Philosophy 240: Symbolic Logic Hamilton College
Fall 2011 Russell Marcus
Mondays, Wednesdays, Fridays: 9am - 9:50am email: rmarcus1@hamilton.edu

Syllabus

Course Description and Overview:

Philosophy has one technical 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 central goal of this course is to provide you with a technical method of deciding what follows from what.

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. We will use a proof system to infer new claims from given ones, following prescribed rules of inference and proof strategies.

Thirty of the forty-two class meetings will be devoted to learning logical techniques. There will be seven 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. You will be asked to write one essay.

Texts

The draft of my logic book, *What Follows*, is the main text of the course. It is available on the course website.

Other readings will also be available on the course website. These will be especially important for Philosophy Fridays and your paper assignment.

On-Line Resources

The website for this course is:

http://www.thatmarcusfamily.org/philosophy/Course_Websites/Logic_F11/Course_Home.html

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.

Office Hours

My office hours for the Fall 2011, term are 10:30am - noon, Monday through Friday. My office is upstairs in 202 College Hill Road.

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 attend class. 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 for approximately the first half of the term are listed on the schedule below. Assignments for Chapter 3 will be distributed later in the term. Most homework assignments are problem sets from Chapters 1-3. Other homework assignments are readings from Chapter 4, mainly in preparation for Philosophy Fridays.

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 85% on any exam, you must hand in all problem sets which are due before the next exam. If you receive an 85% 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 may not need to be written out fully, but solutions must be.

Sample solutions to all homework problems are in the solutions manual, available on line. Acceptable solutions to most problems vary. We will begin most classes with time to review a few homework questions. You are expected to have completed the homework and looked at the sample solutions before the beginning of class. Mark any changes you make to your original solutions in a different-colored writing utensil so I can see where you may need help. Come to class prepared to ask questions which remain unanswered.

The homework assignments on the schedule are minimal. If you are still struggling with the material, you should do more problems.

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 of the same type as each of the first five tests. Be prepared: the final exam will cover the most difficult material in the course.

You will 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 compensatory exam with your original grade. If you miss a test during the term, the compensatory exam 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. Seven class meetings, Philosophy Fridays, will be devoted to such topics. Readings for Philosophy Fridays come from Chapter 4 of *What Follows*. I expect you to do further research for your papers; suggestions are included in the text. Papers may be mainly expository, especially those covering technical topics. The best papers will philosophical, and will defend a thesis. I will suggest topics and readings through the term. **Papers are due on December 2**, 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 26	Arguments Validity and Soundness	§1.1: 1, 3, 8, 20, 22, 27, 33, 35, 39 §1.2: 2-5, 13-18
2	Monday August 29	Translation using Propositional Logic Wffs	§1.3a: 11-20 §1.3b: 6-10 §1.4a: 1-5, 10-13 §1.4b: 1-5, 13, 14, 16
3	Wednesday August 31	Truth Functions	Read §4.3: Conditionals
4	Friday September 2	**Philosophy Friday #1**: Conditionals	§1.4b:12, 17-20 §1.5a: 1-4, 9-13, 17, 18 §1.5b: 1-5, 11, 12, 16 §1.5c: 4, 5, 7, 10
5	Monday September 5	Truth Tables for Propositions	Read §4.2: Disjunction, Unless, and the Sixteen Truth Tables §1.6a: 3, 8, 10, 19, 26 §1.6b: 6, 12, 15, 26 §1.6c: 3, 4, 6, 7, 26, 33
6	Wednesday September 7	Truth Tables for Arguments	Read §4.5: Adequacy
7	Friday September 9	**Philosophy Friday #2**: Adequate Sets of Connectives	§1.7: 1, 3, 4, 6, 8, 12, 13, 16, 19
8	Monday September 12	Invalidity and Inconsistency: Indirect Truth Tables	§1.8a: 3-5, 12-15, 20-23 §1.8b: 1, 3, 5, 17-19
9	Wednesday September 14	Rules of Implication I	Prepare for Test #1
10	Friday September 16	**Test #1**: Chapters 1 and 6	§2.1a: 1-3, 6-8, 16-18, 24 §2.1b: 4, 5, 8, 10
11	Monday September 19	Rules of Implication II	§2.2a: 1-12 §2.2b: 1-3, 10-15, 22, 24 §2.2c: 5, 7, 8
12	Wednesday September 21	Rules of Replacement I	Read §4.4: Syntax, Semantics, and the Chinese Room
13	Friday September 23	**Philosophy Friday #3**: Syntax and Semantics	§2.3a: 1-4, 7, 10-12, 16, 19, 24, 25 §2.3b: 4, 7, 8, 10
14	Monday September 26	Rules of Replacement II	§2.4a: 2, 4-8, 12-14, 20, 25, 26 §2.4b: 2, 3, 8
15	Wednesday September 28	Practice with Proofs	Prepare for Test #2
16	Friday September 30	**Test #2**: Derivations	Read §4.1: The Laws of Logic and Their Bearers

Class	Date	Topic Name	Homework to do before the next class meets
17	Monday October 3	Conditional Proof	§2.5a: 1-4, 14, 15, 17, 19 §2.5b: 4-7 §2.6a: 1, 4, 8, 10 §2.6b: 2, 6, 7
18	Wednesday October 5	Indirect Proof	Read §4.6: Three-Valued Logics
19	Friday October 7	**Philosophy Friday #4**: Three-Valued Logics	§2.7a: 1-3, 5-7, 16-18 §2.7b: 4, 6-10
20	Monday October 10	More on Proofs	Prepare for Test #3
21	Wednesday October 12	**Test #3**: Conditional and Indirect Methods	
	October 14	**Fall Break**	
22	Monday October 17	Predicate Logic, Translation I	TBA
23	Wednesday October 19	Predicate Logic, Translation II	TBA
24	Friday October 21	Derivations in Predicate Logic	Prepare for Test #4
25	Monday October 24	**Test #4**: Predicate Logic Translation	TBA
26	Wednesday October 26	More Derivations and Changing Quantifiers	Read §4.7: Truth and Liars
27	Friday October 28	**Philosophy Friday #5**: Truth and Liars	TBA
28	Monday October 31	Conditional and Indirect Proof, Predicate Versions	TBA
29	Wednesday November 2	Semantics for Predicate Logic	Read §4.8: Quantification and Ontological Commitment
30	Friday November 4	**Philosophy Friday #6**: Quantification and Ontological Commitment	TBA
31	Monday November 7	Invalidity in Predicate Logic	TBA
32	Wednesday November 9	Translation Using Relational Predicates I	Prepare for Test #5
33	Friday November 11	**Test #5**: Predicate Logic Derivations and Invalidity	TBA
34	Monday November 14	Translation Using Relational Predicates II	TBA

Class	Date	Topic Name	Homework to do before the next class meets
35	Wednesday November 16	Derivations Using Relational Predicates	Read §4.9: Color Incomaptibility
36	Friday November 18	**Philosophy Friday #7**: Color Incompatibility	TBA
	Thanksgiving	**Break**	
37	Monday November 28	Translation Using Identity I	TBA
38	Wednesday November 30	Translation Using Identity II	TBA Finish Paper
39	Friday December 2	Derivations Using Identity **Papers are due**.	TBA
40	Monday December 5	Functions	TBA
41	Wednesday December 7	Second-Order Logic	Read §4.10: Second-Order Logic and Set Theory TBA
42	Friday December 9	Catch-Up	Prepare for Test #6
	Thursday December 15 7pm - 10pm	**Test #6 (Final)**: Relations, Identity Theory, Functions, and Second-Order Logic	Plus, Compensatory Material