

PHL245: modern symbolic logic

Instructor: Boaz Faraday Schuman

Locations and times: lectures will be posted to the course YouTube channel (*Logic with Bo*—[link](#)) on Wednesdays

Office hours: online (Blackboard Collaborate), Tuesdays (3-5pm). Office hours can be held by appointment, but only for administrative matters, not course material.

Email: boaz.schuman@mail.utoronto.ca—but note email policy: *course questions are to be asked on Piazza*, unless they relate to private matters like accommodations.

course content and setup

This course is an introduction to deductive arguments in modern symbolic logic. The emphasis is on rigorous formal methods, though we will be paying close attention to arguments in ordinary, day-to-day language as well. Part I of the course will introduce propositional logic (sometimes called *zeroth-order logic*): students will be introduced to arguments, formal symbolizations, and deductions. In Part II (following the June reading break), these skills will be extended to predicate logic (or *first-order logic*), with a special emphasis on derivations. Time permitting, we will conclude with a look at first-order set theory.

While the course aims to make students proficient in symbolising natural language sentences and producing derivations, it has application to virtually all other areas of study: students who complete the coursework can expect to improve their critical thinking in general. Careful reading of the assigned texts prior to class, attentive class participation, and above all frequent practice, will pay significant dividends.

what a week in this course looks like

Monday	<i>Suggestion:</i> study!
Tuesday	<p>Item: office hours on Blackboard Collaborate (3-5pm)</p> <p>Item: assignment due (starting May 12) at midnight EST; next assignment posted online</p> <p><i>Suggestion:</i> discuss assignment questions with TAs</p>
Wednesday	<p>Item: weekly lecture posted online</p> <p><i>Suggestion:</i> watch lecture, begin work on next week's assignment</p>
Thursday	<i>Suggestion:</i> study: rewatch lectures, work on assignment, post any questions to Piazza, etc.
Friday	<i>Suggestion:</i> study!
Weekend	<i>Suggestion:</i> study! But also take time to relax :)

textbook and software

Jon Barwise and John Etchemendy, *Language, Proof and Logic (LPL)*, 2nd edition (2011).

- Note that you *must* buy a new copy of the text, to get your unique key-code.
- Students are encouraged to order the textbook *as soon as possible*.
- The textbook and software can be purchased online:
<https://www.grade grinder.net/Products/lpl-index.html>
- Note that you *must* buy this new, to obtain your unique access code.

LPL is a textbook and desktop software package (supported by both Windows and Mac), which has five components. Here is a brief summary of them:

1. The textbook itself, which forms the basis of the course;
2. *Boole*, a program that guides you through the creation and filling-out of truth tables;
3. *Fitch*, a program that guides you through the creation and completion of formal derivations;
4. *Tarski*, which allows you to interpret and model sentences, both in English and in symbolic logic; and lastly
5. *Submit*, which (as its name suggests) is the program you use to submit your completed work in *Boole*, *Fitch*, and *Tarski*.

The use of these programs will be discussed in the course lectures.

grading policy

The grade for this course will be determined by **weekly homework assignments**, and an online **midterm** and **final exam**. Here is how these make up the final grade:

Weekly assignments (12 total @ 5% ea)	60%
Midterm exam	20%
Final exam	20%

Assignments will begin in the second week of class (due Tuesday, May 12), though the first assignment will be a simple registration through *Submit* and registration on Piazza. Assignments will be posted on Quercus on Tuesdays after class, and will be due the following Tuesday by midnight through *Submit*. Late assignments will be docked 20% per day. The assignments will be marked electronically, and so you will be emailed your results more or less immediately. Students are encouraged to bring questions about the assignments to tutorials.

The **Midterm exam** will be posted online at the beginning of the June study break (June 16), and must be completed by June 25. The exam will take 60 to 90 minutes to complete. Solutions will be posted on Friday, June 26, and discussed in class on Tuesday, June 30.

The **Final exam** will be posted online at the beginning of the final study break (August 18), and must be completed by Thursday, August 27. This exam will likewise take between 60 and 90 minutes to complete. Solutions will be posted on Friday, August 28, and final grades will be posted to Quercus no later than September 10.

This course also features a **Piazza** page (link on Quercus). Piazza is a space where you can ask questions and solicit help on the coursework, assignments, and so forth, both from me, and from your classmates. The course TAs and I will monitor Piazza every weekday for the duration of the course. When you post a question about a problem, please don't just refer to its number in the textbook: post an actual image or paste of the problem itself. Students should ask questions on Piazza first, not use email.

It is your responsibility to ensure that your assignments have been uploaded to *Submit*. Once you believe your file to be submitted, double check that it actually has been. It is also your responsibility to ensure that you have uploaded the correct files. *Please* double-check that you have uploaded the file you intended to upload.

Please also make a habit of backing your work up. Computers crash and hard drives die, but ensuring that this does not result in lost work is very easy.¹

¹ Here is a list of syncing/backup software that freely provide more than enough space to keep your academic work backed up and/or synced between different computers: tresorit, sync.com, idrive, mega.nz, dropbox, onedrive, and google drive.

weekly schedule

Week	Week of...	Assessments + Material
1	May 6 (monday)	Assignment (A): none Material (M): Introduction to the course (tuesday)
2	May 11 (monday)	A: Assignment 1 due (tuesday) M: <i>LPL</i> 1.1-1.4: atomic sentences (wednesday); tutorials begin (tuesday)
3	May 18 (monday)	A: Assignment 2 due (tuesday) M: <i>LPL</i> 2.1-2.5: the logic of atomic sentences (wednesday)
4	May 25 (monday)	A: Assignment 3 due (tuesday) M: <i>LPL</i> 3.1-3.7: boolean connectives (wednesday)
5	June 1 (monday)	A: Assignment 4 due (tuesday) M: <i>LPL</i> 4.1-4.5: the logic of boolean connectives (wednesday)
6	June 8 (monday)	A: Assignment 5 due (tuesday) M: <i>LPL</i> 5.1-5.4: methods of proofs for boolean logic; review for midterm exam (wednesday)
7	June 15 (monday)	M: NO LECTURES OR TUTORIALS (study break) A: A6 due (tuesday); midterm exam posted online
8	June 22 (monday)	A: no assignment due this week M: <i>LPL</i> 6.1-6.6: formal proofs and boolean logic (wednesday) A: midterm exam deadline (thursday)
9	June 29 (monday)	A: Assignment 7 due (tuesday) M: <i>LPL</i> 7.1-7.4: conditionals (wednesday)
10	July 6 (monday)	A: Assignment 8 due (tuesday) M: <i>LPL</i> 8.1-8.3: the logic of conditionals (wednesday)
11	July 13 (monday)	A: Assignment 9 due (tuesday) M: <i>LPL</i> 9.1-9.6: introduction to quantification (wednesday)
12	July 20 (monday)	A: Assignment 10 due (tuesday) M: <i>LPL</i> 10.1-10.3: the logic of quantifiers (wednesday)

13	July 27 (monday)	A: Assignment 11 due (tuesday) M: <i>LPL</i> 11.1-11.5: multiple quantifiers (wednesday)
14	August 3 (monday)	A: Assignment 12 due (tuesday) M: <i>LPL</i> 12.1-12.4: methods of proof for quantifiers (wednesday)
15	August 10 (monday)	A: Assignment 13 due (tuesday) M: <i>LPL</i> 13.1-13.3: formal proofs and quantifiers; review for final exam (wednesday)
16	August 17 (monday)	Material: NO LECTURES OR TUTORIALS (study break) Assessment: Final exam posted online.
17	August 24 (monday)	Wednesday, August 26: Deadline to complete final exam.

how to do well in this course

Practice! A good deal of the coursework involves translating sentences from English into symbolic logic, and vice-versa. Furthermore, producing derivations can be made much easier by establishing a sound basis in the reading of symbolic sentences, and by developing techniques and strategies for arriving at the solution. All this requires considerable practice. Accordingly, it is a good idea to treat PHL245 like a language course, which requires constant practice and repetition in order to establish proficiency and confidence. If you want any further practice problems in addition to the assignments, feel free to do other problems in *LPL* and email me your solutions. I would be happy to look them over for you, and give advice where it's needed :)

academic policies

This course will abide by the U of T's policies on academic integrity, special considerations, and accessibility accommodations.

Academic integrity: Students are responsible for familiarising themselves with and abiding by the University of Toronto's Code of Behaviour on Academic Matters, which is available online: <https://www.academicintegrity.utoronto.ca/>

Special consideration: Students who, for legitimate and verifiable reasons, have to miss coursework, or hand it in late, may petition the Department of Philosophy to find a remedy (e.g. a make up test, or the like). Legitimate reasons include religious observances, as well as health matters. Requests for special consideration that are not filed promptly (*i.e.* in less than two weeks) will be denied. All requests must be filed before the course is over.

Accessibility accommodations: If you need any accommodations, please do not hesitate to contact me, so that we can find a solution for you. For details on accessibility at the U of T, please consult the Accessibility Services webpage: <http://www.studentlife.utoronto.ca/as>