INTRODUCTION TO LOGIC

PHIL 195
Winter 2006
195-A: Carnegie 339 M, W 1:10p–2:30p
195-B: Carnegie 339 M, W 2:40p–4p
Office hours: M, W 4p–5p; F 11a–12p
Teaching Assistants:
Katie Celeste (kceleste) and Adrienne Maxwell (amaxwell)

Casey O'Callaghan
73/75 Campus Ave.
207.786.6308
cocallag

Text

Meaning and Argument: An Introduction to Logic through Language, Ernest Lepore, Blackwell 2003, *revised edition* (blue cover).

Course Description

This is a course concerned primarily with deductive logic. Deductive logic is the study of the principles of implication, or what follows from what. Deductive logic deals with the purely formal properties of, and relations among, statements and arguments. These purely formal aspects of propositions and arguments, without regard to their specific content or subject matter, determine whether an argument is *successful* in one fundamental sense. This sense of success is that the argument's conclusion *must* be true given the assumption that its premises are all true; that is, the premises of the argument (deductively) logically entail its conclusion. This is a matter just of the argument's form or structure, not its particular content. So, the propositions 'If someone is from Athens, then he or she is Greek' and 'Socrates is from Athens' logically entail (imply) the proposition 'Socrates is Greek'. 'If something is made of cheddar, then it's made of cheese' and 'the moon is made of cheddar' logically entail (imply) 'the moon is made of cheese'. Deductive logic is thus to be distinguished from inductive reasoning. A strong bit of inductive reasoning is one whose premises, if true, make it more probable—not logically certain—that the conclusion is true. So, 'The sun rose yesterday' and 'the sun rose the day before yesterday', and so on..., make it likely on inductive grounds, but not logically certain, that 'the sun will rise tomorrow' is true.

Given our concern with the principles of deductive reasoning, we'll develop a formal system or language in which we can paraphrase ordinary English statements so as to exhibit their logical structure. We'll then introduce methods by means of which we can prove that certain logical relations, such as implication, entailment, or equivalence, hold between statements, or that a given statement has a certain logical property, such as being tautological or satisfiable. We'll start with simple ordinary language statement forms and move toward more nuanced forms in order to increase the expressive capacity of our formal language at least in the direction of the rich expressiveness of natural language. Finally, we'll prove some results *about* the formal language and proof methods themselves, such as that the formal methods won't give us false positives (the soundness of the system), and that they yield proofs, for example, of all valid arguments (the completeness of the system).

This course should thus be of interest to philosophers, linguists, mathematicians, computer scientists, and anyone intrigued by the characteristics of languages and the execution of formal reasoning.

Coursework

1. Attendance, preparation, participation, and quizzes: 1/4
2. Weekly reading assignments and problem sets (graded)*: 1/4
3. Midterm exam: 1/4
4. Final exam: 1/4

Schedule

W 4 January	Introduction and Key Terms (Ch. 1)
M 9	Arguments and Propositional Logic (Ch. 2)
W 11	Truth-functions: Conjunction, Negation, and Truth Tables (Chs. 3, 4, 5)
M 16	*No class*—Martin Luther King, Jr., Day
W 18	Disjunction (Ch. 6)
M 23	Conditionals (Ch. 7)
W 25	Truth Tables, revisited (§7.12)
M 30	Truth Trees (Ch. 8)
W 1 February	Truth Trees, continued
M 6	Property Predicate Logic (Ch. 9)
W 8	PPL, continued
M 13	Evaluating Arguments in PPL (§§10.1–2)
W 15	**Midterm Exam**
M 20	*Winter Recess*
W 21	*Winter Recess*
M 27	Evaluating Arguments in PPL (§10.3)
W 1 March	Evaluating Arguments in PPL (§§10.4–5)
M 6	PPL Refinements (Ch. 11)
W 8	Relational Predicate Logic (Ch. 12)
M 13	RPL
W 15	RPL
M 20	RPL with Nested Quantifiers (Ch. 13)
W 22	Truth Trees and RPL (Ch. 14)
M 27	Truth Trees and RPL continued
W 29	RPL with Identity, Number (§§16.1–4)
M 3 April	Definite Descriptions (§16.5)
Final Exam:	§A: Monday, 10 April, 10:30a
	§B: Thursday, 6 April, 1:15p

***Written Work Policy**

You may discuss problems and general solution strategies with other students on homework assignments only, but not on quizzes or examinations (including any take-home quizzes). However, when it comes time to write up homework sets, you should work independently. Please cite anyone with whom you work. Do not, under any circumstances, just copy or rework someone else's solutions.