PHIL 220: Introduction to Formal Logic

Sections 006 and 007 — see the note on the distinction below
Winter 2023–24, Term 2 (Jan–Apr 2024)

For my previous students, the 2024W1 syllabus is available here.

Subject to change. The latest version of this syllabus is always available at http://bit.ly/phil220.

Course Meetings: MWF, 11–11:50 pm, BUCH A101 OR on Zoom — see note below

Instructor: Dr. Jonathan Ichikawa

Email: phil.220@ubc.ca

Once the term begins, please use this email address, rather than my individual email address or Canvas messaging. Before the term, feel free to write to me at jonathan.ichikawa@ubc.ca if you have questions for me.

Please note the course email policy**.**

Office Hours: TBD

Overview:

This course is an introduction to formal logic. Logic is the study of argument forms; "formal" in this context means that we will be studying arguments using rigid rules and procedures. A formal logic course is very different from other courses in Philosophy, or more broadly in the arts and humanities; it is in many ways more like mathematics. Students will produce proofs, not essays, for this course. We will learn the syntax and semantics of sentential and quantified logic, and develop proof systems for each. We will draw some connections to significant historical and contemporary ideas in philosophy, but the main goal of the course is the mastery of formal logic itself, as well as an introduction to metalogic, where we will examine significant proofs about our formal system.

Me:

I'm Jonathan Ichikawa. I've been teaching at UBC since 2011; most of my research is in epistemology. Please feel free to call me "Jonathan," "Dr. Ichikawa," or "Professor Ichikawa", whichever makes you most comfortable. (However, please note that "Mr." and "Ms." are inappropriate titles for anyone with a PhD, which includes me and most of your professors.)

006 In-Person, 007 Hybrid

Note that this syllabus covers *two different sections of this course*. The material covered will be the same, and the lectures for each will be delivered simultaneously. There is only one difference:

- 006 is an **in-person** course. All course elements (lectures and exams) will be in-person. (You may choose to attend lectures online instead if you prefer.)
- 007 is a **hybrid online/in-person** course. Lecture attendance is primarily via Zoom only. Synchronous attendance and participation are expected. If there is room in the classroom, you are welcome to come in-person if you prefer in-person attendance. All students are required to take exams in-person.

Lectures will be recorded and available for review (to both sections) after class. But synchronous participation is *strongly encouraged*, and — unless you opt out — assessed with a participation grade.

Objectives:

This course has three central aims: (1) to help students think more clearly about arguments and argumentative structure, in a way applicable to informal arguments in philosophy and elsewhere; (2) to provide some familiarity and comfort with formal proof systems, including practice setting out formal proofs with each step justified by a syntactically-defined rule; and (3) to provide the conceptual groundwork for metatheoretical proofs, introducing the ideas of rigorous informal proofs about formal systems, preparing students for possible future courses on metalogic and computability.

Course Texts:

Our main text for this term will be my own UBC edition of *forall x*, an open-access logic textbook originally developed by P.D. Magnus. You can download the pdf for free here. It is also linked on Canvas. Note that there will be a slightly revised new version by the start of term.

You can read more about the book here.

Estimated costs for required course materials:

$0.

Teaching Assistants:

Details TBA.

Office Hours:

Each week I will have some office hours on Zoom, and some in my office in Buchanan E. (Students in either section can come to either format.)
My regular office hours are times for students to ask any questions about the course material. There is no need to make an appointment. Sometimes I will need to adjust my office hours from week to week; I'll announce this on Canvas if I do.

Email:

This is a large course that generates a lot of email. Please observe the following guidelines when writing to me about course business:

- **Unless you have private matters to discuss, use Piazza instead of email.** Piazza is an online platform designed for course discussion; students can respond to or upvote one another's questions. I prefer to explain things there than via email, because it is of benefit to more students who probably have the same question. This is also a good way

for students to work together to better understand the course material. You can join the course Piazza site via the link on the Canvas sidebar.

- **If you do email, use the course email address.** phil.220@ubc.ca should be your main email point of contact for the course. TAs and I will share the responsibility for monitoring email, so that's the way to get the most efficient response. Please only write to my individual email address if (a) it is about something outside of course business (e.g. you're asking for a reference letter), or (b) it is about something you don't want TAs to see (e.g. you have a complaint about a TA).
- **If you email, always include your student number and section.** Whenever you write, include your student ID so I can quickly and easily and unambiguously look up your file.
- **When applicable, use the designated web form instead of email.** You will find links on Canvas for forms for the following kinds of requests:

    - Designating your homework/participation assessment options
    - Requesting excused participation for a missed lecture
    - Requesting an excused homework assignment
    - Requesting exam concessions
    - Requesting an assignment regrade

- **Be patient.** I typically only deal with student email at set times, and at busy times it might take me several days to get back to you. If it's been more than a week and you haven't heard back, please feel free to follow up again.
- **One topic per email.** If you need to write about more than one thing, please send separate emails. Please do this even if it means you have to send three emails at once. The TA team and I will sometimes handle different tasks through different procedures.

In general, **we cannot respond to substantive logic questions via email**; email is primarily for course administration. Unfortunately, it is just too time-consuming to offer involved explanations to individual students by typing emails. If you want me to teach you something, please ask in class, in office hours, or on Piazza.

Homework:

I will assign weekly exercises for you to practice at home. These are useful both for developing the skills introduced in lecture, and for indicating what sorts of questions to expect on exams. Homework must be completed every week in which it is assigned, or it will be given a grade of 0. The homework deadline is the end of the day (11:59pm) on the dates listed on the syllabus. Late homework will be accepted without penalty until 11am the next day; after that grace period, no late homework will be accepted, because answers will be posted with the deadline. All homework is required, unless you apply for an academic concession to have an assignment excused. (See the note on academic concessions below.) If you join the course late, you can request to have the earlier homework assignments you missed to be waived.

It is fine to work with classmates as you prepare your homework. You can compare notes, compare answers, etc. But you must submit your own work; do not simply copy material someone else has prepared.

Do not try to make ChatGPT do your homework for you. This is academic misconduct and will be pursued via UBC's academic discipline policies. It also won't do a very good job.

Students who prefer to be assessed via more heavily-weighted exams may opt out of assessed homework. In this case, homework will not be submitted or graded (but it is still recommended practice). This decision needs to be made at the beginning of the term. Do not think of this as a

course where homework is optional; think of this as an opportunity to decide which kind of course you want to take: one that requires homework, or one that doesn't. If you regret your choice later on, I'm sorry, but I can't go back and switch you to the other version. Signing up for homework, like signing up for a course, is a commitment.
I have found, over many years teaching this course, that opting out of homework is not a good decision for most students; the grade incentive to keep up with the material helps most students to perform better on exams.

Student Interactivity and Participation:

This course will use iClicker, an interactive system that allows me to gauge student comprehension during the lectures. You will receive credit for participation, unless you opt out. Consequently, you should consider regular attendance for this course to be mandatory. (Online remote attendance counts.) You can find further logistical instructions on Canvas.
Using the Clicker system in class requires a device with a web browser—typically a smartphone, tablet, or laptop. If you don't have regular access to such a device, or if you expect to miss classes often, you can opt out of the participation component without penalty. But for most students, I strongly encourage assessed participation.
There is one participation point available each class session. Students receive it for answering at least 50% of the participation questions asked that day. (Credit is for answering at all — whether or not the answer is correct.)
You can participate with clickers the same way, whether you are attending online or in-person.
I offer extra credit for participation for students who identify errors in the textbook. See the instructions on Canvas. If you opt out of participation, you forego this opportunity for extra credit.

Crowdmark:

Exams and homework assignments will be handled via Crowdmark, an online grading program. This is free for students to use, but you will need to sign up with an email address that will be used to send you your graded assignments. Instructions will be given early in the semester.

Midterm Exams:

There will be three in-class exams, whose dates will be indicated on the schedule below. For the most part, the exams will contain questions very similar to the homework questions, making the homework exercises the most useful practice. Up to 10% of the possible credit on each exam may be devoted to a more challenging/creative question, measuring deeper comprehension.
For the exam locations, please ensure that you follow the instructions posted on Canvas carefully. **All exams must be taken in-person.**
There will be a poll/announcement about exam times early in the term. Some students may be asked to sit the midterm exams outside of the normal class time.

Final Exam:

There will be a final exam during the April examination period. This is a cumulative exam, covering all the material in the course.

Assessment:

Your course grade will be calculated from the course component grades according to the following weighted average:

Midterm 1:	10%	**Homework:*	*10%*
Midterm 2:	15%	**Participation:*	*5%*
Midterm 3:	20%	Final Exam:	40%

*The **homework** and **participation** components allow an *opt-out*. If you prefer not to have either or both elements assessed, you may request that option in week 2. If you opt out of one or both elements, the credit for those elements will be distributed proportionally over the other components of the course.

Students who join the course after January 12 may elect to opt out of Midterm 1 and HW 1 and 2.

Course grades are rounded to the nearest whole percentage point. (So an 89.499% will round to 89%; an 89.500% would round to 90%.) On borderline grade decisions, I let the math make the judgment calls. I grade based on course performance, not student need or desire.

Re-Marking Policy:

Grading errors happen from time to time. Please check the grading to see that you have gotten the credit you deserve. If there is a mistake, follow the regrade procedure described on Canvas. **All re-marking requests must be made within two weeks after the assignment is returned to you.**

Schedule:

Note: the dates below are not accurate; these were the dates for the 2023W section. The general schedule will be similar, but the exact dates will be updated here to match the upcoming term.

W2 Date	Lecture #	Topic	Textbook Chapter
Mon, Jan 08	1	Introduction, course policies	
Wed, Jan 10	2	Arguments, argument forms, validity	ch1
Fri, Jan 12	3	Sentential Logic: Sentences, Connectives	ch2
Sun, Jan 14	HW 1 due end of day		
Mon, Jan 15	4	Sentential Logic: Translation, Grammaticality	
Wed, Jan 17	5	Truth Tables	ch3
Fri, Jan 19	6	Truth Tables	

Sun, Jan 21	HW 2 due end of day		
Mon, Jan 22	7	Entailment and Models	ch4
Wed, Jan 24		Review day	
Fri, Jan 26		**Exam 1**	
Mon, Jan 29	8	SL Trees	ch5
Wed, Jan 31	9	SL Trees	
Thurs, Feb 01	HW 3 due end of day		
Fri, Feb 02	10	SL Trees, Introduction to Soundness and Completeness	
Mon, Feb 05	11	Soundness and Completeness for SL Trees	ch6
Wed, Feb 07	12	Soundness and Completeness for SL Trees 2	
Thurs, Feb 08	HW 4 due end of day		
Fri, Feb 09	13	SL Natural Deduction 1	ch7
Mon, Feb 12	14	SL Natural Deduction 2	
Wed, Feb 14	15	SL Natural Deduction 3	
Thurs, Feb 15	HW 5 due end of day		
Fri, Feb 16		Review day	
		midterm break	
Mon, Feb 26		**Exam 2**	
Wed, Feb 28	16	QL: Names and Predicates	ch8
Fri, Mar 01	17	QL: Quantifiers	
Mon, Mar 04	18	QL: Translation Practice	
Wed, Mar 06	19	Models for QL	ch9

Thurs, Mar 07	HW 6 due end of day		
Fri, Mar 08	20	Models for QL	
Mon, Mar 11	21	QL Trees	ch10
Tues, Mar 12	HW 7 due end of day		
Wed, Mar 13	22	QL Trees	
Fri, Mar 15	23	Practice with QL Trees	
Sun, Mar 17	HW 8 due end of day		
Mon, Mar 18	24	Soundness for QL Trees	ch11
Wed, Mar 20	25	Completeness for QL Trees	
Fri, Mar 22		Review day	
Mon, Mar 25		**Exam 3**	
Wed, Mar 27	26	Identity	ch12
Fri, Mar 29		*holiday*	
Mon, Apr 01		*holiday*	
Wed, Apr 03	27	Identity	
Fri, Apr 05	28	Complex Trees	
Sun, Apr 07	HW 9 due end of day		
Mon, Apr 08	29	QL Natural Deduction	ch13
Wed, Apr 10	30	QL Natural Deduction	
Fri, Apr 12	31	QL Natural Deduction	
Mon, Apr 15	HW 10 due end of day		
Sat, Apr 20		**Final Exam** — 8:30–11 am, location TBD	

Note on Academic Concessions:

This course will follow UBC's Academic Concessions policies. I am happy to manage small numbers of relatively simple in-term concessions informally; if you require multiple concessions, or need to ask for a major concession (including any concession related to the final exam), please follow the instructions to request a formal concession from your faculty's student academic advising office.

- Homework: If you aren't able to complete an assigned homework problem set on time, you can request to have a homework assignment excused via the form linked on Canvas. Such requests need to be made in advance of the deadline. I do not accept homework submitted after the answer key is published, but I am happy to excuse missed work in appropriate circumstances. All students can excuse one homework assignment during the term in this way. Subsequent requests will require stronger justification, and may require a recommendation from faculty advising. Only in exceptional circumstances (e.g., you were in the hospital over the deadline) can homework be excused after the deadline has already passed. Homework concession requests can be to be excused from submitting an assignment — all submitted homework will be graded and included in the course evaluation.
- Participation: If you know that you will need to miss a particular class, submit an excused participation request via the form on Canvas. These should also typically be done before the missed class, unless there is a strong reason why this is impossible.
- Midterm Exams: If you require a concession related to a midterm exam — if you were sick on exam day, or your bus broke down on your way to campus, etc., — fill out the exam concession form linked on Canvas ASAP. Unless there is a very strong reason why you can't, this should be done before or by the day of the missed exam, so that there is time to make arrangements for a suitable concession. The typical concession for a missed midterm will be either a makeup midterm or a reweighting to the final exam.

Note on Academic Integrity:

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work; nor should you help others to do the same. For example, it is prohibited to: share your past assignments and answers with other students; work with other students on an assignment when an instructor has not expressly given permission; or spread information through word of mouth, social media, websites, or other channels that subverts the fair evaluation of a class exercise, or assessment.
As a student, your number one task is to learn new things. Just like your professors, however, you are a member of a university scholarly community. As a part of this community, you are responsible for engaging with existing knowledge and contributing ideas of your own. Academics—including you!—build knowledge through rigorous research that expands on the contributions of others, both in the faraway past and around the world today. This is called scholarship. Academic integrity, in short, means being an honest, diligent, and responsible scholar. This includes, among other things:

- Taking exams without cheating.
- Completing assignments independently, or acknowledging collaboration when appropriate.

- Ensuring that all work you submit is your own.

Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidents of plagiarism or cheating may result in a mark of zero on the assignment or exam, and more serious consequences may apply if the matter is referred for consideration for academic discipline. Careful records are kept to monitor and prevent recurrences. Any instance of cheating or taking credit for someone else's work, whether intentionally or unintentionally, can and often will result in at minimum a grade of zero for the assignment, and these cases will be reported to the Head of the Department of Philosophy and Associate Dean–Academic of the Faculty of Arts.

Note on Intellectual Property:

The course materials I provide—this syllabus, slides, homework exercises (both questions and answers), etc.—are my own intellectual property. It is a violation of Canadian and international copyright law to distribute such material without the owner's consent. For example, you may not upload my course materials to commercial websites that want to turn around and sell them to other students. Any notes you take are your own intellectual property, and you can do what you like with them, but the material that I am providing to you is only for students in this course. The exception to this is the course textbook, which is published under a Creative Commons License, and can be shared freely (but not for profit, and only with attribution).

Mandatory Syllabus Statement about UBC's Values and Policies:

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious and cultural observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available here.