UNIVERSITY OF CALGARY
FACULTY OF ARTS
Department of Philosophy

PHIL 473 Lec 01
Philosophy of Logic

Fall Term 2020

Course Outline

Who's teaching this?

Instructor: **Richard Zach** (he/him)
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How do I get in touch with you?

1. Your question may already be answered on the course discussion board (or in this outline). Check there first. If it is not, consider posting your question in the discussion board instead of sending an email. (Posting counts toward your grade, and others may benefit from the answer.) Your instructors ("we") will monitor the discussion boards and attend to questions regularly.
2. If your inquiry is specific to your personal situation, or if you need a response quickly, feel free to send an email.
3. If you do, ensure that "Phil 473" or some other clearly identifying term occurs in the subject line. Otherwise there is a strong possibility that your message will be deleted unread as spam.
4. Please make sure your first and last names are clearly included in the body of any email message.
5. If you want to make an appointment please indicate the times when you are available, or use Calendly.
6. We will do our best to reply within one business day.

What is this course about?

Phil 279, Logic I, introduced you to what's called *classical* logic. Classical logic is very useful, widely used, has a long history, and is relatively simple.

But it has limitations: for instance, it does not (and cannot) deal well with certain locutions of natural language such as tense and subjunctive mood, nor with certain constructions such as "Audrey knows that p." It makes certain assumptions, for instance that every sentence is either true or false and never both. It pronounces some formulas tautologies and some arguments as valid, even though these tautologies and arguments formalize arguments in English which many do not consider true or valid, at least not obviously. Thus it seems there are examples where classical logic is not expressive enough, or even where classical logic gets things wrong.

In this course we will discuss some alternative, *non-classical* logics. These non-classical logics are either more expressive than classical logic or have different tautologies or valid arguments. For instance, temporal logic extends classical logics by operators that express tense; conditional logics have a different "if-then" that does not suffer from the so-called paradoxes of the material conditional.

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. In this course, we will study the basics as well as some of the metatheory of various non-classical logics.

How will the course be run?

The course will be delivered in a hybrid synchronous/asynchronous model. There will be readings, prerecorded lecture videos, and discussion boards online. You can read, watch, and participate in discussions more or less when you choose, so that part of the course will not happen at the same time for everyone (i.e., it is asynchronous). There will also be weekly Zoom sessions at specific times where everyone will participate at the same time (i.e., those are synchronous).

The course will also be taught in connection with Philosophy 371 at the University of Victoria, taught by Dr. Audrey Yap.[1] 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 UVic synchronous sessions, and the UVic students will be allowed

[1] UCalgary is weird in its practice of numbering first-year courses at the 200-level. Both courses are aimed at 3rd year students.

(but not required) to participate in ours. The main discussion forum for the course will also be shared between both classes.

What prerequisites do I need for this course?

Phil 279 (Logic I) or Phil 377 (Elementary Formal Logic).

What will I learn in this course?

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:

- articulate and discuss philosophical or technical motivations,
- clearly describe the semantics and proof-theory,
- apply the semantics and proof-theoretic definitions to examples and problems,
- construct basic proofs of metatheoretic properties.

In addition, you will be able to engage constructively with your peers about the topics we cover, and provide fair and useful feedback on their final projects.

What will I have to do in this course?

Visit the D2L/Brightspace site regularly. The course has a D2L/Brightspace site. You will find (information on) course readings, videos, scheduled Zoom meetings, assignments, and grades there. Any updates, including revisions to office hours, course schedule, and deadlines, will be posted there. **To make sure you don't miss a deadline or an important update, please review your notification settings.**

Do the reading. The textbook is

> Audrey Yap and Richard Zach, *What If? An Open Introduction to Non-classical Logics* (Fall 2020 edition)

It is available electronically on D2L. We'll post additional readings on D2L as well. You should read along as we cover the topics in the course.

Watch some lecture videos. Lecture videos will be posted on D2L 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.

Attend Zoom meetings. We'll have Zoom meetings every week on Wednesday, 14:00–15:15. We will not be taking attendance, and the sessions will be recorded and posted on D2L afterwards. We expect that you will be setting aside that time to come to class and participate, however. The 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 things easier for you. The UVic sessions will be Tuesdays 14:30–15:30.

Engage with others in the class. There will be a shared class discussion board to be used for discussion of weekly topics. 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.

Do the homework. There will be 10 short problem sets, 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.

Complete a final project. Your final project can take a variety of forms, and we 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 (approximately 2500–3500 words, or 10–15 pages);
- 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;
- A piece of media, like a story or short movie, that provides philosophically interesting insights into a system of non-classical logic.

Plan said project ahead of time. In order to help you develop the final project, you will hand in an initial proposal (due **November 15**). The project proposal will contain:

- 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.
- An itemized list of things you will need to do in order to complete your project by the due date of November 30 as well as a suggested deadline for doing each of those things.
- 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.

Help each other out. 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. Your feedback should consist in:

- A short summary of the main point of the project, e.g., the argument being made or the result being proved.
- A description of one aspect of the project that you like, and why you like it.
- A description of one aspect of the project that you think could be improved, and a suggestion for how you would improve it.

All peer feedback will be due by **December 6**.

Can we work together?

You're welcome to work together in pairs or teams of three on your final project. If you do, your proposal should include a plan for how to break down the work among the team members, and every team member should turn in a short outline of what each team member ended up contributing. We'll grade the final product, and take into account self- and peer evaluation of contributions of team members in individual final grades.

What do I need for all that?

This course will be delivered online. One or two hours a week will take place via Zoom at the set lecture times, but most content will be delivered asynchronously (that means: not at a specific time). To access the material and complete the assignments you will need a computer and access to the internet (for some things a smartphone or tablet are enough, but a desktop or laptop with a keyboard, mouse, and large-ish screen will be much more comfortable).

You will need an account with the UCalgary IT service, without which you cannot access D2L.

To participate in synchronous groupwork sessions, and to communicate with your instructor and fellow students, you need a Zoom account. To participate with audio and video, you need a microphone and webcam, ideally on a computer with keyboard and mouse. However, attending the synchronous Zoom sessions is not required to pass the course.

Instructions for setting these things up and additional tips for how to best learn online are available at:

taylorinstitute.ucalgary.ca/learning-continuity

So what should my week look like?

Day(s)	Tasks
Monday–Tuesday	Read textbook, watch course videos. Slow down and review materials as needed. Schedule office hours if needed.
Tuesday/Wednesday	Attend class.
Wednesday–Friday	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.

How will my grade be determined?

There will be no registrar-scheduled final exam.

Engagement. For each week you successfully earn engagement credit, you will earn one point up to a maximum of 10.

Evaluation scale. Every other activity, component, or criterion (homework problem, proposal, final project, peer feedback) will be graded on a 4-point scale:

E Exceeds expectations (4 points).
M Meets expectations (3 points).
R Needs work (2 points).
N Not assessible (1 point).

An activity or component that is missing scores 0 points.

Final projects. Final projects will be assessed on the following criteria:

- Clarity and accessibility (25%): 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 (25%): 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 (25%): 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 (10%): 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 (15%): When you receive 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.

Item weights. Your final score will be determined by the point score you earn on each individual activity, multiplied by the following weights:

Component	% each	% total
Engagement (10 weeks)	1	10
Problem sets (10)	4	40
Project proposal		5
Final project		35
Peer feedback		10
		100

Final grades. The final percentage score for the course will be converted to a letter grade in the following manner:

A+	= 90–100	B+	= 77–79	C+	= 67–69	D+	= 55–59
A	= 85–89	B	= 73–76	C	= 63–66	D	= 50–54
A−	= 80–84	B−	= 70–72	C−	= 63–66	F	= 0–49

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 range means satisfactory, or minimally satisfactory, performance. A grade of D indicates merely passable or marginal performance. An F indicates unsatisfactory performance.

What rules do I have to know?

Recording Zoom sessions. In order to allow students to review synchronous sessions, these Zoom sessions will be recorded and the recordings made available to students in the course. Recorded sessions will not be used for any other purpose. Nevertheless, if you object to your image or voice being recorded, you should make sure to turn your video off and set your microphone to mute. (You can use the Zoom chat function to ask questions.) Breakout rooms (small groups) will not be recorded, and as a courtesy to your fellow students, you are encouraged to use video and audio while in a breakout rooms.

Conduct. Learning can only happen well if everyone feels like they belong and are free to ask questions and participate in discussions. It is partly on you to make sure our course is such a space. So please be respectful, positive, and constructive in your participation in the course. It should go without saying, but do not post (links to) anything racist, mysogynist, or homophobic, or NSFW, and don't stalk or harrass your fellow students or instructors. Also, do not share links or passwords to live or recorded Zoom sessions outside the course.

Late policy. You're probably new to online learning—but whether online or in person, we 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.

When is it all happening?

I. Ok, what are we doing?

Wed Sep 09 Course logistics, introduction to non-classical logics

II. Remind me: how does logic work, again?

Wed Sep 16 Set-theoretic and semantic basics

III. Why is everything true or false?

Wed Sep 23 Many-valued logics

IV. But isn't truth relative (to a world)?

Wed Sep 30 Introduction to propositional modal logic

V. Is this really necessary?

Wed Oct 07 Frame correspondence and axioms

VI. But you can't tell me what to think!

Wed Oct 14 Epistemic logics

VII. Is this going to go on forever?

Wed Oct 21 Temporal logics

VIII. What if things were different?

Wed Oct 28 Counterfactuals and conditional logics

IX. How can it be true if you can't prove it?

Wed Nov 04 Intuitionistic logic

X. Are we there yet?

Wed Nov 11 Winter break – No class

Sun Nov 15 Final project proposal due

XI. Wait, I know this is out there but: what if it's both true and false?

Wed Nov 18 Relevance and paraconsistent logics

XII. Was this a good idea?

Wed Nov 25 Final project planning—class meeting will be used for updates on progress and instructor/peer feedback

XIII. Argh, how do I fix it?

Mon Nov 30 Projects due

Wed Dec 02 Student project discussions

Sun Dec 06 All peer feedback due

XIV. Almost done!

Wed Dec 09 Student project discussion, cont'd

Sun Dec 13 Responses to peer feedback, final version of project due

Important departmental, faculty, and university information

Academic accommodations. It is the student's responsibility to request academic accommodations according to the University policies and procedures. The student accommodation policy can be found at: ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities.pdf

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to their instructor.

Absence or missed course assessments. Students who are absent from class assessments (tests, participation activities, or other assignments) should inform their instructors as soon as possible. If the reason provided for the absence is acceptable, instructors may decide that any arrangements made can take forms other than make-up tests or assignments. For example, the weight of a missed grade may be added to another assignment or test.

Student support and resources. Full details and information about the following resources can be found at ucalgary.ca/registrar/registration/course-outlines:

- Wellness and Mental Health Resources
- Student Success Centre
- Student Ombuds Office
- Student Union (SU) Information
- Graduate Students' Association (GSA) Information

- Emergency Evacuation/Assembly Points
- Safewalk

Academic Advising. If you are a student in the Faculty of Arts, you can speak to an academic advisor in the Arts Students' Centre about course planning, course selection, registration, program progression and more. Visit the Faculty of Arts website at arts.ucalgary.ca/advising for contact details and information regarding common academic concerns.

For questions specific to the philosophy program, please visit phil.ucalgary.ca. Further academic guidance is available by contacting David Dick (Undergraduate Program Director, dgdick@ucalgary.ca) or Jeremy Fantl (Honours Advisor, jfantl@ucalgary.ca). If you have questions regarding registration, please email Rebecca Lesser (Undergraduate Program Administrator, phildept@ucalgary.ca).

Writing assessment and support. The assessment of all written assignments—and, to a lesser extent, written exam responses—is based in part on writing skills. This includes correctness (grammar, punctuation, sentence structure, etc.), as well as general clarity and organization. Research papers must include a thorough and accurate citation of sources. Students are also encouraged to use Writing Support Services for assistance (one-on-one appointments, drop-in support and writing workshops). For more information, and other services offered by the Student Success Centre, please visit ucalgary.ca/ssc.

Required technology. In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Broadband internet connection.

Most current laptops will have a built-in webcam, speaker and microphone.

Responsible Use of D2L. Important information and communication about this course may be posted on D2L (Desire2Learn), UCalgary's online learning management system. Visit ucalgary.service-now.com/it for how-to information and technical assistance.

All users of D2L are bound by the guidelines on the responsible use of D2L posted at elearn.ucalgary.ca/commitment-to-the-responsible-use-of-d2l/. The instructor may establish additional specific course policies for D2L, Zoom, and any other technologies used to support remote learning. Instructional materials, including audio or video recordings of lectures, may not be posted outside of the course D2L site. Students violating this policy are subject to discipline under the University of Calgary's Non-Academic Misconduct policy, ucalgary.ca/policies/files/policies/non-academic-misconduct-policy.pdf

Media recording. Please refer to the following statement on media recording of students: elearn.ucalgary.ca/wp-content/uploads/2020/05/Media-Recording-in-Learning-Environments-OSP_FINAL.pdf.

Academic misconduct/honesty. Cheating or plagiarism on any assignment or examination is as an extremely serious academic offense, the penalty for which will be an F on the assignment or an F in the course, and possibly a disciplinary sanction such as probation, suspension, or expulsion. For information on academic misconduct and its consequences, please see the University of Calgary Calendar at: ucalgary.ca/pubs/calendar/current/k.html

Intellectual honesty requires that your work include adequate referencing to sources. Plagiarism occurs when you do not acknowledge or correctly reference your sources. If you have questions about referencing, please consult your instructor.

University policies. The Instructor Intellectual Property Policy is available at: ucalgary.ca/policies/files/policies/Intellectual%20Property%20Policy.pdf

Course materials created by professor(s) (including course outlines, presentations, assignments, and exams) remain the intellectual property of the professor(s). These materials may *not* be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

The University of Calgary is under the jurisdiction of the provincial Freedom of Information and Protection of Privacy (FOIP) Act, as outlined at ucalgary.ca/legalservices/foip. The instructor (or TA) must return graded assignments *directly* to the student **unless** written permission to do otherwise has been provided.

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf) and requirements of the copyright act (laws-lois.justice.gc.ca/eng/acts/C-42/index.html).