Syllabus, Formal Methods for Philosophy

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1   Overview

Philosophy employs a wide variety of methods, and some of these are what we might call *formal*. It's hard to say what, exactly, makes a method formal, though, and so typically you'll get a list of methods: logic (propositional, first-order, and modal), probability theory, semantics, and decision and game theory. We'll cover many of those methods here, broadly speaking, and by the end the hope is that you will have the skills to use these either for further work in philosophy or just in thinking about whatever questions interest you. But this will also be a philosophy class, and one question we'll want to ask is: what's the point of formalization? And even before that, what *is* formalization? One important skill, beyond just the ability to do formal work, is to be able to recognize when and why one *should* apply formal methods in the first place.

2   Prerequisites

Strictly speaking, there are no prerequisites. But a background in introductory logic would be very helpful!

3   Responsibilities and Grades

3.1   Participation

This will be a very collaborative class; it's extremely important to me that everyone be on the same page at the same time. So, we'll devote a lot of time in-class (and office hours) to practice. To that end, attendance is extremely important and therefore mandatory. Beyond that, there are a number of ways to participate: answering questions in-class, working on problems in groups, coming to office hours, answering questions on the class forums, and more. To that end, participation is worth 40% of the grade.

3.2   Problem Sets

There will also be a series of six problem sets, each worth 10% of the final grade. They will be a mix of purely technical problems, of formalization problems, and of purely philosophical questions.

4 Schedule[1]

1. **Propositional and first-order logic.** This will largely be intended as a review of the syntax and semantics of propositional logic and first-order logic with identity. We will not focus on metalogical results in this course, or on proof theory.
   Reading: Magnus and Button, forall x, *chapters 2, 3, 5, and 6; Russell, "On Denoting", and Strawson, "On Referring"*

2. **Modal logic.** Modal logic was originally developed to model possibility and necessity, and that's where we'll start with propositional modal logic, too. Specifically we'll look at the Kripkean possible-worlds semantics for it, including detailed looks at some of the most popular or prominent modal logical systems, such as K, T, D, B, S4 and S5. We'll also do a lot of proofs in these various systems.
   Reading: Sider, Logic for Philosophy, *6.1–6.4; Lewis,* On the Plurality of Worlds, *1.1–1.2, Kaplan, "A Problem in Possible-World Semantics"*

3. **CHOICE POINT.** We will, as a class, pick *one* of the following:

   (a) **Deontic logic.** Here we would study the logic of morality, i.e., of obligation and permission, paying special attention to the deontic paradoxes and the extent to which logic should remain neutral on contentious issues.
   Reading: Hilpinen, "Deontic Logic"; Marcus, "Moral Dilemmas and Consistency", Jackson and Pargetter, "Oughts, Options, and Actualism"

   (b) **Epistemic logic.** Here we would study the logic of knowledge and belief, paying special attention modeling counterexamples in epistemic logic, and principles like: if we know something, we know we know it.
   Reading: Meyer, "Epistemic Logic", Gettier, "Is Justifed True Belief Knowledge?", and Williamson, "Gettier Cases in Epistemic Logic".

   (c) **Conditionals.** Conditionals are among the most difficult subjects in the philosophy of language. What, exactly, do they mean? What is their logic? That's what we'll investigate.
   Reading: Stalnaker, "A Theory of Conditionals", and Edgington, "Do Conditionals Have Truth-Values?"

4. **Probability.** We have so far been talking about the binary values that propositions can have, truth and falsehood. But we can also be *uncertain* about whether they are true, to different degrees. And they may also have *chances*. We'll look at how probability works here, including conditional probabilities, paying special attention to how they can be used measuring belief.
   Reading: Schwarz, Belief, Desire, and Rational Choice, *chapters 2 and 3, and either Moss, "Epistemology Formalized", or Staffel, "Can There Be Reasoning with Degrees of Belief?"*

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[1] This is a rather ambitious course, but it can be adapted to lower levels by removing some readings or topics.

5. DECISION THEORY. Finally, we will investigate the formal theory of rational decision-making, decision theory. First we'll look at the orthodoxy, expected utility theory, and then we'll look into whether that is too restrictive. *Reading: Schwarz,* Belief, Desire, and Rational Choice*, chapters 5, 6, and 9, and Buchak, selections from* Risk and Rationality.

5 *General Expectations, and Academic Dishonesty*

Philosophers sometimes have a reputation for being aggressive or dismissive. In this class, the basic expectation is that we'll engage only in respectful discussion where we aim to learn from one another. And especially do not attack anyone on the basis of their race, gender, sexual orientation, national origin, or, well anything else at all.

Any kind of academic dishonesty, including plagiarism, is completely prohibited. [Insert university procedures here.]

6 *Disability Accommodations*

In light of the possibility that some students will need them, I will allow laptops, but please use them responsibly. If any kind of specific disability accommodation is needed, please let me know and we'll work something out. [Insert university policy regarding student disability accommodations here.]