



UNIVERSITY OF CALGARY
FACULTY OF ARTS
Department of Philosophy

PHIL 279 Lec 01

Logic I

Winter Term 2020

online only as of March 16, 2020

Course Outline

Instructor: [Richard Zach](#) (he/him)
Email: rzach@ucalgary.ca
Office Hours: MWF 10:00–11:00 on Zoom, or by appointment
Phone: (403) 220–3170

Teaching Assistant: [Amir Kiani](#) (he/him)
Email: amirhossein.kiani@ucalgary.ca
Office Hours: on Zoom to be scheduled on D2L, or by appointment

Teaching Assistant: [Brent Odland](#) (he/him)
Email: brent.odland@ucalgary.ca
Office Hours: on Zoom to be scheduled on D2L, or by appointment
Tutorials: R 9:00–9:50, on Zoom
R 10:00–10:50, on Zoom

PASS Leader: [Sarah Hatcher](#) (she/her)

During the COVID-19 outbreak, email and D2L will be the preferred communication channel. Assignments will be submitted on Canvas or D2L. Please screenshot the D2L submitted field or sent email when submitting work electronically in case of systems issues.

Please keep the following in mind:

1. Please ensure that “Phil 279” 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.

2. If you email to make an appointment please indicate the times when you are available.
3. Please make sure your first and last names are clearly included in the body of any email message.
4. We will not respond to email after 7pm or on weekends.

If you do not have access to email an need to get in touch, call (403) 220-3170, leave a message with your phone number, and I will call you back.

Course information

The course will introduce you to the semantics and proof-theory of first-order logic (FOL). We will learn how to “speak” the language of FOL, study the method of truth tables, become proficient in giving formal proofs, and learn how to construct and argue about first-order interpretations. These methods will enable you to answer, in particular cases, the questions that logic is primarily concerned with: When does something follow from something else? What are logical truths? Which arguments are logically valid? But the main payoff will be to get you to become comfortable with formal methods, and to use them to clarify and make precise logical relationships that are hard to understand or express otherwise. We will also look at some results and notions which are important for the applications of formal logic, such as the expressive power of truth-functional and first-order logic, as well as some important theorems relating semantics and proof theory (soundness, completeness). We will touch on applications of logic to philosophy, mathematics, and computer science.

Prerequisites

There are no prerequisites.

Course objectives

By the end of the course, you should be able to ...

1. work with the formal languages of truth-functional and first-order logic, with the ability to translate natural language sentences into a formal language.
2. use truth tables to evaluate sentences and arguments in truth-functional logic.
3. understand the basic semantic concepts such as validity, entailment and logical equivalence, when they apply and how they can be used.

4. construct correct derivations in a natural deduction system for truth-functional and first-order logic, with and without identity.
5. use a proof system to determine whether or not a sentence is a logical truth, whether an argument is valid, and whether two formal sentences are equivalent.
6. construct interpretations that make first-order sentences true or false and to use them to show that arguments are invalid.
7. appreciate some basic metatheoretic results, such as truth-functional completeness, and soundness and completeness of a natural deduction system for truth-functional logic.

Required readings

The textbook

P.D. Magnus, et. al., *forall x: Calgary. An Introduction to Formal Logic* (Fall 2019 edition)

is required for this course. It will be made available electronically via D2L.

Course website

The course has a [D2L/Brightspace](#) site. You will find course readings, assignments, quizzes, grades, and a discussion board there. Any updates, including revisions to office hours, PASS sessions, 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](#).**

During the COVID-19 outbreak, the D2L site will also include:

- **Screencasts on course topics (in lieu of lectures)**
- **Zoom meetings for tutorials (recorded for later review)**
- **Course discussion for extra credit**

Assessment Components

There will be no registrar-scheduled final exam.

Tests. There will be one in-class tests, worth 15% of the final mark. This test is closed book—no reference materials will be allowed during the tests—and held on Wednesday, March 4.

In lieu of the remaining two in-class tests, there will be two additional take-home assignments, each worth 12.5% of the final mark. To complete them, you may consult only your own notes and materials posted by the instructor, TAs, and PASS leader on D2L. These assignments will be posted on D2L at noon on the following days and are due 48 hours later::

- 1. Friday, March 27**
- 2. Wednesday, April 15**

Quizzes. There will be open-book quizzes covering the course material to be taken online on D2L. There will be 10 quizzes in total. Quizzes will be due on Sundays at 23:30 and available on D2L for seven days. Quizzes account for 5% of your final grade.

Final quiz. **There will be one final cumulative quiz. It will account for 5% of your final grade. It will be available for three days and due on Sunday April 12 at 23:30. You will have two attempts on this final quiz.**

Problem sets. There will be 5 problem sets, each worth 10% of the final mark for a total of 50%. Problem sets are due by 11:00 on the following dates:

1. Monday, February 3
2. Monday, February 24
3. Monday, March 9
- 4. Wednesday, March 25**
5. Wednesday, April 8

We will make use of an online service, carnap.io, for completing some of the problems. Any problems not assigned on carnap.io should be **turned in electronically in a D2L dropbox. You may submit electronic documents (Word or PDF) or scans/images of legibly handwritten submissions.**

D2L Discussion. **Starting March 13, you will be able to earn up to 3% extra credit by participating in discussion on the D2L “Course Material” forum. You may ask questions, answer or clarify others’ questions, suggest additional exercises or material on the internet, and ask for or provide help with exercises on the problem sets. Quizzes and test questions are off limits (before the quiz or test is due). Your grade on this**

is determined by the number of upvotes your posts and replies. 10 upvotes constitutes full credit.

Grade scheme

Each test, quiz, and problem set will be assigned a raw point score, which is then normalized to a score out of 100 points. The final score is computed according to the percentage weights given above. The following table will be used to convert the final score to letter grades (the ranges include the lower score and exclude the upper, e.g., 79 earns a B, not a B-):

97–100	A+	86–90	B+	71–75	C+	55–60	D+
93–97	A	79–86	B	64–71	C	50–55	D
90–93	A–	75–79	B–	60–64	C–	< 50	F

Peer Assisted Study Sessions

This course is supported by the PASS (Peer Assisted Study Sessions) program. PASS provides students with free, organized study groups facilitated by a student who has been successful in the course before. Attending PASS can help you build your understanding of course content as well as learn valuable study skills which will help you to succeed in the course. You will meet your PASS leader and receive more information in the first weeks of classes.

Course policies

Late policy. You may turn in **two** problem set 24 hours late, no questions asked. Otherwise, problem sets will not normally be accepted after the deadlines unless special permission has been given by the instructor ahead of time. Failure to submit a problem set on time will normally result in a mark of zero. Students who cannot submit an assignment or a test due to medical reasons or other reasonable grounds should contact the instructor as soon as possible.

Checking your grades and reappraisals of work. University policies for reappraisal of term work and final grades apply (see the *Calendar* section “[Reappraisal of Grades and Non-Disciplinary Academic Appeals](#)”). In particular, term work will only be reappraised within 10 calendar days of the date you are advised of your marks. Please keep track of your assignments (make sure to pick them up in lecture or in office hours) and your marks (check them on D2L) and compare them with the graded work returned to you.

Schedule of topics and due dates

Dates are tentative and subject to revision.

Week	Topics and readings (chapters)	Quiz	P S	Test
1	(Jan 13) Scope of logic, arguments and validity, symbolization, connectives (1–8)	1		
2	(Jan 20) More connectives, semantic notions, proofs (10–11, 14–15)	2		
3	(Jan 27) Proof rules and construction strategies (16–19)	3		
4	(Feb 3) Building blocks of FOL, quantifiers (21–22)	4	1	
5	(Feb 10) Interpretations, semantic notions of FOL (26–30)	5		
6	(Feb 24) Proof rules for quantifiers, proof construction strategies (32–33, 36)	6	2	
7	(Mar 2) Multiple quantifiers, ambiguity, Donkey sentences (23)			1
8	(Mar 9) Interpretations and proofs for multiple quantifiers	7	3	
9	(Mar 16) Properties of relations, reasoning about interpretations (31)	8		
10	(Mar 23) Identity, numerical quantification, definite descriptions (24–25)		4	2
11	(Mar 30) Expressive adequacy and normal forms (41)	9		
12	(Apr 6) History and applications	10	5	
13	(Apr 13) Review			3

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 seeking 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 Dis-

abilities: 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. Instructors may request that evidence in the form of documentation be provided. 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. For information on possible forms of documentation, including statutory declarations, please see: ucalgary.ca/pubs/calendar/current/m-1.html

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 reg-

istration, 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.

Online resources and electronic devices. 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.

The use of laptop and mobile devices is acceptable when used in a manner appropriate to the course and classroom activities. The use of devices must be exclusively for instructional purposes, and without disruption to the instructor or fellow students. In particular, students are to refrain from accessing websites that may be distracting for fellow learners (e.g. personal emails, Facebook, YouTube), watching movies, or playing games. Devices should be set to silent mode during lectures. Audio or video recording of lectures is not permitted without the written permission of the instructor. Students are responsible for being aware of the University's Internet and email use policy, which can be found at: ucalgary.ca/policies/files/policies/electronic-communications-policy.pdf Students violating this policy are subject to discipline under the University of Calgary's Non-Academic Misconduct policy.

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 ref-

erence 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).