’t. That’s logic.”--L. Carroll.

**Rationalism versus Conventionalism**

Russell, B. “Logic as the Essence of Philosophy” from *Our Knowledge of the External World*
“A priori Knowledge and Universals” from *Problems of Philosophy*
Pap, A. “Laws of Logic” from *An Introduction to the Philosophy of Science*
Carnap, R. “The Old and the New Logic”
Hahn, H. “Logic, Mathematics, and Knowledge of the World”

Ryle, G. “Why are the Calculuses of Logic and Arithmetic Applicable to Reality?” from *Collected Papers*, Vol. II.
Popper, K. Why are the Calculi of Logic and Arithmetic Applicable to Reality?” from *Conjectures and Refutations.*

Quine, W.V., “Carnap and Logical Truth” in *Ways of Paradox*

**The concept of logical consequence and criteria for logical constants**

Read, S. *Thinking About Logic*: Chapters 1 and (especially) 2.

Tarski, A. “On the Concept of Logical Consequence” from *Logic, Semantics, Metamathematics*

Prior A.N., “What is Logic?” in *Papers in Logic and Ethics*
Part III: Sample Deviations and Extensions of Classical Logic [3/10-4/23]

If sheer logic is not conclusive, what is? --W.V. Quine

Preliminaries

Dummett, M. “The Justification of Deduction” from *Truth and other enigmas*  
Quine, “Deviant Logics” Ch.6 from *Philosophy of Logic*

Theories of Conditionals:

Read, S. Chapter 3 from *Thinking About Logic*.  
Anderson, A.R. and N. Belnap “Entailment” from *Logic And Philosophy*.  
Edgington, D. “Do Conditionals have Truth-Conditions?”

Modal Logic:

Read, S. Chapter 4 from *Thinking About Logic*.  
Loux, M. from *The Actual and the Possible*.  
Quine W.V., “Three Grades of Modal Involvement” in *Ways of Paradox*.

Free Logic:

Read, Chapter 5 from *Thinking About Logic*.  
Ermanno Bencivenga, “Free Logics” from *Handbook of Philosophical Logic*

Dialethic (Paraconsistent) Logic:

Read, Chapter 6 from *Thinking About Logic*”  
Priest, G. “Can Contradictions be True?” *Aristotelian Society*, supp. vol. 67 (1993)  
Smiley, T.J. “Can Contradictions be True?” *Same as above*.

Fuzzy Logic:

Read, Chapter 7 from *Thinking About Logic*.  
Haack, S. “Do we need ‘Fuzzy Logic?’” and “Is Truth flat or Bumpy?”  
Putnam, H., “The logic of Quantum mechanics”  
Dummett, M. “Is Logic Empirical?”

Intuitionistic Logic:  
Read, Chapter 8 from *Thinking About Logic*  
Van Dalen, D. “The Intuitionistic Conception of Logic”  
Dummett, M. “Truth” and “The Philosophical Basis of Intuitionistic Logic”

On pluralism about logical consequence:

Resnik, M. “Ought There to be but One Logic?” from *Logic and Reality: Essays on the Legacy of Arthur Prior*.  

I’ll suggest further readings that advance class discussion of the issues that we encounter as we move through the material. For now, two excellent sources on lots of the stuff we shall consider are the Stanford Encyclopedia of philosophy at http://plato.stanford.edu/ and the *Routledge Encyclopedia Of Philosophy Online*, which is available to MSU students through the library.