Philosophy 310: Introduction to Symbolic Logic
Spring 2018

Updated 18 January 2018

Instructor: Ben Caplan
Time: T Th 11:00 AM – 12:15 PM
Location: 1007 Wescoe
Office: 3079 Wescoe
Office hours: T 12:15–1:15 PM
     T 1:45–2:45 PM
     Th 12:15–1:15 PM
     Or by appointment
Email: caplan@ku.edu

Course description

We will study sentential and predicate logic. We will learn three skills: (*i*) how to symbolize natural-language sentences (e.g. 'Kara is a superhero and Lena is a CEO', 'Someone who is a superhero is friends with someone who is a CEO') in various formal languages; (*ii*) how to interpret those formal languages; and (*iii*) how to do proofs in those formal languages. These skills are learned, and we will learn them by working through many examples.

Required text

Terence Parsons's *An Exposition of Symbolic Logic: With Kalish–Montague Derivations* (August 2013)—otherwise known as *TerryText*—is available on Blackboard (under 'TerryText').

Required software

We will use Logic 2010. The software can be downloaded (for free) from logiclx.humnet.ucla.edu. You will need to use the software to submit homework assignments.

Further information about how to install and use Logic 2010 is on Blackboard (under 'Logic 2010').

Course requirements

The grading scheme for the course is as follows.

Homework assignments	10%
Two in-class mini-tests	20% (10% each)
Two take-home group assignments	20% (10% each)
Midterm exam	25%
Final exam	25%

Assignments, tests, and exams

Homework assignments will typically (but perhaps not invariably) be due by the beginning of class on Thursdays. You will typically (but perhaps not invariably) have a week to complete each homework assignment. Due dates for the homework assignments will be posted on Blackboard (under 'Schedule').

The mini-tests and group assignments are intended mainly as diagnostics, to provide you with feedback about how well you're learning the relevant skills (and to provide me with feedback about how well I'm helping you learn those skills). The group assignments are also learning and teaching opportunities: they are opportunities for you to learn some skills from, or teach some skills to, your peers.

Dates and due dates

The mini-tests and the midterm exam will be held in class. The midterm will take up an entire class period; the mini-tests will not. The dates for the mini-tests and the midterm exam will be announced at least one week ahead of time, as will the due dates for the take-home group assignments. This information will be posted on Blackboard (under 'Schedule').

When the mini-tests and the midterm exam are held, and when the group assignments are due, will depend on when we cover the relevant material in class. One mini-test will be held, and one group assignment will be due, before the midterm; another mini-test will be held, and another group assignment will be due, after the midterm. The final exam will be on Wednesday, 9 May 2018 from 10:30 AM to 1:00 PM in 1007 Wescoe Hall.

Material to be covered

The first mini-test will cover symbolization in sentential logic, and the first group assignment will cover truth-tables. The midterm exam will be cumulative: it will cover symbolization in sentential logic, truth-tables, and derivations in sentential logic. This material can be found in Chapters 1 and 2.

The second mini-test will cover symbolization in predicate logic, and the second group assignment will cover counter-models. The final exam will be cumulative: it will cover symbolization in sentential and predicate logic; truth-tables and counter-models; and derivations in sentential and predicate logic. This material can be found in Chapters 1–4. If time permits, at the end of the semester we will also cover symbolization, counter-models, and derivations in predicate logic with identity. This material can be found in Chapter 5. If we cover this material in class, it will be on the final exam.

Lateness policies

My policy on late homework assignments and late group assignments is straightforward and draconian: I won't accept late homework assignments under any circumstances; and, unless you contact me beforehand, I won't accept any late group assignments either. My policy on missed mini-tests and exams (including the final exam) is similarly straightforward and draconian: unless you contact me beforehand, you won't be able to take the midterm or the final exam for credit. This is in part to allow me to discuss the homework assignments, the group assignments, the mini-tests, and the midterm in class as soon as possible.

I also have some less draconian policies. First, one or two homework assignments (specifically, the ones on which you score the lowest) will be dropped when calculating your overall grade on the homework assignments. I will count ten homework assignments towards your overall grade. I expect there to be eleven or twelve homework assignments in all.

Second, to give you feedback, I will be happy to correct (but not grade) late group assignments and to administer and correct (but not grade) make-up mini-tests and midterm exams.

And, finally, given the cumulative nature of the course, there is a mechanism in place to weight later exams more heavily to make up for earlier lower grades (see immediately below).

Additional policies

I reserve the right to revise your grade *upward* to reflect my sense of what skills you have learned by the end of the course. For example, if you score higher on the midterm exam than on the first mini-test and the first group assignment, or if you score higher on the final exam than on the midterm exam, the mini-tests, and the group assignments, then I reserve the right to weight the midterm exam or the final exam more heavily.

You do not need to take the final exam if your average on the mini-tests, the group assignments, the midterm, and the homework assignments is 100% (or above). If you don't need to take the final exam, I will let you know beforehand.

Due to the slightly complicated nature of the grading scheme, I won't be using Blackboard to calculate your grades; rather, I'll be using my own spreadsheet. If you're curious about your grade at any point, just ask or email me.

Course format

It would be useful to have a discussion section for this course. To that end, I will divide almost every meeting in two (with exceptions to be noted below): the first part, from 11:00 AM to 11:30 AM, will be more like a discussion section; and the second part, from 11:30 AM to 12:15 PM, will be more like a regular lecture. There will be a short break between the two parts. This format will begin the second week of class (that is, 23 January 2018).

I won't present new course material in the discussion section. Instead, it will be an opportunity to review material, ask questions, work on additional problems, talk about how to use Logic 2010, go over previous or upcoming homework assignments and group assignments, review for upcoming mini-tests or exams, discuss previous mini-tests and the midterm exam, discuss material that goes beyond what will be covered on the tests and exams, and the like. What we end up doing in discussion section will be determined by what you would like to do or would find most useful. Responsibility for the discussion section will, to a large extent, be in your hands. I will be there to help you, but don't expect me to come in with 30 minutes worth of material to lecture at you from.

We won't always use the first 30 minutes of class for a discussion section. In particular, **the two in-class mini-tests will be held during this 30-minute period, and the midterm exam will take up the entire class time, including this 30-minute period**. What this means is that, if you had planned to skip the discussion section and show up for the start of the regular lecture at 11:30 AM on one of the two days when an in-class mini-test is held, you will miss that mini-test and—given the lateness policies above—will not be allowed to take a make-up mini-test. (If you show up at 11:30 AM on the day of the midterm, you will miss the first 30 minutes of the midterm. But you will have the remaining 45 minutes to take the midterm.)

The homework assignments and the group assignments will be due at the beginning of class, at 11:00 AM. If you submit your homework assignment after 11:00 AM but before 11:30 AM, it will be late, and—given the lateness policies above—it will not count. Similarly, if you show up to hand in your group assignment at 11:30 AM, your group assignment will be late, and—given the lateness policies above—it will not count. I want to be able to discuss the homework assignments and the group assignments in discussion section as soon as possible, and it isn't fair to award credit for assignments after I have gone over all the answers in discussion section.

This is a pedagogical experiment. I think it's a good idea, but I haven't tried it before. (Let me know what you think!) Accordingly, I reserve the right to alter or abolish it.

If I change the course format, I will make an announcement in class and post an announcement on Blackboard (under 'Announcements').

A note about grading

On some standardized tests, there is a penalty for being wrong: you earn points for a correct answer, lose points for an incorrect answer, and neither earn nor lose points for no answer. The tests, assignments, and exams in this course are not graded in that way. There is no penalty for being wrong: you earn points for a correct answer, and *at worst* an incorrect answer is treated like no answer (that is, you neither earn nor lose points for it). So it is pretty much never to your advantage to skip a question. Even if you don't feel 100% confident about your answer, you might be right, in which case you will earn full points. And, even if you haven't completely figured out how to solve a problem, if you show your work you can still earn partial credit.

It turns out that there is a significant difference between men and women: men are much more likely to guess when they don't know the answer. There is empirical evidence to suggest that this accounts for much of the reported gender differences in standardized test scores.[1]

A note about stereotype threat

Anxiety can hinder academic performance. And negative stereotypes can contribute to anxiety. In particular, negative stereotypes about a certain group can lead members of that group to be more anxious. If one negative stereotype is that members of that group don't perform as well academically, the negative stereotypes can become self-fulfilling. The process whereby negative stereotypes can hinder academic performance is known as *stereotype threat*.

Unfortunately, it turns out that it's disturbingly easy to elicit stereotype threat. For example, it makes a huge difference whether students are told "This is a math test" or "This is a problem-solving task."[2] (By the way, this is not a course in math. It's a course in problem-solving.)

Fortunately, it also turns out that talking about stereotype threat it is a good way to combat it. For example, if students are put in a situation that elicits stereotype threat (e.g. by being told "This is a math test") but are *also* told about stereotype threat, that can make the effects of stereotype threat go away.[3] The words used in one study were

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[1] See Katherine Baldiga, "Gender Differences in Willingness to Guess," *Management Science* 60.2 (Feb. 2014): 434–448.

[2] For a survey of the literature, see Steve Stroessner and Catherine Good, "Stereotype Threat: An Overview," available at diversity.arizona.edu/sites/diversity/files/stereotype_threat_overview.pdf.

[3] Michael Johns, Toni Schmader, and Andy Martens, "Knowing Is Half the Battle: Teaching Stereotype Threat as a Means of Improving Women's Math Performance," *Psychological Science* 16.3 (March 2005): 175–179.

"it's important to keep in mind that if you are feeling anxious while taking this test, this anxiety could be the result of these negative stereotypes that are widely known in society and have nothing to do with your actual ability to do well on the test."[4]

So it's important to keep in mind that, if you are feeling anxious while taking tests or exams or while completing assignments in this course, the anxiety could be the result of negative stereotypes that are widely known in society and that have nothing to do with your actual ability to do well on the tests, exams, or assignments.

Accessibility

I'm committed to making this class as accessible as possible. If you have any particular accommodation requests, please speak to me as soon as possible.

Title IX

According to Title IX, "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance."[5]

If you or someone you know has been sexually harassed or assaulted, you can find resources at the Office of Institutional Opportunity and Access (ioa.ku.edu) or by contacting the Title IX Coordinator (ioa@ku.edu). Please note that, under FERPA (the Family Educational Rights and Privacy Act), a university has a legal right to access its students' medical records from campus health clinics.[6]

Under Title IX, faculty members have an obligation to report to IOA incidents of sexual harassment or assault that they know, or have reason to believe, have occurred.

Electronic devices

You are permitted to use laptops and other electronic devices in class. Some students prefer taking notes, or reading texts, on such devices; and we'll be using software for the homework assignments.

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[4] Johns, Schmader, and Martens, "Knowing Is Half the Battle," p. 176.

[5] Title IX is a portion of the United States Education Amendments of 1972, Public Law No. 92-318, 86 Stat. 235 (23 June 1972), codified at 20 U.S.C. Section 1681–1688.

[6] In effect, FERPA limits the Health Insurance Portability and Accountability Act (HIPAA). See "Joint Guidance on the Application of the *Family Educational Rights and Privacy Act* (*FERPA*) and the *Health Insurance Portability and Accountability Act of 1996* (*HIPAA*) to Student Health Records," p. 6. Available at https://www.hhs.gov/sites/default/files/ocr/privacy/hipaa/understanding/coveredentities/hipaaferpajointguide.pdf.

However, students report that they find laptop use in class distracting. This includes laptop use by their peers.[7] (If you're browsing Facebook during class, you might find it interesting. So, apparently, might those around you.) More importantly, "the level of laptop use was negatively related to several measures of student learning, including … overall course performance," which is to say that (generally speaking), the more students used laptops in class, the worse their final grades were.[8]

If you use a laptop or other electronic device in class, please try to sit somewhere where your screen is less likely to be visible to others.

Concealed carry

If you carry a concealed handgun, familiarize yourself both with the relevant state and federal laws and with KU's weapons policy. See https://concealedcarry.ku.edu/ information.

Academic misconduct

The university policy on academic misconduct is set out in Article II, Section 6 of the University Senate Rules and Regulations. Examples of academic misconduct include (but are not limited to) "giving or receiving of unauthorized aid on examinations … or other assignments," "knowingly misrepresenting the source of any academic work," and "plagiarizing another's work." Penalties for academic misconduct include receiving a failing grade for the course, being suspended from the university, and being expelled. For further details, see policy.ku.edu/governance/ USRR#art2sect6.

Schedule

A detailed and updated schedule will be posted on Blackboard as we go (under 'Schedule'). The precise schedule will depend on the pace at which we work through the material in class. We will cover the Introduction, Chapters 1–4, and (time permitting) Chapter 5.

Please note that we will cover the material in a different order than the text. Here is a list of the expected readings, in the order in which I expect to cover the material.

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[7] Carrie B. Fried, "In-Class Laptop Use and Its Effects on Student Learning," *Computers and Education* 50.3 (April 2008): 906–914.

[8] Fried, "In-Class Laptop Use and Its Effects on Student Learning," p. 906.

1. Sentential logic

1.1.	Symbolization	Chapter 1.1, 1.3; Chapter 2.1–2.3
1.2.	Truth-tables	Chapter 1.2; Chapter 2.1, 2.10–2.11
1.3.	Derivations	Chapter 1.4–1.12; Chapter 2.4–2.9

2. Predicate logic

2.1.	Symbolization	Chapter 3.1–3.5; Chapter 4.1–4.2
2.2.	Counter-models	Chapter 3.10; Chapter 4.9
2.3.	Derivations	Chapter 3.6–3.9; Chapter 4.3

*3. Predicate logic with identity**

3.1.	Symbolization	Chapter 5.1–5.2
3.2.	Counter-models	Chapter 5.4
3.3.	Derivations	Chapter 5.3

There is no class on Tuesday, 20 March 2018 or on Thursday, 22 March 2018 (Spring Break).

The final exam will be on **Wednesday, 9 May 2018 from 10:30 AM to 1:00 PM in 1007 Wescoe Hall**.

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* Time permitting.