

Introduction to Symbolic Logic

PHI 154 (Fall 2023)

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Texts: *forall x: Calgary, An Introduction to Formal Logic*, Fall 2023 edition
and occasional documents on the Canvas page or Course Site
Course time & location: MW 9:40–11:05 (101 Heger)
Course site: <https://chreliot.github.io/phi154/>

What we're doing here

Like philosophy more broadly, formal logic is concerned with arguments—not with quarrels per se, but with the kind of arguments that involve providing evidence and reasons in support of a claim. Arguments of this sort are a fundamental feature of philosophy, of science, of some parts of the humanities, and of our democratic society. As we know from observing politics and academics, many arguments are bad. In this course we learn a formal system for assessing whether deductive arguments are formally good or bad. Along the way, we discuss some of the assumptions and implications of this system.

You already know some logic, whether you think so or not. We all constantly reason about ideas without the benefit of a formal system. We make inferences from one idea to another, and thus make arguments. Similarly, we also reason about quantities, and often we do so successfully even without much training. But consider how much better we become at reasoning about quantities when we learn some mathematics: we learn not only how to compute powerfully on the back of an envelope, but also how to think more efficiently and accurately about quantities without any writing. (For example, consider how immediately obvious it is to you that two \$1.79 Dr. Peppers shouldn't together cost over \$5.00, even though for many people actually calculating the total would require writing.)

Similarly, the aim of this course in symbolic logic is to develop that same kind of efficiency and accuracy in your reasoning with statements and ideas, including ideas in your writing and in texts you read. You will become proficient at using a formal system for representing statements, and then with rules and techniques for manipulating ideas in that system. We use it to analyze arguments for consistency and validity. We learn techniques for translating sentences and arguments from ordinary language to logical notation and back. Familiarity with the formal system furnishes you with a powerful skill for reading, writing, and analyzing.

Understanding the system also reveals some intriguing philosophical problems, and the limits of logic. I will point to these problems along the way as we focus on learning fluency with the system.

Content

All of this course's reading material is in our textbook, *forall x: Calgary* and in supplementary handouts I will post. We will work through much of the book, mostly sequentially, following its presentation closely, skipping a few sections and chapters. We will cover sentential and predicate logics, skipping the truth-trees and meta-theory chapters for both of those. This simple outline allows you to read and work ahead, to some degree, if you like.

Course site

The schedule of readings and assignments, as well as other important information and requirements for the course, is at <https://chreliot.github.io/phi154/>. Consider bookmarking it for the semester on any device you may use to check it.

Attendance and participation

You are expected to attend the class sessions. Attendance will be taken. This class involves and requires a great deal of participation. I will call on you regularly for answers and contributions. I will ask you direct questions. I will not try to embarrass you.

You will need to know what happened in class if you did not attend, and may therefore need to ask someone for notes. It may be helpful to coordinate with others for this purpose. Beyond the handouts I circulate and slides I post, I don't have notes that would be useful for you. I will take requests for additional handout topics.

Homework

Learning how to do formal logic requires regular practice. Thus, I strongly urge you do all the assigned homework problems. Homework will be assigned in class, and assignments will be posted to the front page of the course site. Expect an assignment for every session. I will not collect homeworks, but I will ask you to share completed homework problems, assess your homeworks in terms of completion, and factor your general readiness with those into your Engagement grade.

If you find the homework problems challenging, I also suggest that you work on other problems in the book or ask for supplementary problems. A great way to learn logic more quickly (and to have more fun with it) is to work on problems with others. Copying problems from someone else will work against you, because you will not build the neurons you will need later. Discussing strategies with others probably *will* help you.

Note-taking

You should not use a laptop or keyboard for note-taking. You should not use electronic devices except occasionally to access the textbook, or to use a tablet with a stylus.

Quizzes

There will be two graded quizzes, each about 20–30 minutes, at about the 1/4 and 3/4 marks in the course. It is fine to work with others on homework, but not on quizzes.

Tests

There will be two tests, approximately halfway through (midterm) and during exam week (final). The midterm and final tests will be cumulative and comprehensive. Before the tests I will distribute handouts describing the kinds of questions problems you can expect. You will need to know how to do each kind of problem we have done during the course, and you will need to be familiar with the ideas and concepts discussed.

How class sessions will go

I will normally begin by polling you on which homework problems you struggled with, if any. I will take us through the questions, often asking for your answers to be put on the board. While students are doing that, I assess grades for homework, and possibly solicit further questions or set up further problems on the board I'll want to discuss. You may work with others for a few minutes, or prepare questions. I will then normally talk us through the problems on the board, soliciting your help and taking questions. I may then also explain one or two other problems requested by the class. I will be watching the time, and will move on as promptly as possible for new material. (For that reason, you will need to have already done much of your learning outside of class, and use this problem-resolution time to resolve your questions, not to learn from scratch.)

Then, the second part of class will normally involve introducing new concepts and strategies, by lecture and demonstration. After my presentation, we will typically work through problems together, with me asking for your input.

But what if I still don't understand/have questions after we've reviewed the homework?

1. Discuss with others. One of the best ways to learn something is to explain it to others; consequently, even helping someone else doesn't need to be a one-way transaction.
2. Email me. Please let me know if you *do not want* me to post your anonymized question (that is, without your name) and an answer on the course site.
3. Visit me office hours or arrange an appointment with me for other times. Further information about reaching me during office hours will appear on the course site.

Grading

If certain things were ideal, I would teach without grades. Or, at most I would base your grade entirely on your final exam. Your grade would reflect your skills and understanding at the end of the course, and nothing else. We would avoid the paternalism of constantly checking on you.

But those certain things are not all ideal. So, I try to base your grade as much as possible on final results, while also compromising to add in (1) check-ups along the way on how much you have learned, and (2) incentives to do the practice without which most students don't end up with good results. Hence, an engagement grade and a midterm test.

Your grade will be calculated as follows:

Engagement:*	10%
Homework:	20%
Quizzes:	20%
First/midterm test:	25%
Second/final test:	25%

*The Engagement grade combines attendance and participation, as above.

Homework grading:

I will not collect your homework. The consequences of not doing the homework are built-in. Homework is your opportunity to learn skills and practice for quizzes. If you choose not to do the homework, quizzes and tests will almost inevitably go poorly for you, and you will not learn. If you do it carefully, they will almost inevitably go well for you.

I *will* check whether you have done (or attempted to do) the assignment. I will quickly assess the results of your efforts on this scale:

- 0 Less than half completed, or not attempted.
- 1 Sincerely attempted, but incomplete or significantly incorrect.
- 2 Complete or approximately so, and generally on the right track.

Quiz and test grading: I will grade quizzes and test questions on a 0–4 point scale following Hofstra's GPA scale (4=A, 3=B, 2=C, 1=D, 0=F). See the grade definitions in the Bulletin.

More descriptively: 4 answers are approximately perfect; I sometimes use 3.5 for small, often nonlogical errors. 3 answers are good, often containing just a minor problem. The overall structure is correct, for instance, but something went slightly awry. I use 2 for answers that are getting something significantly right, but have other significant problems. I think of 2 as "half right." 1 is for answers that show some basic set-up and basic thinking but are not successful. 0 means there's less than that.

Grade adjustment: If on a particular assignment or in the final grade distribution the mean or median score for the class turns out lower than I think is reasonable or desirable, I sometimes increase everyone's grades uniformly. I will not, however, curve the scores to a normal distribution or reduce them.

University Academic Honesty policy

Hofstra University Honor Code: "As a member of the Hofstra community I pledge to demonstrate integrity and ethical behavior in all aspects of my life, both inside and out of the classroom. I understand that I am

accountable for everything I say and write. I will not misrepresent my academic work, nor will I give or receive unauthorized assistance for academic work. I agree to respect the rights of all members of the Hofstra community. I will be guided by the values expressed in the P.R.I.D.E. Principles. I accept the responsibility to follow this Honor Code at all times.”

Instructor’s academic honesty policy

The following is my policy: Representing someone else’s work as your own, or any other form of scholastic dishonesty (as defined by the University), will automatically earn you an F for the course, beyond the required report. So this is the key point you should internalize now: If you ever find yourself in circumstances where it seems like a good idea to be dishonest, please come talk to me about what we can do about the circumstances instead. You will find that while after I’ve detected scholastic dishonesty, the outcome is severe and automatic, *beforehand* I try to be as helpful as possible.

Contacting me

Email me at Christopher.Eliot@hofstra.edu. If you need more help, don’t hesitate to visit my office hours, listed above, or ask to meet at a different time. Speak to me after class or email me to see if we can set up a mutually convenient time. I will try to reply to all email within 48 hours or the next working day after a weekend. If you send me an email and have not heard back from me in a day or two, you might check and make sure I received it.

Test calendar

1. October 25 - first (midterm) test, during class period
2. December 20 - second (final) test, 8–10 AM

University learning goals and objectives

The following Learning objectives and goals below, as adopted by the Philosophy Department as part of required outcomes-assessment exercises, apply to this course:

- ▷ Goal 6: Students understand the formal structure of arguments and understand rules of inference.
- ▷ Objective 6a: Students translate ordinary language arguments into symbolic form.
- ▷ Objective 6b: Students assess formally stated arguments for validity and soundness.

General university policies:

Information about Class Attendance; Campus Closures/Snow Day; Academic Integrity; Disability Accommodations; Resources for Students who are Pregnant; Temporary Adjustments/Academic Leave of Absence; Absences for Religious Observance; University Deadlines; Grade Policy; and Discriminatory, Harassment, and Sexual Misconduct is available on the Provost’s webpage at this link: <https://www.hofstra.edu/provost/policies-wording-syllabi-ai-prohibited.html>.

Final thought

Inevitably, here as elsewhere, grades are a function of performance, not of effort in itself. I can’t reasonably assess effort. What’s challenging varies. You will need to figure out what *you* need to do to perform well. I will try to help you with what’s hard for you, if I know you need help. In the end, you are responsible for your education, however, and if you are confused, you should ask a question, or I will assume you understand. Unless you discuss them with me in person or by email, I will also likely not be aware of any dissatisfactions you have with any aspect of the course. I hope you will not be dissatisfied. I think this material is fun and useful, and believe an important part of my job is trying to show you why it is.