

P352: Logic and Philosophy

Indiana University, Bloomington, Fall 2025

Contact	Lead Instructor: Prof Calum McNamara Email: calmcnam@iu.edu Office: Sycamore Hall , Room 107 Office Hours: Tuesdays and Thursdays 12:30–1:30pm (i.e., immediately after class)
Course Meetings	Tuesdays and Thursdays, 11:10am–12:25pm, Woodburn Hall, 005
Course Description	In this course, we will survey a number of the formal, logical tools and methods that get used in contemporary philosophy. Specifically, you'll be introduced to topics like set theory; the mathematics of infinity; possible worlds and modal logic; conditionals; probability theory and formal epistemology; and decision, game theory, and social choice theory—all things that come up frequently in contemporary philosophy. In addition to learning basic concepts and results in each of the areas listed, you'll gain mastery of the formal methods mentioned by working with other students on collaborative problem sets.
Objectives	By the end of the course you should (i): be proficient with the technical ideas we've discussed, from each of the areas covered, and (ii) be able to apply these ideas in simple ways to your own philosophical projects and writing.
Prerequisites	Satisfaction of the basic quantitative reasoning requirement. A basic course in logic (like IU's course, P150) is also highly recommended.
Materials	Many of our readings will be drawn from the excellent <i>Philosophical Devices</i> , by David Papineau (2012). You may want to pick yourself up physical copy. (It's cheap!) Alternatively, this book is available digitally, through the university's library website. Other readings will be posted to the Canvas page. I will also provide detailed hand-outs.
Grading	Problem Sets: 40% Final Exam: 50% Class Participation: 10%
Problem Sets	There will four problem sets assigned in this course. You <i>must</i> collaborate with other students on the answers. Specifically, you're expected to work with other students in groups of 3-5, and submit a single set of solutions together as a group. Each student in a group <i>must</i> participate in the generation of each solution in order to receive credit. In other words, it's not permissible to (e.g.) split up a problem set into portions that individual members complete. At the top of each problem set, please list the names of the members of your group.

Warning: the problem sets in this course are meant to be *difficult*. In some cases, in fact, I will set you problems that are being actively discussed in the current literature. Given this, however, I will award credit, not merely for correct answers; but also for ingenuity, creativity, and insight. In other words, if you (and your group) can show me that you've thought about a given problem deeply, and have made a genuine attempt to solve it, then you may be awarded full credit, even if your answer is wrong.

Participation	Part of your grade for this course comes from participation. This involves attending class regularly, engaging in discussion, participating actively in the problem-solving sessions with your group, and so on. (That said, please be mindful of the frequency of your contributions in class. We want <i>everyone</i> to have the opportunity to participate.) Most importantly, however, in order to earn full marks for participation, it is expected that, at some point during the semester, you will volunteer as a “typo checker”. Specifically, you will read through my hand-out after class, check for any typos, and report them to me if you find them. After that, I will post the handout online (with credit given to your work).
Honor Code	Although it should go without saying: don't cheat on the problem sets. Minor infractions will result in you failing the relevant assignment. Major infractions will be kicked up to the university. Punishments in that case can be severe. (Note also: using Chat-GPT, or a similar LLM, to help you complete the problems sets <i>is</i> cheating. And for what it's worth, LLMs are generally very bad at solving problems like the ones I'll be setting anyway.)
Technology	<p>With two exceptions, laptops, phones, and other electronic devices are not permitted to be used in class. Multiple studies have shown that students using laptops, etc., do significantly worse on exams that test their comprehension than students who do not use these things. This is true even when students are not multitasking. Typing shifts you into “transcription mode”, whereas writing by hand requires you to actively process material.</p> <p>The first exception to the technology rule is if you're going to take notes <i>by hand</i> on a device like an iPad or a reMarkable. That's allowed. The other exception is if you have a disability that necessitates using a computer, or some other electronic device. If that's the case, then I'm happy to accommodate you. But if this is so, please speak to me about it as early as you can.</p>
Communication	<p>If you have a question about course mechanics or housekeeping, please check the syllabus before emailing me (Prof McNamara). Likewise, if you have questions about course content, please try to visit my visit office hours.</p> <p>That said, if you do need to email me, then I'll endeavor to answer within 24 hours. The exception to this rule is if you email me on a Friday. Then, I will try to answer by the end of the day the following Monday. Please don't repeat-email me until at least 24 hours has elapsed.</p>

(Sorry if this sounds harsh—I have a lot of students this semester, so keeping up with email is going to be a challenge.)

Disabilities

The Americans with Disabilities Act is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Students who require academic accommodations can work with AES (Academic Education Services) to arrange for (among other things) assistive technology or academic coaching. Many students don't receive adequate diagnoses, or discover only late in their academic careers that they have access to academic accommodations. Thus, if you even *suspect* that you might need such accommodations, it's worth reaching out early on.

For reasons of privacy and consistency, I ask that you start with AES; in particular, see [here](#) for further details. However, please know that whether or not you are able to arrange formal accommodations, I am committed to working with you to ensure that you are able to participate fully in this course. Just speak to me about your needs, as soon as you can.

Mental Health and "Ghosting"

In the past, I've had students who stop coming to class or section, and stop handing in assignments, partway through the term. This is usually because the student is overwhelmed with work, facing a difficult personal situation, or struggling with a mental health issue. If you find yourself confronted with any of these issues (or a similar one), please know that you're not alone: many college students experience such struggles.

In case you find yourself in a situation like this, I strongly encourage you to talk to the university's counseling service as soon as you can: see [here](#) for contact information. They are professionals and they care very much about your well-being. I also encourage you to communicate with me or your Oliver about any missing homeworks, etc. We're not mental health professionals, but we also care about your well-being, and can better help you manage your assignments if we know what's going on as it's happening, instead of being informed of any issues shortly before (or after) the end of term.

Tentative Schedule **Unit 1: Prerequisites and Preliminaries**

8/26 **Set Theory.**

Reading: Papineau, *Philosophical Devices*, Chapter 1.1–1.6

8/28 **Set Theory (cont'd).**

Reading: Sider, *Logic for Philosophy*, Chapter 1.8 (you only need to read the few pages on relations and functions)

9/2 **Logic—from 50,000 feet**

Reading: Papineau, *Philosophical Devices*, Chapter 10

9/4 **Logic—from 50,000 feet (cont'd)**

Reading: Papineau, *Philosophical Devices*, Chapter 10

9/9 **Infinity**

Reading: Papineau, *Philosophical Devices*, Chapter 1.7–1.11, Chapters 2 and 3

9/11 **Proof**

Reading: Russell (MS), *The Limits of Logic*, Chapter 0 (“Strategies for Proving Things”)

9/16 **Bits and Pieces**

Reading: MacFarlane (MS), “Substitutional Quantifiers”, pp. 1–5; Papineau, *Philosophical Devices*, Chapter 3

9/18 **Bits and Pieces: (Cont’d)**

Reading: Papineau, *Philosophical Devices*, Chapter 4

Unit 2: Propositional Modal Logic

9/23 **Propositional Modal Logic I: Expanding the Language**

Reading: Sider, *Logic for Philosophy*, Chapter 6.1–6.2

9/25 **Propositional Modal Logic II: Models**

Reading: Sider, *Logic for Philosophy*, up to the end of Chapter 6.3.1

****Problem Set 1 due at the start of class!****

9/30 **Propositional Modal Logic III: Systems K, T, 4, S5**

Reading: Sider, *Logic for Philosophy*, Chapter 6.3.2–6.3.3

10/2 **Propositional Modal Logic IV: Systems, B, D**

Reading: Sider, *Logic for Philosophy*, Chapter 6.3.2–6.3.3 (if you didn’t finish it last time)

10/7 **Conditionals I: Indicatives vs. Subjunctives, Lewis-Stalnaker Semantics**

Reading: Bennett, *A Philosophical Guide to Conditionals*, Chapter 1.4–1.5, Chapter 10

10/9 **Conditionals II: “Closeness”, CEM vs. Duality**

Reading: Bennett, *A Philosophical Guide to Conditionals*, Chapters 11–13

Fall Break 10/10–10/12

Unit 3: Probability Theory and Formal Epistemology

10/14 **Probability I: Basics**

Reading: Papineau, *Philosophical Devices*, Chapter 7.1–7.4

10/16 **Probability II: Conditional Probability, Total Probability, etc.**

Reading: Papineau, *Philosophical Devices*, Chapter 8.2–8.4

****Problem Set 2 due at the start of class!****

10/21 **Formal Epistemology I: Types of Probability**

- 10/23 Reading: Papineau, *Philosophical Devices*, Chapter 7.5–7.6
Formal Epistemology II: Dutch Books, Accuracy
 Reading: Papineau, *Philosophical Devices*, Chapter 7.8
- 10/28 **Formal Epistemology III: Chance, Credence, and Friends**
 Reading: Papineau, *Philosophical Devices*, Chapter 8.1
- 10/30 **Formal Epistemology IV: Probabilities of Conditionals**
 Reading: Bennett, *A Philosophical Guide to Conditionals*, Chapters 4–5

Unit 4: Decision Theory, Game Theory, and Social Choice Theory

- 11/4 **Decision Theory I: Expected Utility Theory**
 Reading: Briggs, “Normative Theories of Rational Choice: Expected Utility” (*Stanford Encyclopedia* article)
- 11/6 **Decision Theory II: Evidential Decision Theory**
 Reading: Reading: David Lewis, “Causal Decision Theory” (1981), Sections 1–3
****Problem Set 3 due at the start of class!****
- 11/11 **Decision Theory III: Causal Decision Theory**
 David Lewis, “Causal Decision Theory” (1981), Section 3–10, Spencer and Wells “Why Take Both Boxes” (2019)
- 11/13 **Game Theory I: Basics, Prisoner’s Dilemma**
 Reading: Weatherson, “Logic of Decision”, Chapters 7–9
- 11/18 **Game Theory II: Further Games, Solution Concepts**
 Reading: Weatherson, “Logic of Decision”, Chapters 10–12
- 11/20 **Social Choice Theory I: Arrow’s Theorem**
 Reading: Weatherson, “Logic of Decision”, Chapters 13

Thanksgiving Break 11/21–11/30

- 12/1 **Social Choice Theory I: Harsanyi’s Utilitarian Theorem**
 Reading: Resnick, *Choices*, Chapter 6 (in particular, the section on Harsanyi’s theorem)
- 12/3 **Spill-over**
 Reading: None
****Problem Set 4 due at the start of class!****

Week 15: Review

- 12/1 **Review**
- 12/3 **Final Exam (in class)!!**