LPS/Phil/LSCI 30: Introduction to Symbolic Logic

Spring, 2020 | Tue/Thu 2-3:20 pm | over Zoom. Meeting ID: 789-901-871

Instructor Information

Instructor	Email	Office hours
Kino Zhao	yutingz3@uci.edu	Mondays, 2-3pm; also by appointment

General Information

Course Description

This class introduces you to basic logical ~~jargons~~ concepts like validity and soundness, theorems and tautologies. You will learn some logic and some philosophy of logic.

The core of the course consists of 4 areas of logic:

- Truth table semantics for sentential logic
- Natural deduction proof system for sentential logic
- Standard semantics for quantified logic
- Natural deduction proof system for quantified logic

Alongside learning the technical aspects of logic, we will discuss various topics in the philosophy of logic, such as what a proof is supposed to be doing and in what sense might a logic be "about" the world.

Learning Outcome

This class fulfills the General Education (GE) requirement under **V.b Formal Reasoning**. Students will learn the concept and purpose of formal languages, possess an elementary grasp of the power and limits of formal methods; and be able to do the following:

- apply formal tools of logic or mathematics to the analysis and evaluation of everyday and/or scientific arguments, texts, and communicative situations;
- apply basic algorithms for the generation of logical deductions

Reading

P. Magnus, *for all x*

- A free textbook. A PDF will be uploaded to Canvas but can also be found here https://www.fecundity.com/logic/
- Note: I prefer if you can read it electronically. However, if you cannot (either because you don't have reliable computer access or you much, much prefer to read on paper), let me know and I can print a copy for you. (I can print things for free as long as it's not too much.)

Supplementary text: Schaum's Outline of Logic (Nolt et al.)

- *NOT* required. It's cheap & easy to find & provides a lot of extra practice if you need it.

Assessment

Grade Breakdown

10% x 7 = 70% homework exercises

(8 homework in total. The lowest grade will be dropped.)

30% final exam

Policies

Late homework

The standard penalty for late homework is 10% (of that one homework's grade) deduction per day late. However, having to hand in things late usually signals a bigger problem that's worth addressing, and I'd rather help you address that than penalize you for inconveniencing me.

Generally, you should start working on a homework **at least 3 days before the due date** and seek help from me or the TAs as soon as you realize you're stuck. You can just tell us which question you are stuck on and we can work through a similar (but different) question with you.

Cheating

The penalty for any violation of cheating on the exams or assignments is a **fail grade**. Depending on the level of severity, a letter recording the violation may be sent to the Dean.

For homework:

- Working with friends to figure out a problem or having a more knowledgeable person (friend or tutor or me) teach you how to solve a few problems **do not count as cheating**.
- Having someone else write up the answers and put your name on it or blindly copying someone else's answers without understanding the steps both **count as cheating**.
- Note: there are usually more than one proofs possible for any given problem. Just because your proof differs from your friend's it doesn't mean at least one of you has to be wrong.

Tips on succeeding in an online environment

Technology

Lecture recordings & slides will be posted online, so no need to panic if your connection dies during class. If you do not have internet connection, Zoom allows for dialing in with audio. If you do not have reliable computer/internet access, please get in touch with me early. I'll help in any way I can.

Maintain structure

A major challenge students face when trying to learn online is difficulty maintaining motivation. Since lecture recordings are accessible online, there's no reason not to wait until the day before the exam to binge-watch all of them… right?

To guard against this tendency, it is important to deliberately maintain structure. Try to set a regular schedule Monday-Friday and force yourself to stick to it (e.g., by recruiting your roommate as an accountability buddy). Here are some activities to consider: force yourself to go on a 10-minute walk in the morning to simulate "walking to school". Designate a "study zone" in your home that is preferably not in your bedroom – a corner on the dining table will do. Plan regular break times during which you leave the study zone to do something relaxing. Negotiate with your household members to not disturb you while you are in your study zone. Do not use the study zone for entertainment. If you want to play games/ watch shows, move your laptop to a different location and do it there.

Try your best to make it to class time. Class videos will be uploaded to accommodate those with limited access to technology but, if you can, try to join classes in real time. This will help your maintain structure.

Start by planning fewer study hours than you think you can accomplish. Slowly add more after you've successfully implemented your schedule. If you keep falling short of your plan, consider changing the plan rather than getting frustrated and trying to overcompensate.

Discord

It's hard to stay connected while you are physically isolated. I have made a Discord server (https://discord.gg/TWYtDw9) to help you meet fellow students in your class. If you don't know already, Discord is a platform where you can chat with others using text or voice. You don't need a full account to use it but it's free to make one. You will be able to create chat rooms ("channels") yourself so feel free to use that for study groups. You can read through the help page (https://support.discordapp.com/hc/en-us). All important announcements will be made through Canvas and sent to your email, so you don't need to use the Discord if you don't want to. It's there to simulate chit-chatting before/after classes.

When I'm online, I'll mostly hang out in #general and you can tag me to ask questions. You can also DM me. However, I will *not* be monitoring other channels so don't expect me to answer questions you post there.

Office hours

In addition to forming virtual study groups, your TA and I will be available for help. The set "office hours" will probably be held on Zoom (changes will be announced), but we can also accommodate other virtual meeting programs you may prefer. If the scheduled office hours don't work for you, you can also email us to set appointments.

Course Schedule (subject to modification closer to date)

Week		Topic	Reading
Week 1	Tuesday (Mar 31)	- Go over class logistics - A story about what logic is	- The syllabus - *Forall x* p.5-10
	Thursday (Apr 2)	- Logical connectives and truth tables	- *Forall x* p.18-26
Week 2	Tuesday (Apr 7)	- Well-formed formulas (wff) - More truth tables	- *Forall x* p.27-31; 35-38
	Thursday (Apr 9)	- Using truth tables to determine validity - **HW1 due Saturday (Apr 11)**	- *Forall x* p.39-40
Week 3	Tuesday (Apr 14)	- Natural deduction for sentential logic - Basic rules	- *Forall x* p.102-111
	Thursday (Apr 16)	- More natural deduction - Derived rules - **HW2 due**	- *Forall x* p.112-115
Week 4	Tuesday (Apr 21)	- The relationship between truth tables and proofs	- *Forall x* p.79-84
	Thursday (Apr 23)	- Tautologies vs. theorems - **HW3 due**	- *Forall x* p.124; 126-127
Week 5	Tuesday (Apr 28)	- Reasoning about things: QL - Predicates, names, variables	- *Forall x* p.46-51
	Thursday (Apr 30)	- Reasoning about things pt.2 - Quantifiers, Wff in QL - **HW4 due**	- *Forall x* p.52-54; 66-72
Week 6	Tuesday (May 5)	- Semantics of QL	- *Forall x* p. 84-89
	Thursday (May 7)	- Models of QL - **HW5 due**	- *Forall x* p.89-98
Week 7	Tuesday (May 12)	- Review of semantics & models of QL	-
	Thursday (May 14)	- Proofs in QL - Replacement, quantifiers - **HW6 due**	- *Forall x* p.113-121
Week 8	Tuesday	- Proofs in QL - Quantifiers	- *Forall x* p.113-121

Week		Topic	Reading
	(May 19)		
	Thursday (May 21)	- Proofs in QL - Identity - **HW7 due**	- *Forall x* p.121-122
Week 9	Tuesday (May 26)	- Practice proofs in QL	- *Forall x* p.122-123
	Thursday (May 28)	- Review core concepts: syntax v. semantics, proofs v. model, object language v. metalanguage - **HW8 due**	-
Week 10	Tuesday (Jun 2)	- Uses and limitations of QL	-
	Thursday (Jun 4)	- Other logics	-

(updated March, 2020)