PHIL 230: Logic and Critical Thinking
Fall 2022
MWF, 1:20-2:25pm
Goldspohn 17
Professor: Adam Kotsko, akotsko@noctrl.edu
Office: Seybert 102 (temporarily)
Office Hours: MWF, 10:45-1:15pm, or by appointment

Course Description

Logic is the study of reasoning and argumentation. All of us make reasoned arguments of various kinds every day, and all of us can tell if an argument sounds right or wrong. For instance, if I said: "The sky is blue and grass is green, therefore dogs are mammals," you would think something was amiss. Even though all three claims are true, they are not connected to each other in the way my statement implies. In this course, we will be studying the nature of that connection (or lack of connection) between statements. Starting with our informal intuitions, we will gradually develop more formal and rigorous ways of assessing arguments.

Course Objectives

- Recognize the difference between arguments and other kinds of speech
- Identify and reconstruct arguments in everyday and academic writing
- Recognize informal argumentative fallacies and understand why they are fallacious
- Evaluate arguments for their soundness or strength
- Formalize arguments from natural language
- Demonstrate validity, contradiction, and tautology using truth-tables
- Demonstrate validity using natural deduction, indirect proof, and conditional proof

Course Readings

The sole required textbook for this course is *Introduction to Logic*, 15th edition, by Irving M. Copi, Carl Cohen, and Victor Rodych (Routledge, ISBN: 978-1-138-50086-0). We will be using this book from the very start of the class, so it is important that you order it as soon as possible.

Assignments and Grading

Student grades will be based on the following:

- Homework: 20%
- Participation: 20%
- Exam 1: 20%
- Exam 2: 20%
- Final Exam: 20%

Homework and Participation: Like learning a musical instrument or perfecting a sport, skills of careful argumentation and analysis can only be honed through regular practice. We will practice both separately, through homework, and as a team, through class discussion of the homework problems. The goal of the homework is not necessarily for you to get everything right on the first try. Your mistakes or confusion are every bit as helpful to the discussion as the right answers, and correcting your own mistakes can be one of the most powerful ways to master a concept. Hence homework will be graded on completeness rather than correctness, and students are

actively encouraged to correct or enhance their homework answers during the course of class discussion. Late homework will only be accepted in case of an excused absence, but I have built a little extra credit into the homework scoring on Blackboard.

Students should also be prepared to speak, whether in small groups or to the whole class, every single day of class. Students who meet that standard and show evidence of strong participation will receive a grade in the **B range** for their participation portion. Students whose contribution is notably lacking—for instance, those who speak very little, who give no evidence of having done the reading carefully, who consistently change the topic in a disruptive way, or whose primary contributions are jokes or personal anecdotes—will receive a participation grade in the **C or D range**. Students who distinguish themselves through some particular service—such as consistently contributing new topics that shape the discussion, serving as a resource for navigating the text, or making a special effort to draw in quieter classmates—will qualify themselves for a participation grade in the **A range**.

The baseline condition for class participation is of course attendance at our meetings. Absences not only affect the individual student, but the entire group, and the same is true of habitual lateness. Lateness will count against a student's participation for that session, and in extreme cases will be treated as the equivalent of an absence.

Attendance will be taken at the start of each class. Absences will be considered excused only for the following reasons:

- You have suffered an illness or other emergency that prevents attendance
- The death or illness of a family member requires you to be elsewhere during class time
- You are celebrating a religious holiday and have received approval for this before missing class.
- You are representing the college in an official capacity and have made me aware of your responsibilities before missing class.

Unexcused absences will negatively affect your participation grade.

Exams will be evenly spaced throughout the semester and are designed to assess students' mastery of the skills and concepts discussed in class. The first exam will cover informal logic, the second will cover syllogistic logic, and the final will cover propositional logic.

Note on Institutional Policies

Note that the college-wide policy on academic dishonesty holds for this class. Cheating on an exam is a very serious academic and ethical offence that can lead to failure of the assignment or course—or, after multiple instances, expulsion from college. Please consult the Student Handbook for more details of this policy. All other institutional policies apply equally, including those related to accommodations for students with learning disabilities or differences and Title IX protections. More details on those policies are available in the Student Handbook, and students are encouraged to approach the professor with any questions or concerns they may have. In particular, students requiring additional accomodations related to attendance or test-taking are urged to discuss this matter with the professor as early as possible in the semester and to devise a formal written plan in consultation with the relevant institutional offices.

Class Schedule and Readings

This calendar provides the schedule for assignments and readings for our time together this semester. Students should be aware that the schedule may change. All students will be alerted as soon as possible via email and Blackboard announcement. ***Failure to check email regularly is no excuse for missing these updates.*** *Note that readings are listed first, followed by homework.*

Wednesday	August 24	Course introduction and syllabus
Friday	August 26	1.1, What Logic Is; 1.2, Propositions and Arguments; 1.3, Recognizing Arguments; 1.4, Arguments and Explanations *Homework:* 1.2, #2-10; 1.4, #2-7
Monday	August 29	1.5, Deductive and Inductive Arguments; 1.6, Validity and Truth; 2.1 Paraphrasing Arguments *Homework:* 1.6, #1-8; 2.1, #1-5
Wednesday	August 31	2.2, Diagramming Arguments; 2.4, Problems in Reasoning *Homework:* 2.2A, #2-6. 2.2B, 2-5; 2.4, #1-3
Friday	September 2	3.4, Definitions and Their Uses; 3.5, The Structure of Definitions: Extension and Intension; 3.6, Definition by Genus and Difference *Homework:* 3.5A, #1-5; 3.6A, #1-10; 3.6B, #1-10
Monday	September 5	**NO CLASS—Labor Day**
Wednesday	September 7	4.1, What is a Fallacy?; 4.2, Classification of Fallacies; 4.3, Fallacies of Relevance *Homework:* 4.3A, #1-10; 4.3B, #1-5
Friday	September 9	4.4, Fallacies of Defective Induction; 4.5, Fallacies of Presumption; 4.6, Fallacies of Ambiguity *Homework:* 4.4, #1-5; 4.6A, #1-5; 4.6C, #1-10
Monday	September 12	14.1, Alternative Conceptions of Probability; 14.2, The Probability Calculus; 14.3, Probability in Everyday Life *Homework:* 14.2A, #2-6; 14.2B, 1-5; 14.3, #1-5
Wednesday	September 14	**Knachel handout:** IV. Basic Statistical Concepts and Techniques; V. How to Lie With Statistics *Homework:* Exercises (pp. 217-218), #1-8
Friday	September 16	Review of Informal Logic
Monday	September 19	**Exam #1: Informal Logic**
Wednesday	September 21	5.1, The Theory of Deduction; 5.2, Classes and Categorical Propositions; 5.3, The Four Kinds of Categorical Propositions; 5.4, Quality, Quantity, and Distribution *Homework:* 5.3, #1-7; 5.4, #1-7
Friday	September 23	5.5, The Traditional Square of Opposition; 5.6, Further Immediate Inferences

		Homework: 5.5A-B (all); 5.6A-C (all)
Monday	September 26	5.7, Existential Import…; 5.8, Symbolism and Diagrams for Categorial Propositions *Homework:* 5.7B and C; 5.8, #2-11
Wednesday	September 28	6.1, Standard-Form Categorical Syllogisms *Homework:* 6.1, #1-5
Friday	September 30	6.2, The Formal Nature of Syllogistic Argument; 6.3, Venn Diagram Technique… *Homework:* 6.2, #2-6; 6.3A, #1-5; 6.3B, #1-5
Monday	October 3	6.4 Syllogistic Rules and Syllogistic Fallacies; 6.5, Exposition of the Fifteen Valid Forms (skip appendix) *Homework:* 6.4A, #2-7; 6.4B, #2-6; 6.4C, #2-6
Wednesday	October 5	7.1, Syllogistic Arguments; 7.2, Reducing the Number of Terms to Three; 7.3, Translating Categorical Propositions into Standard Form *Homework:* 7.2, #2-6; 7.3, #2-15
Friday	October 7	7.5, Enthymemes *Homework:* 7.5, #2-13
Monday	October 10	7.6, Sorites *Homework:* 7.6A, #2-4; 7.6B, #1-3
Wednesday	October 12	7.7, Disjunctive and Hypothetical Syllogisms *Homework:* 7.7, #2-11
Friday	October 14	7.8, The Dilemma *Homework:* 7.8, #2-11
Monday	October 17	**Fall Break—NO CLASS**
Wednesday	October 19	Review of Syllogistic Logic
Friday	October 21	**Exam #2: Syllogistic Logic**
Monday	October 24	8.1, Modern Logic and Its Symbolic Language; 8.2, Truth-Functionality; 8.3, Conjunction, Negation, and Disjunction *Homework:* 8.3A, #1-10; 8.3B, #1-10; 8.3C, #1-5
Wednesday	October 26	8.4, Conditional Statements and Material Implication *Homework:* 8.4A, #1-10; 8.4B, #1-5
Friday	October 28	8.5, Argument Forms and Refutation by Logical Analogy; 8.6, The Precise Meaning of "Valid" and "Invalid" *Homework:* 8.5 (all)
Monday	October 31	8.7, Testing Argument Validity Using Truth Tables: The Complete Truth-Table Method *Homework:* Copy truth tables from reading

Wednesday	November 2	8.8, Some Common Argument Forms *Homework:* 8.8B, #1-5; 8.8C, #1-5
Friday	November 4	8.9, Statement Forms and Material Equivalence *Homework:* 8.9B, #1-5; 8.9C, #1-5
Monday	November 7	8.10, Logical Equivalence; 8.11, The Three "Laws of Thought" *Homework:* Copy truth tables from reading
Wednesday	November 9	8.1, Formal Proof of Validity; 8.2, The Elementary Valid Argument Forms *Homework:* 9.2, #1-10
Friday	November 11	9.3, Formal Proofs of Validity Exhibited *Homework:* 9.3, #1-5
Monday	November 14	9.4, Constructing Formal Proofs of Validity *Homework:* 9.4, #1-10
Wednesday	November 16	9.5, Constructing More Extended Formal Proofs *Homework:* 9.5A, #1-5; 9.5B, #1-5
Friday	November 18	9.6, Expanding the Rules of Inference: Replacement Rules *Homework:* 9.6, #1-10
Monday	November 21	**NO CLASS—Professor traveling for conference**
Wednesday	November 23	**NO CLASS—Thanksgiving Break**
Friday	November 25	**NO CLASS—Thanksgiving Break**
Monday	November 28	9.7, The System of Natural Deduction; 9.8, Constructing Formal Proofs Using the Nineteen Rules *Homework:* 9.8A, #1-5; 9.8B, #1-10
Wednesday	November 30	9.11, Condition Proof: Sections A and B *Homework:* Copy proofs from reading
Friday	December 2	9.11, Conditional Proof: Sections C through E *Homework:* 9.11D, #1-4
Monday	December 5	9.12, Indirect Proof: Sections A through C *Homework:* 9.11A, #1-5 (pg. 440)
Wednesday	December 7	9.12, Indirect Proof: Sections D through G; 9.13, Sound Arguments and Demonstrative Arguments Distinguished *Homework:* 9.12D, #1-5 (pg. 442)
Friday	December 9	Review of Propositional Logic
Monday	December 12	**Final Exam: Propositional Logic, 1:30-3:30pm**