

Intermediate Logic

SECTION

PHIL 470 A,
Winter 2024

INSTRUCTOR

Jer Steeger
(they/them)

EMAIL

jsteeger@uw.edu

OFFICE LOCATION

M396 Savery Hall

OFFICE HOURS

MW, 3-4 pm

DESCRIPTION

After the crisis in mathematics ushered in by Russell's paradox, developments in formal logic offered renewed hope for foundational security. This course covers its major success stories—namely, the development of a formal notion of syntax and semantics for which the classical rules of inference are sound (everything they prove is true) and complete (everything true is provable). We also face new problems, like Skolem's paradox, which notes that many logical theories cannot single out their intended models. We'll conclude by turning to intuitionistic logic, exploring how these sorts of problems afford opportunities to characterize hidden structure in our reasoning.

REQUIRED TEXT

(Z) Zach, Richard (2021). *Sets, Logic, Computation*. The Open Logic Project.

GOALS

- **Know** the soundness, completeness, and compactness of first-order logic, as well as the Löwenheim-Skolem theorem.
- **Do** the proofs of these theorems and other exercises with metalogical tools.
- **Feel** the power of these results and (any combination of) frustration, puzzlement, curiosity, and wonder about the limitations and structure they uncover.

COURSE AT A GLANCE

DATE	SECTION	CORE READINGS
1. Constructing our language		
1/4	1.1. Sets and infinity	Z Part I
1/9	1.2. Building blocks	Z 6.1 to 6.3
1/11	1.3. Unique readability	Z 6.4 to 6.6
1/16	1.4. Formation sequences	Z 6.7 to 6.9
1/18	1.5. Structures	Z 7.1 to 7.3
1/23	1.6. Satisfaction	Z 7.4 to 7.5
1/25	1.7. Extensionality	Z 7.6 to 7.7
2. Theories and their meanings		
1/30	2.1. Properties of structures	Z 8.1 to 8.2
2/1	2.2. Examples	Z 8.3 to 8.4
2/6	2.3. The theory of sets	Z 8.5 to 8.6

2/8	2.4. Natural deduction	Z 9, 11 (part 1)
2/13	2.5. Soundness	Z 11 (part 2)
3. Their power and limitations		
2/15	3.1. Preparation	Z 12.1 to 12.4
2/20	3.2. Completeness	Z 12.5 to 12.8
2/22	3.3. Löwenheim-Skolem	Z 12.9 to 12.11
4. The structure of our intuitions		
2/27	4.1. Intuitionistic logic	Z 13.5
2/29	4.2. Admissibility 1	Canvas notes
3/5	4.3. Admissibility 2	Canvas notes
3/7	4.4. Semantics for IPC	Canvas notes

ASSIGNMENT SCHEDULE

ASSIGNMENT	DUE DATE	POINTS	% OF TOTAL
Problem sets	Midnight, Monday, start of the week	10 each, 90 total	67%
Take-home final	Midnight, Wednesday, 3/13	45	33%

GROUP WORK

Each of the problem sets will be done as a group that is randomly assigned at the start of each week. Each group will turn in one copy of the problem set. I will grade that copy and assign that grade to each member of the group. I highly encourage communicating with your groupmates outside class to work on problem sets and finalize your submissions.

EXPECTATIONS AND ACCOMMODATIONS

I encourage you to read through the **UW Department of Philosophy's syllabus supplement** at <https://tinyurl.com/3949zyby>. It has detailed information on the department's policies on academic misconduct.

If you experience or witness sexual harassment or discrimination, I highly recommend contacting **SafeCampus** by visiting <https://www.washington.edu/safecampus/> or by calling their hotline at **206-685-7233**.

If you need disability accommodation, please let me know as soon as possible; I also highly recommend contacting **Disability Resources for Students (DRS)** at <http://depts.washington.edu/uwdrs/>.