Philosophy 240: Symbolic Logic   Hamilton College
Fall 2009   Russell Marcus
Mondays, Wednesdays, Fridays: 9am - 9:50am   Office: 210 College Hill Road, Room 201
Root 310   email: rmarcus1@hamilton.edu

Syllabus

Course Description and Overview:

       Philosophy has one main tool: logic. Formal logic is the study of arguments and inferences, made in artificial languages designed to maximize precision. This course is a standard introduction to elementary formal logic, covering propositional logic and predicate logic, including identity theory, functions, and second-order quantification.

       The two main techniques we will study are translation and derivation. We will establish a formal definition of valid inference using logical operators and truth functions. We will translate sentences of English into the formal languages of propositional and predicate logic, and back. And we will study a proof system which allows us to infer new claims from given ones, using prescribed rules of inference and proof strategies.

       Twenty-nine of the forty-two class meetings will be devoted to learning logical techniques. There will be eight Philosophy Fridays during which we will examine some philosophical questions about logic. Some of these questions concern the status of logic, and its relation to the rest of our knowledge. Some of these questions concern how best to construct logical systems.

       The remaining five classes, and the final exam period, will be used for tests.

Texts

       Patrick Hurley, *A Concise Introduction to Logic*, 10th edition, Wadsworth. The full text costs
          ~$130. I have ordered copies with just the sections we will use, and an appendix of
          interest to pre-law students. It will be available at the bookstore for $50.
       Jennifer Fisher, *On the Philosophy of Logic*, Wadsworth. Seven classes this term will be devoted
          to the philosophy of logic, and this book will be our central text. It will be a good
          resource for your papers.
       Other readings, including class notes, will be available either on ereserve or on the course
          website. These will be especially important for the several topics not covered in Hurley
          or Fisher.

On-Line Resources

       The website for this course is:

          www.thatmarcusfamily.org/philosophy/Logic/Course_Home.htm

       The course website includes an html syllabus and schedule, homework solutions, class notes, course bibliography, other readings and handouts, and links to websites specifically selected for this course. Limited material, other than your grades, will be available on the Blackboard course pages. The Blackboard page will contain a link to the course website.

Assignments and Grading:

Your responsibilities this course include the following, with their contributions to your grade calculation in parentheses:

> Attendance
> Homework (8%)
> Six Tests (72%, 12% each)
> One four-to-six page paper (20%)

Attendance: Classes are for your edification. It will be useful for you to come to class, but there is no direct penalty for missing class. Some students pick up on the technical material quickly. If you do miss a class, you should arrange to drop off your homework, if you have homework due to be handed in.

Homework: Homework assignments and their due dates are listed on the schedule below. Some homework assignments are problem sets, mainly from the Hurley text; there are also seven homework handouts. Other homework assignments are readings in preparation for classes in which we will discuss the philosophy of logic.

All students will be expected to hand in the first six problem sets, those which are due before the first exam. If you receive less than an 80% on any exam, you must hand in all problem sets which are due before the next exam. If you receive an 80% or higher on the most recent exam, you may hand in your homework, if you wish, but it will not be required. When handing in homework, make it neat and presentable. There should be no ripped or crumpled pages. Problems should be clearly delimited. Questions need not be written out fully, but solutions must be. The homework assignments on the schedule are minimal. If you are still struggling with the material, you should do more problems.

Sample solutions to all homework problems are available on line. Acceptable solutions to most problems vary. We will begin most classes by reviewing a few homework questions. You are expected to have completed the homework and looked at the solutions provided before the beginning of class. Come to class prepared to ask any unanswered questions about the homework.

Use the text as a reference guide. The chapter sections include excellent examples, and solutions. Read on a need-to-know basis: when you have difficulty with specific problems, read the relevant sections of the chapter. My lecture notes should also be helpful, and contain additional exercises.

Tests: All six tests are mandatory. Dates for the tests are given on the schedule below. No make-ups will be allowed for missed tests. If you are unable to take a test, you must request an arrangement from me in advance. The final exam will be one more test of the same type as each of the first five tests. You will also have an opportunity, at the time of the final, to take a compensatory version of up to two of the first five tests. I will average the grade on the re-take with your original grade. If you miss a test during the term, the re-take will be averaged with a 0. Practice problems for each test will be available on the course website.

Paper: Each student will write a short paper on a topic in logic, philosophy of logic, or the application of logic to philosophy. Eight class meetings will be devoted to such topics. All papers will require a small amount of research. Papers may be mainly expository, especially those covering technical topics. But, the best papers will philosophical, and will defend a thesis. I will suggest topics and readings through the term. The Fisher text will also be useful in generating ideas.

Papers are due on December 4, though they may be submitted at any time during the course. More details about the papers will be distributed in class.

The Hamilton College Honor Code will be strictly enforced.

Schedule:

Class	Date	Topic Name	Homework to do before the next class meets
1	Friday August 28	Arguments; Validity and Soundness	**§1.1: I.**1, 3, 7, 14, 20, 27 **§1.4: I.**1, 3, 7, 8, 10 **§1.2: VI.**1, 2, 4, 7, 9
2	Monday August 31	Translation using Propositional Logic; Wffs	**§6.1: I.**1-11, 13-16, 21-23, 29, 30, 38, 39, 41-43 Homework Handout #1: Translating from Propositional Logic **§6.1: III.**1-10
3	Wednesday September 2	Truth Functions	Read Fisher, pp 106-111.
4	Friday September 4	Philosophy Friday #1: Conditionals	**§6.1: I.**34-37, 45, 47, 48, 50 **§6.2: I.**1-4, 9, 10 **§6.2: III.**1-3, 6-11, 12, 21, 22, 24 **§6.2: II.**1-3, 13, 15 **§6.2: IV.**1-5, 11, 12
5	Monday September 7	Truth Tables for Propositions	**§6.3: I.**1-4, 11, 14 **§6.3: II.**1, 3, 5, 11 **§6.3: III.**1, 9, 10
6	Wednesday September 9	Truth Tables for Arguments	Read Fisher, pp 46-52. Read Searle, "Can Computers Think?"
7	Friday September 11	Philosophy Friday #2: Syntax and Semantics	**§6.4: II.**2, 5, 10, 17, 19 **§6.4: I.**1, 3, 5, 10
8	Monday September 14	Invalidity and Inconsistency: Indirect Truth Tables	**§6.5: I.**3, 6, 12, 13, 15 **§6.5: II.**2, 5, 9
9	Wednesday September 16	Rules of Implication I	Prepare for Test #1.
10	Friday September 18	**Test #1**: Chapters 1 and 6	**§7.1: III.**1-3, 5, 7, 8, 14, 21, 22 **§7.1: IV.**1, 3, 8
11	Monday September 21	Rules of Implication II	Homework Handout #2: Rules of Implication **§7.2: III.**2, 4, 8, 12, 16, 22 **§7.2: IV.**1, 2, 6, 8
12	Wednesday September 23	Rules of Replacement I	Read Fisher pp 91-105 and pp 125-131.
13	Friday September 25	Philosophy Friday #3: Three Valued Logics	**§7.3: III.**6-12, 14, 18, 19, 22, 26, 32 **§7.3: IV.**4, 9
14	Monday September 28	Rules of Replacement II	**§7.4: III.**2-5, 8, 10, 21, 24, 36, 38, 45 **§7.4: IV.**6, 8

Class	Date	Topic Name	Homework to do before the next class meets
15	Wednesday September 30	Practice with Proofs	Prepare for Test #2.
16	Friday October 2	**Test #2**: Derivations	Read Fisher 53-8.
17	Monday October 5	Conditional Proof	**§7.5: I**.3, 7, 9, 11, 14, 18, 20 **§7.5: II**.3, 5 Note: You need not try each problem without conditional proof, though trying a few may be edifying. **§7.7:** 1, 3, 5
18	Wednesday October 7	Indirect Proof	**§7.6: I**.1, 2, 4, 6, 13, 15, 17 **§7.6: II**.2, 4 Note: You need not try each problem without indirect or conditional proof, though trying a few may be edifying. **§7.7:** 2, 9, 13, 16, 18
19	Friday October 9	Philosophy Friday #4: Adequacy	**§7.6: I**.7, 8, 11, 16, 19 **§7.7:** 6, 10, 14, 17, 19
20	Monday October 12	Predicate Logic, Translation I	Prepare for Test #3. Homework Handout #3: Practice Problems for Test #3
21	Wednesday October 14	**Test #3**: Conditional and Indirect Methods	**§8.1**: 2-4, 6-11, 14-19, 23-28, 35-37
	October 16	**Fall Break**	
22	Monday October 19	Predicate Logic, Translation II	**§8.1**: 21, 31-34, 38-40, 42, 44-6, 50-55, 58, 60 Homework Handout #4: Translating from Predicate Logic
23	Wednesday October 21	Derivations in Predicate Logic I	Read Fisher, pp 36-45 and pp 132-7.
24	Friday October 23	Philosophy Friday #5: Truth and Liars	**§8.2: I**.1-3, 7-9 **§8.2: II**.1, 3, 4, 6
25	Monday October 26	Derivations in Predicate Logic and Changing Quantifiers	**§8.2: I**.4, 5, 10, 12, 13 **§8.2: II**.5, 7, 9, 10 **§8.3: I**.1, 3, 7, 8, 10, 14 **§8.3: II**.3, 5, 9
26	Wednesday October 28	Conditional and Indirect Proof, Predicate Versions	Prepare for Test #4.
27	Friday October 30	**Test #4**: Predicate Logic Translation	**§8.4: I**.1-4, 10, 12, 19, 21 **§8.4: II**.4, 6, 9
28	Monday November 2	Semantics for Predicate Logic	**§8.5: I**.1, 2, 10 **§8.5: II**.1, 2, 6, 10 **§8.5: III**.2, 4

Class	Date	Topic Name	Homework to do before the next class meets
29	Wednesday November 4	Review for Test #5	Prepare for Test #5.
30	Friday November 6	**Test #5**: Predicate Logic Derivations and Invalidity	
31	Monday November 9	Translation Using Relational Predicates I	**§8.6: I**.1-4, 7-10, 13, 14, 17, 19, 20
32	Wednesday November 11	Translation Using Relational Predicates II	Read Quine, "On What There Is." Read Fisher, pp 59-69.
33	Friday November 13	Philosophy Friday #6: Quine and Ontological Commitment	**§8.6: I**.5, 6, 11, 12, 23, 24, 27, 30 Homework Handout #5: Translating from Relations
34	Monday November 16	Derivations Using Relational Predicates	**§8.6: II**.2, 3, 4, 7, 9, 13, 14, 19 **§8.6: III**.1, 4, 8
35	Wednesday November 18	Translation Using Identity I	Read Fisher, pp 74-84.
36	Friday November 20	Philosophy Friday #7: Modal Logic	**§8.7: I**. 2, 3, 6, 9, 10, 13, 14, 15, 17, 18, 22, 23, 24, 25
	Thanksgiving	**Break**	
37	Monday November 30	Translation Using Identity II	**§8.7: I**. 28, 31, 34, 35, 37-39, 40, 42, 43, 45, 46, 47, 50
38	Wednesday December 2	Derivations Using Identity I	**§8.7: II**.2, 3, 5, 6, 9, 11, 12, 19 **§8.7: III**.2, 3, 7, 8, 10, 12 Complete paper.
39	Friday December 4	Derivations Using Identity II **Papers are due**.	**§8.7: II**.7, 10, 14, 15, 17 **§8.7: III**.5, 13, 15
40	Monday December 7	Functions	Homework Handout #6: Functions
41	Wednesday December 9	Second-Order Logic	Homework Handout #7: Second-Order Quantifiers Read Fisher, pp 84-90 and pp 153-161.
42	Friday December 11	Philosophy Friday #8: The Right Logic?	Practice Problems for Test #6
	Wednesday December 16 2pm - 5pm	**Test #6 (Final)**: Relations, Identity Theory, Functions, and Second-Order Logic Plus, Compensatory Material	

Office Hours

My office hours for the Fall 2009, term are 10:30am - noon, Monday through Friday.