

PHI 451/651: Logic and Language

Syracuse University, Fall 2023

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Office Hours: Tue 2:30–4:30pm (523 HL) or by appointment

Course Description

The aim of this course is to provide students with a background in various concepts, methods, and results from formal logic that are of philosophical importance. We will study basic set theory, topics in the model- and proof-theory of propositional logic, modal logic, and first-order logic, as well as the application of formal techniques to the study of meaning in natural language.

This course is open to both undergraduates and graduate students. You'll be expected to proceed at a brisk pace, read difficult material, and put in a substantial amount of independent work every week. PHI 251 or an equivalent introductory logic course is a prerequisite. If you are unsure whether you have adequate preparation, come speak with me individually.

Texts

We will work with the following textbooks:

- Sider, T. (2010). *Logic for Philosophy*. Oxford University Press, Oxford
- Open Logic Project (Fall 2021). *Sets, Logic, Computation*
- Heim, I. and Kratzer, A. (1998). *Semantics in Generative Grammar*. Blackwell, Malden, MA

Sider's *Logic for Philosophy* will be our primary textbook, make sure to get a copy (we'll start using it in week 3 or so). I will provide pdfs of all other course materials.

Course Requirements

- (i) Class participation and attendance (UG: 10%, G: 10%)
- (ii) Weekly problem sets, quizzes, and exams (UG: 90%, G: 70%)
- (iii) Article exegesis (G: 20%)

'UG' indicates the percentage weight for undergraduates, 'G' for graduate students. The article exegesis is due on the last day of class and is required of graduate students only. Problem sets will usually get posted on Thursday evenings and will be due by the start of class the following Thursday. Whether and how many quizzes or exams we have will be determined as the semester proceeds. Letter grades are based on the scale of 93+ = A, 90-92 = A-, 87-89 = B+, 83-86 = B, 80-82 = B- etc.

Problem sets must be typed. Any text editor will do, but a particularly good resource for typing work in logic is LaTeX (I use this for my handouts, and all our textbooks were written with it). An online LaTeX editor is available here: <https://www.overleaf.com>

Schedule

The precise schedule and material covered will depend on the pace at which we proceed. It is your responsibility to ensure that you know what the reading and homework is for each class meeting. Roughly, we will cover the following topics in the order indicated:

Part 1: Set Theory

- Basic set theory: sets, relations, functions. (Open Logic, Ch. 1–3)
- Diagonalization, infinity, and the size of sets. (Sider Ch. 1)

Part 2: Propositional Logic (Sider Ch. 2–3)

- The semantics of propositional logic.
- Axiomatic proofs in propositional logic.
- Metatheoretic proofs by induction.
- Soundness and completeness of propositional logic.

Part 3: Modal Propositional Logic (Sider Ch. 6)

- The semantics of modal propositional logic.
- Axiomatic systems for modal propositional logic and frame correspondence.

Part 4: Predicate Logic (Sider Ch. 4–5)

- Symbolization in predicate logic with identity; Russell's theory of descriptions.
- Semantics of predicate logic.

Part 5: Formal Semantics for Natural Language

- Truth-conditional semantics and the lambda calculus (Heim & Kratzer, Ch. 1–2)
- Quantifiers in English (Heim & Kratzer, Ch. 6)

Course Policies

Academic Integrity

Do not cheat. Any established academic integrity violation may result in course failure, regardless of violation level. For details on SU's academic integrity expectations and policies visit:

<http://class.syr.edu/academic-integrity/policy/>

Discussing problem sets with others is fine, and indeed encouraged. However, all the work that you submit *must have been written up by you individually and reflect your own understanding of the material*. Directly copying someone else's work or submitting nearly identical answers produced as a group is considered a violation of academic integrity, as is the use of artificial intelligence to complete any assignment, quiz, or exam. AI detection tools including Turnitin's built-in AI writing indicator, may be used as one factor in evaluating potential inappropriate use of AI in this course.

Electronic Devices

Please do not use electronic devices in class. Phones, tablets, computers etc. should be put away and the volume muted. If you think you need to use an electronic device during class in order to succeed in this course, please come speak to me individually.

Extensions and Absences

To request an extension on an assignment you need to contact me *at least two days* before the due date. Unexcused late work will not be accepted.

You can have two unexcused absences without it affecting your grade. Additional absences should come with an official excuse (e.g. a doctor's note). If you expect to miss a class meeting due to a religious observance, please inform me of the dates on which you will be absent within the first two weeks of the semester. You will be marked absent on a given day if you arrive late, sleep, text on your phone, email, surf the web, or engage in other distracting activity.

Email Policy

I will do my best to reply to emails about brief administrative questions within a day (on weekdays). For substantive inquiries, please come see me during office hours or schedule an appointment.

You can ask content-related questions via the Q&A forum for this class on piazza.com I encourage you to also answer each other's questions on piazza! Please use this tool responsibly: you can offer suggestions on problem set questions, but don't just share complete answers.

Health

Mental health and overall well-being have a significant impact on academic success. It is important to develop skills and resources to effectively navigate stress, anxiety, depression and other mental health concerns. Please familiarize yourself with the range of resources the [Barnes Center](#) provides and seek out support for mental health concerns as needed. Counseling services are available 24/7, 365 days a year, at 315.443.8000, and I encourage you to explore the resources available through the [Wellness Leadership Institute](#).

Accommodations for Students with Disabilities

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. There may be aspects of the instruction or design of this course that result in barriers to your inclusion and full participation in this course. I invite any student to contact me to discuss strategies and/or accommodations (academic adjustments) that may be essential to your success and to collaborate with the [Center for Disability Resources \(CDR\)](#) in this process. Since accommodations may require early planning and generally are not provided retroactively, please contact the CDR as soon as possible.