

Introduction to Symbolic Logic

Instructor: Brandon Ashby

1. Textbooks and reading materials

- Richard Parsons, *An Exposition of Symbolic Logic*.

We will also be using the UCLA Logic 2010 software program. Both are available for free at this website:¹

<https://logiclx.humnet.ucla.edu>

2. Course contents

In this course, we will cover propositional and first-order quantificational logic. We will cover how to translate natural language statements into a formal language, how to prove sentences in our formal language using natural deduction, and methods of determining the validity and invalidity of formulas and arguments.

3. Assignments

- Three exams, 45% of your final grade.
- two quizzes, 25% of your final grade.
- Homework, 20% of your final grade.
- Class attendance and participation, 10% of your final grade.

3.1. Exams:

This course will have three exams (including the final). Each will be worth 15% of your final grade. The exams are comprehensive and will ask you the same sorts of questions that are posed in the homework, though they will tend to be harder than the homework questions.

3.2. Quizzes

There will be two quizzes in this class. The quizzes are designed to give you a sense of whether or not you are comprehending the material well enough to succeed on the exams.

3.3. Homework:

For every course meeting, you shall have a set number of questions to answer. I encourage you to do more than is required in the homework, as this will only increase your proficiency with the material. Logic is not difficult to learn, but it takes a lot of practice.

¹ If you are struggling to understand the material, I will always be happy to help. But, if you want a third or fourth point of contact with the material besides me and the Parsons book, Paul Teller's *A Modern Formal Logic Primer* (<https://tellerprimer.ucdavis.edu/pdf>) and *For All X* (<http://forallx.openlogicproject.org>) are high-quality, free, online logic books. If you want additional proof checker systems for practicing deductions and other logic problems: <http://proofs.openlogicproject.org> works with *For All X*, and <http://selfpace.uconn.edu/BertieTootie/software.htm> works with the Teller's *A Modern Logic Primer*.

3.4. In class participation

Students will be called upon randomly to share their solutions to one or more of the homework problems with the class. An important part of developing your skills as a logician is to see how others approach the same problems that you are working on. Witnessing the techniques used by your peers will enhance your own creativity by allowing you to see their insights, and you shall have the opportunity to share your own in turn.

I realize that the thought of having to present before the class may be frightening to some of you. But being able to share and present your work in front of others will almost certainly be an important part of your work at some point in your career. I promise you that I shall do my best as an instructor to create a supportive atmosphere (which you may not have in a real job) in which you can practice this important skill.

4.0 Course Schedule

Readings are listed in terms of the chapter number and then section number. For instance, §1.1-3 indicates that you should read the first three sections of the first chapter.

Exercises are listed by chapter, section, then number. E.g., exercises 1.2.3-6 would refer to exercises three through six in section two of the first chapter.

Exercises to be done using the UCLA Logic 2010 software package will be listed on the assignment sheets that I will hand out at the end of every class.

Major assignments are listed in red and are underlined.

4.1 MWF version

Week 1:

- Introduction to the course; how to use the UCLA Logic 2010 software
- Before class, read §0.1-2; after class, do exercises 0.1.1-0.1.7.
- Before class, read §0.3-6; after class, do exercises 0.3.1-6.

Week 2

- Before class, read §1.1-3; after class, do exercises 1.1.1; 1.2.1-2; 1.3.1-2.
- Before class, read §1.4-5; after class, do exercises 1.4.1-2; 1.5.1-2.
- Before class, read §1.6-7; after class, do exercises 1.6.1-3; 1.7.1-2.

Week 3

- Before class, read §1.8-10; after class, do exercises; 1.8.1-2; 1.9.1-3; 1.10.1-3.
- Before class, read §1.11-12; after class, do exercises 1.11.1; 1.12.1.
- Review day (first half of class), quiz #1 (second half of class)

Week 4

- Before class, read §2.1-2; after class, do exercises 2.1.1-2; 2.2.1-3.
- Before class, read §2.3-4; after class, do exercises 2.3.1-4; 2.4.1-2.
- Before class, read §2.5-6; after class, do exercises 2.5.1; 2.6.1.

Week 5

- Before class, read §2.7-8; after class, do exercises 2.7.2-5; 2.8.1-2.
- Before class, read §2.9; after class, do exercises 2.9.1.
- Before class, read §2.10; after class, do exercises 2.10.1.

Week 6

- Before class, read §2.11; after class, do exercises 2.11.1.
- Review Day
- Exam #1

Week 7

- Before class, read §3.1-2; after class, do exercises 3.1.1-3; 3.2.1; 3.2.1.
- Before class, read §3.3-4; after class, do exercises 3.3.1; 3.4.1-2.
- Before class, read §3.5a-c; after class, do exercises 3.5.1; 3.5.2a-e; 5.3.3a-l; 3.5.4c-j.

Week 8

- Before class, read §3.5d-e; after class, do exercises 3.5.5-6.
- Before class, read §3.6; after class, do exercises 3.6.1-3.
- Before class, read §3.7; after class, do exercises 3.7.1.

Week 9

- Before class, read §3.8; after class, do exercises 3.8.1c-g; 3.8.2.
- Before class, read §3.9; after class, do exercises 3.9.1-2.
- Before class, read §3.10-11; after class, do exercises 3.10.1; 3.11.0.

Week 10

- Review day.
- Exam #2
- Before class, read §4.1-2; after class, do exercises 4.1.1; 4.2.1a-m.

Week 11

- Before class, read §4.3-4; after class, do exercises 4.3.1-2; 4.3.5-7; 4.4.1-2.
- Before class, read §4.5-6; after class, do exercises 4.5.1-2; 4.6.1.
- Before class, read §4.7-8; after class, do exercises 4.7.1-2; prove theorems T249, T253, T254, T256, T269, T270, T71, T272.

Week 12

- Before class, read §4.9-10; after class, do exercises 4.9.1; 4.10.a-c.
- Review Day
- Before class, read §5.1-2; after class, do exercises 5.1.1-2; 5.2.1-4.

Week 13

- Before class, read §5.3-4; after class, do exercises 5.3.1-3; 5.4.1-4.
- Review day (first half of class), quiz #2 (second half of class)
- Before class, read §5.5-6; after class, do exercises 5.5.a-h; 5.6.1-3.

Week 14

- Before class, read §5.7-8; after class, do exercises 5.7.1-2; 5.8.1-4.
- Before class, read §6.1-2; after class, do exercises 6.1.1; 6.2.1-2.
- Before class, read §6.3-4; after class, do exercises 6.3.1; 6.4.1-3.

Week 15

- Before class, read §6.5-6; after class, do exercises 6.5.1-3; 6.6.1-3.
- Before class, read §6.7; after class, do exercises 6.7.1-3.
- Review day

Week 16: Fall/spring break [MOVE TO APPROPRIATE LOCATION]

- No new material

TBD: Final Exam

4.2 TR version

Week 1:

- Introduction to the course; how to use the UCLA Logic 2010 software
- Before class, read §0.1-6; after class, do exercises 0.1.1-0.1.7; 0.3.1-6.

Week 2

- Before class, read §1.1-4; after class, do exercises 1.1.1; 1.2.1-2; 1.3.1-2; 1.4.1-2.
- Before class, read §1.5-8; after class, do exercises 1.5.1-2; 1.6.1-3; 1.7.1-2; 1.8.1-2.

Week 3

- Before class, read §1.9-12; after class, do exercises; 1.9.1-3; 1.10.1-3; 1.11.1; 1.12.1.
- Review day (first half of class), quiz #1 (second half of class)

Week 4

- Before class, read §2.1-3; after class, do exercises 2.1.1-2; 2.2.1-3; 2.3.1-4.
- Before class, read §2.4-6; after class, do exercises 2.4.1-2; 2.5.1; 2.6.1.

Week 5

- Before class, read §2.7-9; after class, do exercises 2.7.2-5; 2.8.1-2; 2.9.1.
- Before class, read §2.10-11; after class, do exercises 2.10.1-2.11.1.

Week 6

- Review Day
- Exam #1

Week 7

- Before class, read §3.1-3; after class, do exercises 3.1.1-3; 3.2.1; 3.2.1; 3.3.1.
- Before class, read §3.4-5a-c; after class, do exercises; 3.4.1-2; 3.5.1; 3.5.2a-e; 5.3.3a-l; 3.5.4c-j.

Week 8

- Before class, read §3.5d-e and read §3.6; after class, do exercises 3.5.5-6; 3.6.1-3.
- Before class, read §3.7-8; after class, do exercises 3.7.1; 3.8.1c-g; 3.8.2.

Week 9

- Before class, read §3.9-11; after class, do exercises 3.9.1-2; 3.10.1; 3.11.0.
- Review day

Week 10

- Exam #2
- Before class, read §4.1-3; after class, do exercises 4.1.1; 4.2.1a-m; 4.3.1-2; 4.3.5-7.

Week 11

- Before class, read §4.4-7; after class, do exercises; 4.4.1-2; 4.5.1-2; 4.6.1; 4.7.1-2.
- Before class, read §4.8-10; after class, do exercises; prove theorems T249, T253, T254, T256, T269, T270, T71, T272; do exercises 4.9.1; 4.10.a-c.

Week 12

- Before class, read §5.1-4; after class, do exercises 5.1.1-2; 5.2.1-4; 5.3.1-3; 5.4.1-4.
- Before class, read §5.5-6; after class, do exercises 5.5.a-h; 5.6.1-3.

Week 13

- Review day (first half of class), quiz #2 (second half of class)
- Before class, read §5.7-8; after class, do exercises 5.7.1-2; 5.8.1-4.

Week 14

- Before class, read §6.1-3; after class, do exercises 6.1.1; 6.2.1-2; 6.3.1.
- Before class, read §6.4-5; after class, do exercises; 6.4.1-3; 6.5.1-3.

Week 15

- Before class, read §6.6-7; after class, do exercises 6.6.1-3; 6.7.1-3.
- Review day

Week 16: Fall/spring break [MOVE TO APPROPRIATE LOCATION]

- No new material

TBD: Final Exam