

Phil 371: Non-Classical Logics

Syllabus

Instructor: Dr. Audrey Yap (ayap@uvic.ca)

Office Hours: Wednesdays and Fridays 11:30am–12:30pm (sign up required)

Course Website: Through Brightspace: (<https://bright.uvic.ca/d21/home>)

Class Times: Tuesdays 1:30–2:20 over Zoom. Optional additional meetings Wednesdays 1:00–2:15pm

Textbook: PDF available through the course website.

Lecture videos posted weekly on the course website.

Prerequisites: Prerequisites: Phil 203, Math 122, or permission of the instructor.

Course videos will be captioned, and I will try to fix any errors in the automatic transcriptions, but please feel free to email me if you notice any remaining mistakes. If you notice any additional accessibility issues with respect to this class, please let me know and I will do my best to solve them. I would also encourage any students who might benefit from their services to register with the Centre for Accessible Learning (<https://www.uvic.ca/services/cal/>).

Course Description

This is an intermediate-level course in symbolic logic that covers the basics as well as some of the metatheory of various non-classical logics. Non-classical logics have historically been developed to model features of formal languages or reasoning systems that are absent from classical propositional or first-order logic. Some of them are compatible with classical reasoning, while others are not.

Learning Objectives

This course will cover the basics of several systems of non-classical logic. Though the time we spend on each individual system and the particular aspects of it we emphasize will vary, we will expect you to be able to do the following for the systems we are covering:

- understand and discuss the philosophical or technical motivations behind the various logical systems,
- apply the definitions of basic syntactic and semantic concepts to problems, and
- construct metatheoretic proofs about the systems.

Course Logistics

This course will have both *synchronous* and *asynchronous* components, and will also be taught in connection with Philosophy 473 at the University of Calgary, taught by Dr. Richard Zach. This means that we will be progressing through the material at the same pace, and some assignments may be common to both courses, though I will be the one responsible for grading your work. You will also be allowed (but not required) to participate in the U of C synchronous sessions, and the U of C students will be allowed (but not required) to participate in ours. The main discussion forum for the course will also be shared between both classes.

Lecture videos will be posted on the course website the week before the material is to be covered. It will be beneficial for you to have watched these videos prior to the weekly class meeting in order to better participate in the discussion. All homework will be handed in online, as well as the final project. You will also be required to post regularly in the discussion groups for a participation grade. You are welcome and encouraged to discuss course material with others in your class, and work together to solve problems. However, the work you turn in must be your own, and you are not allowed to provide the solutions for someone else's assignments or vice versa. If you are ever unsure about what constitutes a violation of academic integrity, more information is provided on the University Calendar: <http://web.uvic.ca/calendar/undergrad/info/regulations/academic-integrity.html>

The course schedule at the end of this documents lists the topics for each week and relevant readings from the textbook. All of the course videos and the week's homework assignment will be available on the course website prior to the start of the week when the material is covered.

Synchronous Sessions: There will be one synchronous course meeting per week, Tuesdays from 1:30–2:20pm, held over Zoom. I will not be taking attendance, and I will be recording these sessions to be posted on the course website afterwards, but my default expectation is that you will be setting aside that time to come to class and participate. Those sessions will be interactive - you will have the opportunity to ask questions, as well as engage in small group and full class discussions. Video or audio participation is not required, but may make it easier for you. The U of C sessions will be Wednesdays 1:00–2:15pm.

Communication and Office Hours: Email is my preferred method of communication, as opposed to Brightspaces messages or forum posts, especially for any official requests. If you ask me a question over email, you can expect a reply within about 1 working day. If you don't hear back from me within that time frame, feel free to try again in case your message went astray. When you do address me (over email or otherwise), please do so as either Professor (Prof.) Yap, Dr. Yap, or just as Audrey. Please don't use any of Mrs/Miss/Ms/Mr, for a

variety of reasons. If you are ever nervous about sending me an email, or asking a question, feel free to include a picture of a puppy with your request. This will not affect whether or not I will be able to help you with your request, but will give you an excuse to look for pictures of puppies. Finally, my pronouns are she/hers. If you think I am unlikely to know the name you would prefer to be called, or the pronouns I ought to use for you, through the entry that I will see for you through your Brightspace/UVic registration, please don't hesitate to make me aware.

I will be available for office hours on Wednesdays and Fridays between 11:30am and 12:30pm. My default platform for office hours will be Zoom, but if that does not work for you, please feel free to email me in advance to suggest an alternative. You will need to schedule an appointment beforehand using the weekly scheduler on the course website. Appointments can be scheduled in 20 minute blocks. If you are working with a study group and would like to attend office hours as a group, simply designate one person to reserve the appointment slot, and let me know who else will be attending.

Participation: There will be a shared class discussion board to be used for discussion of weekly topics. In order to receive full marks for participation, you will be responsible for posting in 10 out of the first 11 weeks of class. Specific guidelines for each week's participation assignment will be given in the forums where the posts are to be made. But the typical format will ask you to explain one thing from the week's material that you found clear, and pose one question about something that you found less clear. You are highly encouraged to learn from each other and discuss your forum responses. Often you will find that explanations from your peers will be helpful in ways that explanations from your instructors are not, as they will be learning the concepts along with you and may better understand where you're at. Since these forum posts are intended to be ways to engage with the material at the same time as your peers, you will have to post them during the week the material is covered in order to receive credit. Any post that satisfies the weekly guidelines will be given full credit.

Homework: There will be 10 short problem sets, each worth 4% of your final grade, one on each of the topics or formal systems we are covering. Each problem set will be due at the end of the week when that topic is covered. Many of you might be new to online learning—but whether online or in person, I know that sometimes things do not go as planned. You are welcome to two day's worth of extensions on assignments. This means you can take two extra days to complete a single assignment, or have one extra day on two different assignments. Please let me know before the due date if you are using an extension. You also do not need to tell me why you need the extension, but if you anticipate needing more than these two days, I highly encourage you to make an appointment with me to talk about how we can plan for you to keep up with the course schedule.

Final Projects: Your final project can take a variety of forms, and I encourage you to be creative with it. It will engage with a system, or multiple systems, of non-classical logic in a scholarly way. It should also be presented in a format that makes it easily shared with others in your class. Here is a non-exhaustive list of potential ideas: a more traditional paper in the philosophy of logic that makes or considers philosophical arguments relevant to a particular logical system; an explainer guide or video that introduces a particular audience to the basics and motivations behind of a particular logical system; a technical exploration of a logical system that we did not cover in the class; an analysis of a piece of media, like a movie or short story, in terms of a systems of non-classical logic, such as a consideration of which temporal logics could be used to model a movie in which time travel is fundamental; the production of a piece of media, like a story or short movie, that provides philosophically interesting insights into a system of non-classical logic. Papers should be approximately 2500-3500 words (10-15 pages). Whatever you choose, the project (worth 40 marks) will be assessed in accordance with the following criteria, in which numerical scores out of 10 or 5 are taken to correspond to percentage grades.

- Clarity and accessibility (10): How clearly communicated are the ideas through your chosen medium? Is technical material presented an appropriate level, where it can be understood by any of your classmates?
- Technical mastery (10): Is there substantial engagement with at least one system of non-classical logic? Is the system presented correctly, with relevant details included and accurately explained?
- Internal coherence (10): Are all parts of the project working together to accomplish its main objective? Is the medium chosen for the final project an appropriate one to carry out that objective? Are there irrelevant parts presented, or is everything clearly connected?
- Creativity and originality (5): Does the project help to fill a gap in the existing literature, whether philosophical, technical, or pedagogical? Is it presenting ideas in a new and potentially fruitful way?
- Responsiveness to peer feedback (5): Instructions for providing peer feedback are given below. When you receive such feedback on your project, you should reply in a way that indicates how you have taken in the feedback and potentially could use it to improve the project. If you do not think one of your peer's suggestions should be implemented, or that their criticisms are warranted, you should explain your views clearly. Your responses do not need to endorse your classmates suggestions, but must demonstrate that you have taken them seriously. All peer feedback must be in by Dec 10th, and all responses must be in by Dec 13th.

In order to help you develop the final project, you will hand in an initial proposal (due Nov 15) that will be worth 4%.

Final Project Proposal and Update: The project proposal will contain: (1) an approximately 250 word abstract or project description that clearly outlines your objectives as well as the form the final project will take and how it will be shared. The motivations behind your project should be made clear, as well as the process you are going to be using for carrying it out. (2) an itemized list of things you will need to do in order to complete your project by the due date of Nov 30th as well as a suggested deadline for doing each of those things. (3) a list of 2-3 scholarly resources you plan to consult in order to carry out your project with a sentence or two about why each one will be important for your project.

If your proposal is given a grade below 2 (out of 4), you *must* resubmit it, and your project will not be approved until it is regraded, and the revised proposal is assessed at a 2 or higher. The grading scale for project proposals is given below:

- 3–4: Project abstract is extremely clear and provides a well-motivated and transparent description of the project. Projected timeline is clearly connected to the objectives and self-imposed deadlines are feasible. Resources provided are clearly relevant to the stated project objectives.
- 2–3: Project abstract gives a relatively clear description of what will take place. Projected timeline is connected to the objectives, but there may be some problems with feasibility, or items may require additional clarification. Resources provided seem connected to the stated project objectives, but further clarification may be required.
- 0–2: One or more of the three required items is missing, incomplete, or is significantly lacking in clarity. Project or timeline may be unrealistic, or sources may be inappropriate. *Requires Resubmission.*

Peer Feedback: You will also be responsible for providing substantive peer feedback on at least three other final projects in a discussion forum dedicated to final projects. This feedback should engage with a key aspect, whether technical, pedagogical, or philosophical, of your classmate's work. It might suggest additional connections, make further suggestions, raise questions, or provide a criticism. However, where your feedback is critical, it should also be constructive, in that you should make suggestions about how your criticisms might be addressed, or suggest alternative ways of looking at things. All peer feedback will be due by Dec 10th.

- 1.5-2: Substantial and constructive feedback that clearly describes how the project could be expanded, improved, or connected to existing work.
- 1-1.5: Helpful feedback, but may not provide clear suggestions for expansion, improvement, or connection.

- 0.5-1: Incomplete or perfunctory feedback that does not demonstrate clear engagement with the project.

Grading Breakdown

Gradable Item	Description	Value
Participation	Posting on the course discussion boards	$1\% \times 10 \text{ weeks} = 10\%$
Problem Sets	Weekly problems on the week's material	$4\% \times 10 = 40\%$
Final Project Proposal	Proposal and plan for final project	4%
Final Project	See description for more details.	40%
Peer Feedback	Substantive constructive feedback on peer projects.	6%
		Total = 100%

Suggested Weekly Schedule

Day(s)	Tasks
Monday – Tuesday	Read textbook, watch course videos. Slow down and review materials as needed. Schedule office hours if needed.
Tuesday	Attend class.
Wednesday – Thursday	Work through problem set. Review material. Post and reply on course discussion board Schedule office hours as needed.
Friday – Saturday	Finish and hand in problem set.

Numerical and Letter Grades

Grades will be given as percentile marks. Work will be evaluated on both its clarity and its correctness. The percentile mark for the course will be converted to a letter grade in the following manner:

A+	= 90–100	B+	= 77–79	C+	= 65–69	D	= 50–59
A	= 85–89	B	= 73–76	C	= 60–64	F	= 0–49
A–	= 80–84	B–	= 70–72				

The A range means exceptional, outstanding and excellent performance. A grade in the B range means a very good, good and solid performance. A grade in the C+ or C range means satisfactory, or minimally satisfactory, performance. A grade of D indicates merely passable or marginal performance. An F indicates unsatisfactory performance.

Schedule

- Week One: Short week — term starts Sep 9
What are we doing?
Course Logistics, Introduction to Non-Classical Logics. No Tuesday class meeting, but feel free to tune in to optional Wednesday class.
Problem Set 1 due Sep 13
- Week Two: Sep 14–20
Remind me: how does logic work, again?
Set-theoretic and Semantic Basics
Problem Set 2 due Sep 20
- Week Three: Sep 21–27
Why is everything true or false?
Many-Valued Logics
Problem Set 3 due Sep 27
- Week Four: Sep 28–Oct 4
But isn't truth relative (to a world)?
Introduction to Propositional Modal Logic
Problem Set 4 due Oct 4
- Week Five: Oct 5–11
Is this really necessary?
Frame Correspondence and Axioms
Problem Set 5 due Oct 11
- Week Six: Oct 12–18 (Thanksgiving is Oct 12)
But you can't tell me what to think!
Epistemic Logics
Problem Set 6 due Oct 18
- Week Seven: Oct 19–25
Is this going to go on forever?
Temporal Logics
Problem Set 7 due Oct 25
- Week Eight: Oct 26–Nov 1
What if things were different?
Counterfactuals and conditional logics
Problem Set 8 due Nov 1
- Week Nine: Nov 2–8
How can it be true if you can't prove it?

Intuitionistic logic
Problem Set 9 due Nov 8

- Week Ten: Nov 9–15 (Reading Break is Nov 9–11)
Are we there yet?
No class meeting or new material—work on proposals.
Final project proposal due Nov 15
- Week Eleven: Nov 16–22
Wait, hear me out: what if it's both true and false?
Relevance and paraconsistent logics
Problem Set 10 due Nov 22
- Week Twelve: Nov 23–29
Final Project Planning—class meeting will be used for updates on progress and instructor/peer feedback.
- Week Thirteen: Nov 30–Dec 6
Projects must be submitted by Nov 30
Student Project Discussions
- Week Fourteen: Dec 7–13
Student Project Discussions, Continued.
All peer feedback due by Dec 10
All responses to peer feedback due by Dec 13