

INTRODUCTION TO SYMBOLIC LOGIC
PHL 225
FALL 2007

AUG. 27th – DEC. 7nd

Professor: Kevin J. Kukla

- MEETING TIME: TBA
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Final Exam: TBA

Textbooks

- *Deduction: Introductory Symbolic Logic* – Daniel A. Bonevac, Blackwell, 2002, 2nd edition. I will refer to this text with the letter, ‘**D**’
- *Logic: An Introduction* – Greg Restall, Routledge, 2005, 1st edition. I will refer to this text with the letter, ‘**L**’

Recommended Text

- *Logic: A Very Short Introduction* – Graham Priest, Oxford, 2000. I will refer to this text with the letters, ‘**LSI**’

Course Description

Logic is the theory or *good reasoning*. There are many different reasons to study logic. Logic not only helps you reason well, but it also helps you *understand* how reasoning works.

Logic can be done in two ways: it can be *formal* and it can be *philosophical*. We will be concentrating on *both* aspects of logic. So, we will be examining the techniques logicians use in *modeling* good reasoning. This ‘modeling’ is formal and technical, just like the formal modeling you see in other disciplines: chemistry, physics, economics, mathematics, etc. This means we will be developing an *artificial language* – logic – in order to formalize English sentences and arguments that will enable us to develop a theory of good reasoning and better understand how reasoning works. As a result, there will be a heavy emphasis on translating English sentences and arguments into logic.

The philosophical aspects of logic are also important, because we try to not only model good reasoning, but also to understand *why* things work the way they do – or to understand why they *do not* work. So, we will not only learn formal techniques, but we will also *analyze* and *interpret* those techniques.

To achieve this second goal, we will examine some classic problems that have historically been seen as challenges to logic. These considerations raise questions about whether logic should be modified, either *extended* or *modified*. It is important, therefore, to recognize that logic is not a completed science. When students take an introductory philosophy course they often leave with the false impression that all the important issues in logic have been decided and all the important questions have been given definitive answers. Interesting issues in logic arise not just at the far reaching abstractions of mathematical logic, but also in an introductory course like this one. It is my hope, then, that you leave this course with a sophisticated understanding of *how* to do logic, as well as a *philosophical understanding* of the discipline itself.

The techniques, then, of logic are *abstract* and *rigorous*. They’re abstract, since we concentrate on particular properties of reasoning that are relevant to our goals. They’re rigorous, because we try to define all the terms we use, and we take our definitions seriously. The goal is for us to *understand* what we are doing as much as possible.

The techniques of formal logic can be used in many different ways. The things we learn in this class can be applied in philosophy, mathematics, computer science, economics, linguistics, and many other domains. Logic is important to *philosophy* as reasoning and argumentation form a core part of philosophy. Logic is important to *mathematics* because the formalization of logic is important when it comes to mathematical theories and mathematical structures. In fact, many of the techniques we will be looking at arose in the study of mathematics. Logic is important in *computing*, because the process of describing a problem or a process to be implemented in a computer is a problem of formalization. Furthermore, the kinds of algorithms or recipes we use in solving problems in logic are useful in problems which can be found in computing. Logic is important to *linguistics* because the formal languages used in the study of logic provide helpful models for linguistic theories.

So, logic has its place in many different disciplines. Even more generally, learning logic helps you learn how to be precise and rigorous in any area of study.

Evaluation

- 3 Exams: 75%
- Problem Sets: 20%
- Attendance & Participation: 5%

Attendance

You are allowed no more than 2 unexcused absences to be eligible for full participation/attendance consideration. Any undocumented absence beyond your fourth will result in 0% for your attendance/participation grade. Additionally, tardiness and sleeping in class is equivalent to an absence.

Participation

Students are expected to attend class prepared to discuss critically the assigned readings and problem sets. If ever the class fails to prepare adequately for class, I reserve the right to administer a quiz for that day.

Grading Scale

- **A+** = 97 - 100%
- **A** = 93 - 96%
- **A-** = 90 - 92%
- **B+** = 87 - 89%
- **B** = 83 - 86%
- **B-** = 80 - 82%
- **C+** = 77 - 79%
- **C** = 73 - 76%
- **C-** = 70 - 72%
- **D+** = 67 - 69%
- **D** = 63 - 66%
- **D-** = 60 - 62%
- **F** = < 60%

Electronic Devices

All electronic devices must be turned off before class begins. If a student's electronic device sounds during class, the student will be counted absent for that day.

Disability Access

Students with disabilities should register with the Office of Disability Services, 205/348.4285. They should then provide the instructor with appropriate documentation and written requests regarding special accommodations. Students who wish to discuss such accommodations are invited to schedule appointments during the instructor's office hours.

Code of Misconduct

The Academic Misconduct Disciplinary Policy will be followed in the event of academic misconduct.

All students in attendance at the University of Alabama are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University expects from its students a higher standard of conduct than the minimum required to avoid discipline. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student.

TENTATIVE SCHEDULE

WEEK	READING/HW	TOPIC	RECOMMENDED
1	<p>HAN: “Logic”, in <u>Fundamentals in Philosophy</u>, edited by John Shand, Routledge, 2003, Greg Restall, pp. 64 – 93</p>	<p>An introductory essay to logic and philosophy of logic: deductive/inductive validity, formal languages, proofs, models, soundness, completeness, vagueness & bivalence, conditionality, definite descriptions, negative existentials, and the nature and scope of logic.</p>	
2	<p>D: Chapter 1, Basic Concepts of Logic</p> <p><u>Problem Set 1:</u> Due at the beginning of Wednesday’s class</p> <p><u>Problem Set 2:</u> Due at the beginning of Friday’s class</p>	<p>Arguments; Validity; Implication & Equivalence, Logical Properties of Sentences; & Sets of Sentences</p>	LSI: Chapter 1
3	<p>D: Chapter 2, Connectives & Arguments Forms</p> <p><u>Problem Set 3:</u> Due at the beginning of Wednesday’s class</p> <p><u>Problem Set 4:</u> Due at the beginning of Friday’s class</p>	<p>Sentence Connectives; A Sentential Language; Truth Functions; Symbolization; Validity; Truth Tables for Formulas; and Other Uses of Truth Tables</p>	LSI: Chapter 2
4	<p>D: Chapter 3, Semantic Tableaux</p> <p><u>Problem Set 5:</u> Due at the beginning of Wednesday’s class</p> <p><u>Problem Set 6:</u> Due at the beginning of Friday’s class</p>	<p>Rules for Negation, Conjunction, and Disjunction; Rules for Conditional & Bi-Conditional; and Decision Procedures</p>	

TENTATIVE SCHEDULE (Continued)

WEEK	READING/HW	TOPIC	RECOMMENDED
5	<p>LI: Vagueness & Bivalence, Chapter 5</p> <p><u>Problem Set 7</u>: Due at the beginning of Friday's class</p>	<p>The Problem of Vagueness in Natural Language and the Sorites Paradox, and their relation to the Principle of Bivalence</p> <p>EXAM 1 (MONDAY)</p>	LSI: Chapter 10
6	<p>LI: Conditionality, Chapter 6</p> <p><u>Problem Set 8</u>: Due at the beginning of Wednesday's class</p> <p><u>Problem Set 9</u>: Due at the beginning of Friday's class</p>	The Paradoxes of Material Implication; Truth & Assertability; & Possibilities & Possible Worlds	LSI: Chapter 6, 7
7	<p>D: Natural Deduction, Chapter 4</p> <p><u>Problem Set 10</u>: Due at the beginning of Wednesday's class</p> <p><u>Problem Set 11</u>: Due at the beginning of Friday's class</p>	Natural Deduction Systems; Rules for Negation & Conjunction; Rules for the Conditional & Bi-Conditional; Rules for Disjunction; & Derivable Rules	
8	<p>D: Quantifiers, Chapter 5</p> <p><u>Problem Set 12</u>: Due at the beginning of Wednesday's class</p> <p><u>Problem Set 13</u>: Due at the beginning of Friday's class</p>	Constants & Quantifiers; Categorical Sentence Forms; Polyadic Predicates; The Language of QL; & Symbolization	LSI: Chapter 3

TENTATIVE SCHEDULE (Continued)

WEEK	READING/HW	TOPIC	RECOMMENDED
9	<p>D: Quantified Tableaux, Chapter 6</p> <p><u>Problem Set 14</u>: Due at the beginning of Wednesday's class</p> <p><u>Problem Set 15</u>: Due at the beginning of Friday's class</p>	<p>Quantifier Tableau Rules; Strategies; Interpretations; & Constructing Interpretations from Tableaux</p>	
10	<p>D: Quantified Natural Deduction, Chapter 7</p> <p><u>Problem Set 16</u>: Due at the beginning of Wednesday's class</p> <p><u>Problem Set 17</u>: Due at the beginning of Friday's class</p>	<p>Deduction Rules for Quantifiers; Universal Proof; & Derivable Rules for Quantifiers</p>	<p>LSI: Chapter 5</p>
11	<p>D: Identity, Function Symbols, and Descriptions, Chapter 8</p> <p><u>Problem Set 18</u>: Due at the beginning of Wednesday's class</p> <p><u>Problem Set 19</u>: Due at the beginning of Friday's class</p>	<p>Identity; Tableau Rules for Identity; Deduction Rules for Identity; Function Symbols; & Definite Descriptions</p>	<p>LSI: Chapter 4</p>
12	<p>LI: Definite Descriptions, Chapter 12</p> <p><u>Problem Set 20</u>: Due at the beginning of Friday's class</p>	<p>EXAM 2 (MONDAY)</p> <p>Russell's Solution; & Referential & Attributive Uses of Definite Descriptions</p>	<p>LSI: Chapter 8, 9</p>

TENTATIVE SCHEDULE (Continued)

WEEK	READING/HW	TOPIC	RECOMMENDED
13	<p>LI: Free Logic, Chapter 13</p> <p><u>Problem Set 21</u>: Due at the beginning of Wednesday's class</p> <p><u>Problem Set 22</u>: Due at the beginning of Friday's class</p>	Existential Import & Predicates; Existential Import & Names; Models; & Tree Rules	
14	<p>LI: What is Logic?, Chapter 14</p> <p><u>Problem Set 23</u>: Due at the beginning of Wednesday's class</p> <p><u>Problem Set 24</u>: Due at the beginning of Friday's class</p>	Logic as Invariance Under Permutation; Logic as Necessary Truth Preservation; & Non-Classical Logics	
15		THANKSGIVING BREAK!!	
16		WRAP-UP & REVIEW FOR FINAL (I.E. EXAM 3)	