UNIVERSITY OF CALGARY
FACULTY OF ARTS
Department of Philosophy

PHIL 279 Lec 01
Logic I
Spring 2023

COURSE OUTLINE

Instructor Name: Koray Akçagüner (he/him)
Email: koray.akcaguner@ucalgary.ca
Teaching Assistant: none
Office: Social Sciences 1227
Office Hours: Friday 1:00-2:00pm (over zoom but I will be in my office if you want to meet in person)

COURSE DELIVERY INFORMATION

Online Synchronous (Zoom), Monday-Wednesday, 6:00pm-8:45pm.

PREREQUISITE(S)

None; there are no prerequisites for this course.

COURSE INFORMATION

The course will introduce you to the semantics and proof-theory of Truth-Functional logic (TFL) and 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 first-order interpretations. These methods provide us with precise ways to make sense of argument validity. The goal is to have you 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), though we will not cover them in great detail. We will touch on applications of logic to philosophy and mathematics.

The kinds of things you will learn are mainly of three sorts: (1) symbolize sentences of English in a formal language, (2) give counterexamples (truth tables, interpretations) that show various things, (3) give formal proofs. Much of this will be completely new and not something that's like anything you've done before. It will not feel like what you might think of as philosophy. There will be lots of symbols. Most of the assignments will be completed on Carnap.io, a website designed to teach formal logic to students. Information about registering and accessing Carnap will be posted on D2L. This is a course in formal logic, not a course on how to think or how to avoid fallacies. There are similarities to some things in discrete mathematics, but formal logic is applied to more than mathematics.

Please note that class sessions will *not* be recorded, but I will share the lecture slides after every lecture. The classes will consist of two 75-minute sessions with a 15-minute break in between.

COURSE OBJECTIVES/LEARNING OUTCOMES

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

- work with the formal languages of truth-functional and first-order logic, with the ability to formalize natural language sentences in a formal language,
- use truth tables to evaluate sentences and arguments in truth-functional logic,
- understand the basic semantic concepts such as validity, entailment and logical equivalence, when they apply and how they can be used,
- construct correct derivations in a natural deduction system for truth-functional and first-order logic, with and without identity,
- use a proof system to determine whether a sentence is a logical truth, whether an argument is valid, and whether two formal sentences are equivalent,
- construct interpretations that make first-order sentences true or false and use them to show that arguments are invalid,
- appreciate some basic metatheoretic results, such as truth-functional completeness, and soundness and completeness of a natural deduction system for truth-functional logic,
- be able to articulate clear questions, explain logical concepts, and guide others through logical problems.

REQUIRED/RECOMMENDED TEXTBOOKS, READINGS AND MATERIALS

The textbook is: P.D. Magnus, et. al., *forall x: Calgary. An Introduction to Formal Logic* (Fall 2021 edition). forallx.openlogicproject.org. It is free and available on D2L in PDF, as well as in Carnap. It comes in two formats, and many of the exercises in it have solutions in the accompanying solutions manual. You may also purchase a paper copy if you like.

Each lecture in the Content section on D2L will tell you which chapters of the book that section covers. The book is more of an accompaniment than a primary source. The lectures will cover all the material you need, but you can find more detailed information on certain topics and also additional practice questions in the textbook.

HOW TO CONTACT AND ASK QUESTIONS

1. There are different modules in D2L's Discussion Board for you to ask your questions. Your question about the course content (logical concepts, course outline, etc.) may already have been answered on the course discussion board (or in this outline). Check these first. If you can't find the answer to your question, consider posting your question on the discussion board. I will monitor the discussion boards and attend to questions regularly.
2. If your inquiry is specific to your personal situation or for some reason you couldn't find the answer you are looking for, feel free to send me an email (koray.akcaguner@ucalgary.ca). Please write "Phil 279" in the subject line of your emails.
3. I will do my best to reply within one business day. Consider reminding me if I didn't get back to you in 2 full business days.
4. You're highly encouraged to attend the lectures, but attendance is not mandatory. If you do attend, you'll have a chance to ask your questions first-hand and get an answer on spot. You will also see examples and exercises and discuss things with me and your peers; this is very useful for getting prepared for the weekly assignments.
5. Office hours are on Fridays from 1:00 to 2:00 pm. I will be in my office during this time (Social Sciences 1227) and keep zoom on. You can either connect via zoom or come to my office if you happen to be on campus.
6. Feel free to call me "Koray". I'm not a doctor yet, so please don't call me "Dr. Akçagüner".

7. Make sure you keep the conversations, posts and in-person meetings (class or individual) civil and respectful. Everyone from all backgrounds are welcome and equal in this class, and everyone should feel welcome and comfortable in asking questions, engaging with discussions and working towards their desirable results in the course.

COURSE ASSESSMENT

ASSESSMENT COMPONENTS

The aim of this course is for you to become proficient in the learning objectives listed below. Your success in this will be assessed by the number of activities (problem sets, quizzes, and timed problems) you complete successfully, and your performance in each of them. Each activity has a minimum level of performance that counts as "complete (✓)." Completing an activity roughly corresponds to earning at least a B on that activity. Problem sets and quizzes have a higher level of performance that earns you a "complete+ (✓+)." Completing a quiz or problem set at this level roughly corresponds to an A (see below for details).

Problem sets

You must score 70% on a problem set for it to count as complete. If you score at least 90%, you earn a "complete+." (You can check your answers before submitting.)

Quizzes

A quiz counts as complete if you score at least 70% on it, and complete+ if you score at least 90%. (You have four attempts at each quiz, and although the questions you get each time are randomized, they are of the same difficulty.)

Timed problems

Each week there will be timed problems to complete. These problems will be have a time limit (usually 30-60 minutes), but they will be available to complete up until their deadlines are due. (You can check your answers before submitting.)

Overall, there are 12 sets of three assignments (PS, Q and TP) prepared for the 7 weeks of the class, and you'll be assessed through your engagement with these 12 sets. See the section Course Evaluation and Grading Scheme to see how exactly you'll be graded. Every week will have 6 assignments to complete (2Q, 2PS, 2TP). See the course schedule (on D2L) to see what assignments you'll be doing on a specific week, the deadlines, etc.

Remember: you get immediate feedback on all your activities, so you will know right away whether you have completed it, or your grade after submission. On the quizzes you will not see which questions you got wrong: part of the learning experience is figuring that out. On the carnap.io activities, you can check that your answers are correct before submitting them. Overall, you can take your time and learn from your mistakes.

REDIONG PREVIOUS ASSIGNMENTS

Each week you will be given a chance to resubmit *two* assignments, *any* assignment you like, from the weeks before, and you will be given another week to complete it. This means you can redo 12 assignments out of 36. In order to do this, you'll email me and specify what assignments from the previous weeks you'd like to redo. Asking to redo an assignment counts as spending a token. I will then give you access to the assignments you picked (or variants of them), no questions asked, and you may resubmit them by the designated deadline. I will be distributing tokens every Wednesday, so the two assignments you picked will become available to you on Wednesday before our lecture. This is essentially a chance for you to shoot for higher-tier marks in this course, in case you had other pressing

obligations, personal issues or just like high grades. At the end of the semester, only your highest performance in each assignment will count towards your final grade.

If you spend a token on a quiz, you will get an additional attempt on top of the 4 attempts given to you initially. If you spend a token on a problem set, the deadline of the assignment will be extended for you and you can work on the version you already submitted. Finally, if you spend a token on a timed problem, a slightly different version of the problem will be uploaded to carnap.io and you will be given the password to access this file. You should not share this password with other students.

For example: Suppose we're finishing week 2 and you didn't perform well on Problem Set 2, Quiz 1 and Timed Problem 2. You can pick two of these assignments and email me saying you want to spend two tokens on them. On Wednesday of week 3, you'll gain access to the two problems you've picked and you will have time until next Wednesday to complete them, which is the due date of your week 3 assignments.

Caution: It is highly recommended that you try your best in your first attempts on the assignments and engage with each assignment before its original deadline because most material in the later weeks are built on the ones from earlier weeks. If you push all the assignments to later weeks in the hope that you'll get them done all together, that will likely cause some stress and make things harder because at that point you may not have a good understanding of the earlier material due to not having practiced.

Collaboration

In addition to the learning outcomes, an objective of the course is the development of collaborative study habits. You should become able to ask clear questions about the course material and problem sets in class and on the discussion board, to explain topics to and answer questions of your peers, and to work with others in small groups during class time. You will *not* be formally assessed on this learning outcome.

CLASS SCHEDULE AND DEADLINES

The first part of each lecture (~75 minutes) will typically cover the material outlined in the course schedule (check D2L for the schedule), and the second part will be active learning where we will do some exercises together which are similar to the ones you'll see on your assignments for that week. During this session you'll get to see solutions and discuss things with me and with one another. The three assignments for each lecture will become accessible to you in the morning of that lecture. You'll then be given one week to do the quiz, problem set and timed problem of the relevant material covered in that week.

For example: In our second lecture (Week 2, Monday May 8), I'll teach you the material on Syntax and Symbolization in TFL. I will show you slides and explain the relevant concepts with examples in the first half. During the second half we will do exercises on Carnap together. Q2, PS2, and TP2 will become accessible to you in the morning, so you will see them before the lecture. You will then be given a whole week (until next Sunday midnight, May 14, 11:59pm), to do your assignments covering the relevant material.

A REGULAER WEEK OF THE CLASS

Here's the ideal way of proceeding in the class.

1. Before each lecture, take a look at the book chapters specified in the course schedule and, if any, the optional material posted on D2L.
2. Attend the class. (Remember: this is not mandatory but highly encouraged.)
3. Work and practice on the problems of the week by the deadline. (Remember: You'll have 12 tokens to spend on any previous assignments, but it is highly recommended that you engage

with each week's assignments on time to avoid accumulating many of them for the end of the semester.)

4. Ask and answer questions on the D2L discussion board.
5. If (4) doesn't work or your issue is personal, send me an email (koray.akcaguner@ucalgary.ca).

COURSE EVALUATION AND GRADING SCHEME

Your final grade will be determined on the basis of how many activities you complete and your best performance on them.

This mapping of performance on activities to letter grades is more complicated than a points system with percentage cutoffs, but it captures more accurately how much you've shown to have learned in the course. The following table lists how many activities of each type you have to complete in order to earn a given grade. "Total" is the overall minimal number of activities you must complete for that grade range. For A-range grades, you must also earn complete+ marks on a sufficient number of activities. You earn the highest grade you qualify for on the basis of the number of ✓'s and ✓+'s you have earned in each category, and the total number you have earned.

Grade	PS	Q	TP	Total
A+	12✓+	12✓+	12✓	36
A	12✓/10✓+	12✓/10✓+	12✓	36
A−	11✓/8✓+	11✓/8✓+	11✓	33
B+	10✓	10✓	10✓	32
B	10✓	10✓	10✓	30
B−	8✓	8✓	8✓	28
C+	8✓	8✓	8✓	26
C	8✓	8✓	8✓	24
C−	6✓	6✓	6✓	22
D+	6✓	6✓	6✓	20
D	6✓	6✓	6✓	18

For instance, to earn a B−, you must complete 8 of each activity (that's 24 total) but overall must complete at least 28 activities (so e.g., an additional two problem sets and two quizzes, or two problem sets, a quiz, and a timed problem). For an A, you must complete all activities, and for 10 problem sets and 10 quizzes you must receive a ✓+. (An A+ requires 12 ✓+ on problem sets and quizzes, and an A− requires 11 problem sets and quizzes completed, of which 8 must be ✓+.)

Note that the number of activities alone does not guarantee a higher grade. E.g., if you have completed all 12 problem sets and 12 timed problems, but only 8 quizzes, this earns you only a B−, not a B+ even though you have 32 activities completed in total. Also, ✓+ only play a role in earning A-range grades. So 8 ✓+ on problem sets, 8 ✓+ on quizzes, and 8 ✓ on timed problems is still just a C.

EXAMS

There are no exams (mid-term or final) for this course.

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/legal-services/sites/default/files/teams/1/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/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.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/current-students/student-services

- 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 https://arts.ucalgary.ca/current-students/undergraduate/academic-advising
for contact details and information regarding common academic concerns.

For questions specific to the philosophy program, please visit arts.ucalgary.ca/philosophy. Further academic guidance is available by contacting Jeremy Fantl (Undergraduate Program Director jfantl@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. For more information, and other services offered by the Student Success Centre, please visit ucalgary.ca/student-services/student-success.

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 will be posted on D2L (Desire2Learn), UCalgary's online learning management system. Visit https://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 here: https://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.

Media Recording

Please refer to the following statement on media recording of students: https://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/legal-services/sites/default/files/teams/1/Policies-Intellectual-Property-Policy.pdf

The University of Calgary is under the jurisdiction of the provincial Freedom of Information and Protection of Privacy (FOIP) Act, as outlined at https://www.ucalgary.ca/legal-services/access-information-privacy. 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 (https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Acceptable-Use-of-Material-Protected-by-Copyright-Policy.pdf) and requirements of the copyright act (https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html).