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Office: Arnold Hall 112  
Hours: M/T 10:30–12:00

## INTRODUCTION TO SYMBOLIC LOGIC

PHIL 260, FALL 2019

Ming Hsieh Hall 122, M/W/F 1:30–2:20

This lecture course is an introduction to symbolic logic: the science of correct reasoning. We will spend the first half of the course with our noses to the grindstone, studying sentential logic and becoming proficient at constructing truth tables and proofs. Our hard work will be rewarded with a refined capacity to recognize and diagnose good and bad arguments. The second half of the course will introduce monadic predicate logic, and also provide opportunities to apply our newfound proficiency with symbol systems to venerable philosophical debates concerning truth, the existence of God, free will, and the nature of logic itself.

### Required book

Virginia Klenk, *Understanding Symbolic Logic* 5<sup>th</sup> Edition (Pearson Prentice Hall 2008)

### Brief grading breakdown

Twelve beginning of week quizzes: 20%  
Twelve end of week quizzes: 20%  
Midterm exam: 20% (10/9)  
Final exam: 40% (12/17, 11am–1pm)

### Grade scale

A: 90–100%  
B: 80–89%  
C: 70–79%  
D: 60–69%  
F: 0–59%

### Brief schedule

Week 1: Reasoning correctly

#### Sentential logic

Week 2: Sentences and truth values

Week 3: Symbolizing sentences

Week 4: Truth tables I: Testing (in)validity

Week 5: Truth tables II: Logical properties

Week 6: Proofs I: Inference and replacement rules

Week 7: Proofs II: Proofs with replacement and assumptions

Week 8: Review

#### Philosophical interlude

Week 9: Truth, God, and freedom

#### Predicate logic

Week 10: Sets, singular sentences, and quantifiers

Week 11: Symbolizing categorical propositions

Week 12: Quantifier rules

Week 13: Predicate proofs

Week 14: Proofs workshop

#### Philosophy of logic

Week 15: Logic and psychology

Week 16: Review

**Detailed grading breakdown****Beginning of week quizzes (20%)**

Quizzes on eCampus will be due by the beginning of class on most Mondays. These beginning of week quizzes will test both your comprehension of that day's assigned reading and your cumulative understanding of symbolic logic (and, occasionally, its philosophical applications). Your lowest two beginning of week quiz grades will be dropped. The remaining ten quizzes will each be worth 2% of your total grade.

**End of week quizzes (20%)**

Additional eCampus quizzes will be due by 11:59 pm on most Fridays. These end of week quizzes will test you on the material covered during the week. Your lowest two end of week quiz grades will be dropped. The remaining ten quizzes will each be worth 2% of your total grade.

**Midterm exam (20%)**

The midterm exam on 10/9 will test your ability to construct truth tables and proofs in sentential logic. You may bring a cheatsheet to the exam, consisting in whatever you wish written (or printed) on a single page.

**Final exam (40%)**

The final exam on 12/17 will have two parts. Part I (worth 30% of your total grade) will test your ability to construct proofs in monadic predicate logic. Part II (10%) will prompt you to write a 250–500 word essay on the relationship between logic and thought. You may bring a cheatsheet to the exam, consisting in whatever you wish written (or printed) on a single page.

**Extra credit**

You will earn  $\frac{1}{4}$  point of extra credit—up to a maximum of 2 points—each time you alert me to an outright error in a quiz or the Klenk textbook.

**Attendance and participation**

Attendance will not directly affect your course grade. Daily class participation will be the determining factor if you end up on the borderline between two grades (e.g., excellent participation will bump a 79% to a B).

**Some tips**

Practice, practice, practice. Ask questions in class. Before taking beginning of week quizzes, read—and, if necessary for comprehension, reread—the relevant unit(s) in the Klenk textbook. Before taking end of week quizzes, complete the exercises at the end of the relevant unit(s). Form a study group which meets regularly to work on exercises and quizzes; but make sure that you, personally, fully understand all of the solutions your group discovers. Come to office hours for help if anything is tripping you up.

**Detailed schedule****(BQ)** = Beginning of week quiz (due by 1:30pm on Monday)**(EQ)** = End of week quiz (due by 11:59pm on Friday)

8/21: Fallacies, formal and informal

8/23: Reasoning and symbol systems

**Reading:** Klenk, Unit 1**(EQ1)****Sentential logic**

8/26: Sentences

**Reading:** Klenk, Unit 2

8/28: Sentential logic

8/30: Truth values

**Reading:** Klenk, Unit 3**(EQ2)**9/2: *No class (Labor Day)*

9/4: Symbolizing sentences

**Reading:** Klenk, Unit 4**(BQ1)**

9/6: Symbolizing complex sentences

**(EQ3)**

9/9: Symbolizing arguments

**Reading:** Klenk, Unit 5**(BQ2)**

9/11: Truth tables

9/13: Testing validity

**(EQ4)**

9/16: Tautologies, contradictions, and contingencies

**Reading:** Klenk, Unit 6**(BQ3)**

9/18: Implication, equivalence, and consistency

9/20: Simple proofs

**(EQ5)**

9/23: Inference rules

**Reading:** Klenk, Unit 7**(BQ4)**

9/25: Complex proofs without replacement

9/27: Replacement rules

**(EQ6)**

9/30: Simple proofs with replacement

**Reading:** Klenk, Unit 8**(BQ5)**

10/2: Complex proofs with replacement

10/4: Conditional proofs and reductions

**Reading:** Klenk, Unit 9**(EQ7)**

10/7: Review

**(BQ6)**

10/9: Midterm exam

**10/11:** *No class (Fall Break)*

### Philosophical interlude

**10/14:** Truth

**Reading:** Leibniz, "The Nature of Truth"

**10/16:** God

**Reading:** Herrick, "Does God Exist?"

**10/18:** Freedom

**Reading:** Herrick, "Do We Have Free Will?"

### Predicate logic

**10/21:** Sets

(BQ7)

**10/23:** Symbolizing singular sentences

**Reading:** Klenk, Unit 10

**10/25:** Quantifiers

**Reading:** Klenk, Unit 11

(EQ8)

**10/28:** Venn diagrams

**Reading:** Klenk, Units 12 & 23

(BQ8)

**10/30:** Symbolizing categorical propositions

**11/1:** Complex subjects and predicates

**Reading:** Klenk, Unit 13

(EQ9)

**11/4:** Quantifier form

**Reading:** Klenk, Unit 14

(BQ9)

**11/6:** Quantifier rules

**11/8:** Pure quantifier arguments

(EQ10)

**11/11:** Proofs for pure quantifier arguments

**Reading:** Klenk, Unit 15

(BQ10)

**11/13:** Proofs for arguments containing truth-functional compounds

**11/15:** Proofs for quantifier theorems

(EQ11)

**11/18:** Proofs workshop

(BQ11)

**11/20:** Proofs workshop

**11/22:** Proofs workshop

(EQ12)

### Philosophy of logic

**12/2:** Logic as the science of thinking

**Reading:** Kant, "Logic"

**12/4:** Anti-psychologism

**Reading:** Frege, "Thought"

**12/6:** Logic and psychologism

**Reading:** Haack, "Logic and Thought"

**12/9:** Review

**(BQ12)**

**12/11:** Wrap-up

**12/17: Final exam** (11am–1pm)

### **Other expectations and policies**

#### **Expected learning outcomes**

Upon successful completion of this course, students will be better able to:

- 1) recognize and diagnose good and bad arguments;
- 2) symbolize arguments in logical form;
- 3) construct proofs in sentential and predicate logic;
- 4) understand some fundamental issues in the philosophy of logic;
- 5) reason logically in everyday life.

#### **Make-up exams**

If you have good reason to miss an exam, please email me at least one week beforehand.

If you fail to do so, then you may forfeit the opportunity to make up the exam. Because quizzes can be taken anytime before the deadline, make-up quizzes will not be offered.

#### **Plagiarism**

Don't do it. Exercise academic integrity, as defined by the WVU Policy on Student Academic Integrity. Plagiarism (or abetting another student plagiarizing) will result in an automatic zero on the plagiarized assignment, as well as a formal complaint. If you have questions about what constitutes plagiarism, please ask.

#### **Accommodations**

If you have good reason to be exempt from (or subject to a modified version of) any policy on this syllabus, please let me know. We'll work something out. If you have a disability and anticipate needing any type of accommodation in order to participate in this course, please let me know and make appropriate arrangements with the Office of Accessibility Services (<https://accessibilityservices.wvu.edu/>).

#### **Statement of non-discrimination**

The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. All of our classroom discussions will be predicated on these commitments.