

## Logic

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### Description

This course covers the basics of formal logic. No background in any formal discipline is required.

Through studying logic, you will get better at thinking *structurally*. Any time someone wants to rationally convince you of something, they have to give you an argument. And every argument has a logical structure. Some of these structures are strong, while others are hopelessly weak. In this class, you'll learn to not only spot the difference, but *prove* the difference.

This will help you to develop and strengthen essential reasoning skills, which will improve your ability to think critically about everything from the sciences to the humanities.

### Textbook

*A Modern Formal Logic Primer* by Paul Teller.

This textbook is available (legally) for free online, in searchable PDF form, with manuals containing the solutions to all the textbook exercises.

### Assignments and Grading

The only required assignments in this class are the three exams:

- Exam 1 (on sentence logic): 30%
- Exam 2 (on predicate logic): 30%
- Exam 3 (cumulative): 40%

There will also be eleven in-class quizzes, each worth up to two points of extra credit (equivalent to 2% of your final grade).

There will be no mandatory homework to turn in. You will be encouraged to go over particular textbook chapters and exercises to prepare for the quizzes and exams. Specific exercises from the textbook will be recommended for this purpose.

### Course Schedule

<u>Week</u>	<u>Textbook Reading</u>	<u>Topics</u>
1	Vol. 1 Ch.1	Introduction to the course and the basic elements of sentence logic: atomic sentences, connectives, truth values, parentheses, and truth tables.
2	Vol. 1 Ch. 3 & 4	Using truth tables to prove logical equivalence, logical truth, contradiction, and validity + Quiz 1.
3	Vol. 1 Ch. 5	Natural deduction: Introducing and eliminating the connectives + Quiz 2.

4	Vol. 1 Ch. 7, secs. 7-1 to 7-3	Natural deduction: Derived rules + Quiz 3
5	Vol. 1 Ch. 7 Sec. 7-4	Natural deduction: Proving logical truth and contradiction + Quiz 4
6	Vol. 1 Ch. 8 & 9	Truth trees + Quiz 5 + review for Exam 1
7	Vol. 2 Ch. 1 & 2	EXAM 1 + Basic elements of predicate logic: predicates, names, variables, quantifiers, substitution instances, and interpretations.
8	Vol. 2 Ch. 3	Interpretations and counterexamples + Quiz 6
9	Vol. 2 Ch. 5	Natural deduction: Introducing and eliminating the quantifiers
10	Vol. 2 Ch. 6	Natural deduction: Multiple quantifiers, negated quantifiers, and the contradiction rule + Quiz 7
11	No new reading	Quiz 8 + Review + EXAM 2
12	Vol 2. Ch. 7 & 8	Truth trees for predicate logic + Quiz 9
13	Vol 2. Ch. 9	Identity
14	No new reading	Quiz 10 + review for the final