

PHIL 120: Introduction to Logic

Summer 2021

[This class is entirely online on Canvas](#)

Contact Info

Instructor: Ian Schnee

Email: ischnee@uw.edu

Group office hours/Zoom class time: Tuesdays from 1:10-3:20 p.m. Pacific Time

Individual office hours: By appointment

Course Structure

This course is online. It can also be done entirely asynchronously. There are no required synchronous parts. All lectures are pre-recorded and uploaded to Canvas. Each day you will have some combination of reading from the textbook with practice problems, video lectures to watch, and homework problem sets to complete. All of that will be organized in Modules in Canvas. Each week has its own Module, arranged vertically: start at the top and work your way down.

There will be optional synchronous group office hours/live class time on Tuesdays from 1:10-3:20 p.m. via Zoom (meeting links in Canvas). I won't lecture during those sessions. Instead, we'll use that time to answer questions, work through problems together, and provide help on the homework.

We will cover new material every day, but homework problem sets will generally be due on Tuesdays and Saturdays. For example, the homework for the content from Monday and Tuesday will all be due Tuesday night. The point of these due dates is to give you more flexibility on when you get the work done, **but don't leave it all until the deadline!** The homework is broken down into several different Canvas quizzes, so that you can work on bits at a time as you progress through the material. You may take each homework quiz up to five times, and only your highest score is kept, so you don't have anything to lose by trying it early! After you submit a problem set, you will get some feedback: you learn your score for each problem, but not which exact parts you got wrong. Answer keys will be posted after the problem set closes. (In week 5, the homework is due on Monday because of the final exam—see the schedule below.)

Exams are also done as online Canvas quizzes. They are open book and open note, but you must take them individually. (Working with other students on homework is allowed.) The exams are **timed** Canvas quizzes and you may only take them once; you will have a couple-day window in which the exams will be open, so that you can fit them into your schedule. See below for more specific information on how grades will be determined.

Instructor email policy

I cannot answer content questions over email. Since many folks tend to have the same questions, I will maintain a discussion board for questions that are non-private. That way I only

have to answer them once, and you can answer each other's questions sometimes faster than I can. For questions about your grades or other private matters, email me.

Content Overview/Course Description

What makes an argument good? How do you show that someone has reasoned invalidly? In this course we will study arguments and reasoning both informally as well as with the tools and techniques of formal deductive logic. We learn the syntax and semantics of propositional and first-order logic (polyadic with identity), and we will use them to explicate the notion of a valid argument. We then apply our formal logical techniques to a variety of domains, such as the domain of sets (abstract collections of objects). Topics include syntax, semantics, pragmatics, consistency, proof, logical consequence, logical equivalence, logical truth, logical form, set theory, infinity, paradoxes, truth functionality, binary numbers, logic gates, truth tables, quantification, relations, functions, interpretations, models, soundness, and completeness. We will also discuss connections between formal logic and computability theory, philosophy of language, cognitive science, foundations of mathematics, and metalogic (theorems about logical systems themselves).

Prerequisites

None.

Warning

Even though the class is designed to be flexible, that does not mean it is easy. If you find yourself struggling to make deadlines or to manage your personal obligations with school, **email me right away and we will try to find a path to success for you.** This 4½-week summer quarter will fly by—don't wait until the end of the course to contact me, when it's often too late to find a solution. This is a difficult and fast-paced course! **Sometimes summer courses, or hybrid/online courses, are viewed as less rigorous or less work than in-person courses. This is not one of those courses!** This class covers exactly the same material as when I teach it in person during a regular quarter. We have problem sets due almost every-other day. Furthermore, all the material is cumulative, so you must keep up with the work all quarter in order to succeed. That does not mean that this class will be all work and no fun. This is the most fun class on campus! (In my biased opinion.) But you must know what you are getting into if you take this course.

Books

The textbook is *The Logic Course Adventure* (logiccourse.com). The book is provided free for you. [To get the book, go here](#) and click the green "Purchase Textbook" button. On the next page, in the field that says "optional", enter the code **pay0** and click the "Enter Code" button, which should make the book free. Then just complete the purchase, which will take you to an orientation page explaining how the book works.

Grading and Course Requirements

There are four components of your grade:

1. Participation: 5%
2. Homework: 30%
3. Midterm Exam: 30% (**see note below about exam times**)
4. Final Exam: 35% (**see note below about exam times**)

Here is an explanation of each part:

1. Participation: 5%. Participation will be measured by your involvement in the online discussion boards on Canvas. We will use the discussion boards as places for you to ask and answer questions—about practice textbook problems, or homework problems that you are struggling with, or course content in general.

The main point of the discussion boards is for you to help each other with the course material, so you are expected to answer as well as ask questions (though I will help answer questions too). **You must use the boards at least 5 times by July 20** (1% point for each time). By “use the board” I mean substantive posts—questions or answers—not just saying “Thank you”. Of course, polite behavior is required, and I highly encourage saying thanks—doing so just doesn’t count as one of your five posts for credit!

2. Homework: 30%. Homework problem sets are done as quizzes in Canvas. They are not done with the online textbook. The questions and problems in the textbook are for practice and are not worth points. You may take each Canvas quiz for homework five times. Your highest score will be counted. Working with other students in a study group on homework is allowed—learning from your peers is very beneficial!

Homework assignments will start to be due the first week. They are typically due each **Tuesday and Saturday by 11:59 p.m.** The Canvas assignment is “available” until the next day, per the late policy; see below.

You can see your score after submitting each homework quiz, which can help you improve your result if you choose to take it a second or third time. Each time you take a quiz, you must still answer all the questions. Correct answers will be posted at 12:01 a.m. the day after the quiz closes.

3. Midterm Exam 30%. The midterm will occur online during week 2 as a timed Canvas quiz (see schedule below). **It is a timed:** once you start it, you will have 2 hours to complete it (unless DRS accommodations allow otherwise). **You will have some flexibility as to when you take it: it will be available for certain days. But if you cannot commit to taking the exam then, you should not enroll in this course.** It is open book/open note/open computer, but you must take the exam individually. The exam will be multiple choice, true/false, proofs, etc. Directions and a study guide will be provided before the exam. Unlike the problem sets, you can only take the exam once!
4. Final Exam: 35%. The final exam will occur at the end of our 4½-week session. Like the midterm, **it is a timed Canvas quiz:** once you start it, you will have 2 hours to complete it (unless DRS accommodations state otherwise). **You will have some flexibility as to when you take it: it will be available certain days. But if you cannot commit to taking the exam then, you should not enroll in this course.** It is open book/open note/open computer, but you must take the exam individually. The exam will be multiple choice, true/false, proofs, etc. Directions and a study guide will be provided before the exam. Unlike the problem sets, you can only take the exam once!

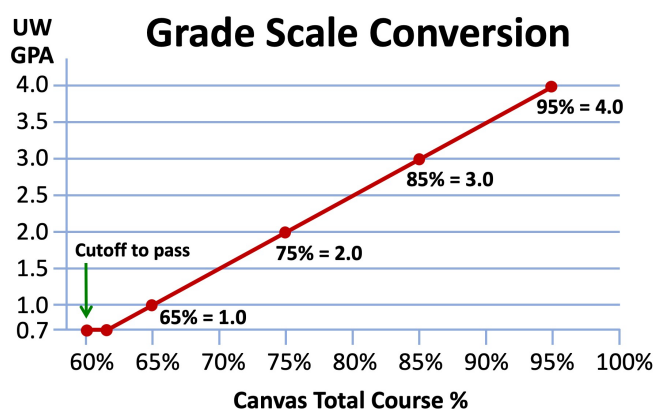
Late Policy

In order to pass the class students must complete their work on time. To give you a break everyone gets a free 24-hour grace period. So if you have unexpected internet trouble, homework problem sets that are less than 24 hours late will not be penalized. However, unexcused homework that is more than 24 hours late will not be accepted. For one thing, we need to post the answer key for students' learning; additionally, you cannot fall behind and be successful in this class! There is no late work accepted for the exams, except in special circumstances (talk with me about individual circumstances).

The EXCEPTIONS: lateness may be excused with prior approval or demonstrated emergency. If you find yourself in difficult circumstances, please talk to me right away. Do not leave things to the end of the quarter, when it might be too late to address the issue and help you! (Internet trouble right before the "available" window closes is not a good emergency: that is what the 24-hour grace period is for!)

Calculating Grades

At the end of the quarter we will convert your course grade percentage to the UW 4-point scale using this metric: 95% and up is 4.0; 94% is 3.9; 93% is 3.8; etc. Each 1% step is a 0.1 step on the UW 4-point scale. So an 86.1%, for example, would give you a 3.1 on the UW scale. 85.5% rounds up to 86% (and thus 3.1), but 85.49% does not. The cutoff to pass with 0.7 is 60%. Here is a visual summary:



(Rounding: 0.5% rounds up but 0.49% does not; e.g., 84.5% rounds to 85%, but 84.49% does not)

Disability Resources for Students (DRS)

I am committed to the success of every student. If you have a disability or need accommodation please contact DRS, 011 Mary Gates Hall, 206-543-8924. Per university policy, all students needing special accommodation need a letter from DRS; please present it to me so we can discuss your needs for the class. See department policies below for more information.

Privacy

All Zoom sessions in this course may be recorded for students unable to attend live. The recording will capture the presenter's audio, video and/or computer screen. Student audio and video will be recorded if they share their computer audio and video during the recorded session. The recordings will only be accessible to students enrolled in the course to review materials. These recordings will not be shared with or accessible to the public.

The University and Zoom have FERPA-compliant agreements in place to protect the security and privacy of UW Zoom accounts. Students who do not wish to be recorded should:

- Change their Zoom screen name to hide any personal identifying information such as their name or UW Net ID, and
- Not share their computer audio or video during their Zoom sessions.

Academic Integrity

Plagiarism and other forms of cheating and student misconduct will not be tolerated; students caught doing any such acts will receive a 0 for the course. It is your duty to know and understand what plagiarism and other forms of academic dishonesty are as well as the university's policy on student conduct and discipline. Here are some resources to help you:

- The UW student conduct code:
<http://www.washington.edu/cssc/for-students/student-code-of-conduct/>
- The Center for Teaching and Learning's page on plagiarism and cheating:
<https://teaching.washington.edu/topics/preparing-to-teach/cheating-or-plagiarism/>

All cases of plagiarism, cheating, or student misconduct will be report to the Dean's Office.

NOTE: I respect your right to due process. Should you be reported, the relevant committee will decide your case and (i) you may continue the course, being presumed innocent until found otherwise, and (ii) you have the right to appeal the committee's decision. (See end of syllabus for elaboration and additional department policies.)

Learning Outcomes

In this course students learn a formal, symbolic language and a logical system (a polyadic first-order system with identity). Students learn how to use first-order logic (FOL) to model the notions of logical truth and logical consequence as well as model mathematical reasoning and proofs, and they apply these techniques in order to solve a variety of problems (proving results about the cardinality of sets, demonstrating that certain arguments are valid or invalid, resolving putative paradoxes, etc.). Students will demonstrate the ability to:

1. Use a formal, symbolic language to illustrate and communicate information, including concepts and theorems concerning natural numbers, real numbers, and sets.
2. Perform computations on strings of symbols both in a Boolean algebra and in first-order syntactic proofs. Students learn how to apply these techniques of FOL to problems in order to determine when and which computations are needed, and they learn how to execute the appropriate computations.
3. Use a variety of symbolic modeling techniques and apply an appropriate model to the problem to be solved; specifically, they learn how to model propositional as well as quantified inferences, theorems, etc., and they learn how to apply the appropriate model to the problem at hand.
4. Make inferences and evaluate assumptions both informally and formally, via syntactic inference rules. They learn how to show when a conclusion does and does not follow from a set of assumptions and how to identify hidden assumptions in arguments. Furthermore, they learn the relationship between formal and informal methods.

See next page for our schedule.

Tentative Schedule

This is subject to revision—see Canvas for the final word.

	Monday	Tuesday Problem Sets Due	Wednesday	Thursday	Friday	Saturday Problem Sets Due
Week 1	<u>June 21</u> Quarter begins: get started on Canvas Ch. 1-2	<u>June 22</u> Ch. 3-4 and live class (optional) Due: Ch. 1-4 problem sets	<u>June 23</u> Ch. 5-6	<u>June 24</u> Ch. 7-8	<u>June 25</u> Ch. 9	Due: Ch. 5-9 problem sets
Week 2	<u>June 28</u> Ch. 10-12	<u>June 29</u> Ch. 13-15 and live class (optional) Due: Ch. 10-15 problem sets	<u>June 30</u> Ch. 16 No Ch. 16 problem set (it's just review)	<u>July 1</u> Midterm	<u>July 2</u> Ch. 17 Midterm still open	Due: Ch. 17 problem set
Week 3	<u>July 5</u> University Holiday Nothing Required (Start Tues. if you wish)	<u>July 6</u> Ch. 18-19 and live class (optional) Due: Ch. 18-19 problem sets	<u>July 7</u> Ch. 20-21	<u>July 8</u> Ch. 22-24	<u>July 9</u> Ch. 25-26	Due: Ch. 20-26 problem sets
Week 4	<u>July 12</u> Ch. 27	<u>July 13</u> Ch. 28-29 and live class (optional) Due: Ch. 27-29 problem sets	<u>July 14</u> Ch. 30	<u>July 15</u> Ch. 31	<u>July 16</u> Ch. 32-33	Due: Ch. 30-33 problem sets
Week 5	<u>July 19</u> Ch. 34-35 Due: Ch. 34-35 problem sets	<u>July 20</u> Ch. 36 (just review, no hw) Catch up or Final Exam & live class (optional)	<u>July 21</u> Final Exam	Final Exam still open		

Please see the following pages for department policies.

INFORMATION FOR STUDENTS

University of Washington, Department of Philosophy

POLICIES AND RESOURCES

Academic Misconduct

Academic misconduct, including plagiarism, is prohibited by the [Student Conduct Code for the University of Washington](#) and is taken very seriously by the UW. According to the student conduct code, academic misconduct includes:

1. "Cheating" which includes, but is not limited to:
 - a. The use of unauthorized assistance in taking quizzes, tests, or examinations, or completing assignments;
 - b. The acquisition, use, or distribution of unpublished materials created by another student without the express permission of the original author(s);
 - c. Using online sources, such as solution manuals, without the permission of the instructor to complete assignments, exams, tests, or quizzes; or
 - d. Requesting, hiring, or otherwise encouraging someone to take a course, exam, test, or complete assignments for a student.
2. "Falsification," which is the intentional use or submission of falsified data, records, or other information including, but not limited to, records of internship or practicum experiences or attendance at any required event(s), or scholarly research.
3. "Plagiarism," which is the submission or presentation of someone else's words, composition, research, or expressed ideas, whether published or unpublished, without attribution. Plagiarism includes, but is not limited to:
 - a. The use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment; or
 - b. The unacknowledged use of materials prepared by another person or acquired from an entity engaging in the selling of term papers or other academic materials.
4. Unauthorized collaboration.
5. Engaging in behavior specifically prohibited by an instructor in the course of class instruction or in a course syllabus.
6. Multiple submissions of the same work in separate courses without the express permission of the instructor(s).
7. Taking deliberate action to destroy or damage another's academic work in order to gain an advantage for oneself or another.
8. The recording of instructional content without the express permission of the instructor(s), unless approved as a disability accommodation, and/or the dissemination or use of such unauthorized records.

(Source: [WAC 478-121 - Academic Misconduct](#))

Plagiarism may lead to disciplinary action by the University against the student who submitted the work. Any student who is uncertain whether his or her use of the work of others constitutes plagiarism should consult the course instructor for guidance before formally submitting the course work involved.

Incompletes

Incomplete grades may only be awarded if a student is doing satisfactory work up until the last two weeks of the quarter and has furnished proof satisfactory to the instructor that the work cannot be completed because of illness or other circumstances beyond the student's control.

(Sources: [Office of the Registrar – Incomplete Grades](#)), [UW General Catalog, Student Guide – Grading System](#))

Grade Appeal Procedure

A student who believes that the instructor erred in the assignment of a grade, or who believes a grade recoding error or omission has occurred, shall first discuss the matter with the instructor before the end of the following academic quarter (not including Summer Quarter). If the student is not satisfied with the instructor's explanation, the student, no later than ten days after their discussion with the instructor, may submit a written appeal to the chair of the Department of Philosophy with a copy of the appeal also sent to the instructor. The chair consults with the instructor to ensure that the evaluation of the student's performance has not been arbitrary or capricious. Should the chair believe the instructor's conduct to be arbitrary or capricious and the instructor declines to revise the grade, the chair, with the approval of the voting members of his or her faculty, shall appoint an appropriate member, or members, of the faculty of the Department of Philosophy to evaluate the performance of the student and assign a grade. The Dean and Provost should be informed of this action. Once a student submits a written appeal, this document and all subsequent actions on this appeal are recorded in written form for deposit in a School file. (Source: [UW General Catalog, Student Guide – Grading System](#))

Concerns About a Course, an Instructor, or a Teaching Assistant

If you have any concerns about a philosophy course or your instructor, please see the instructor about these concerns as soon as possible. If you are not comfortable talking with the instructor or not satisfied with the response that you receive, you may contact the chair of the program offering the course (names available from the Department of Philosophy, 361 Savery Hall).

If you have any concerns about a teaching assistant, please see the teaching assistant about these concerns as soon as possible. If you are not comfortable talking with the teaching assistant or not satisfied with the response that you receive, you may contact the instructor in charge of the course. If you are still not satisfied with the response that you receive, you may contact the chair of the program offering the course (names available from the Department of Philosophy, 361 Savery Hall), or the Graduate School at G-1 Communications Building (543-5900).

Equal Opportunity

The University of Washington reaffirms its policy of equal opportunity regardless of race, color, creed, religion, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam-era veteran in accordance with University of Washington policy and applicable federal and state statutes and regulations.

Access and Accommodations

Your experience in this class is important to the instructor. If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to the instructor at your earliest convenience so you can discuss your needs in this course.

If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but are not limited to: mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 (Voice & Relay) or uwdrs@uw.edu or disability.uw.edu. DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

Sexual Harassment

Sexual harassment is defined as the use of one's authority or power, either explicitly or implicitly, to coerce another into unwanted sexual relations or to punish another for his or her refusal, or as the creation by a member of the University community of an intimidating, hostile, or offensive working or educational environment through verbal or physical conduct of a sexual nature.

If you believe that you are being harassed, seek help—the earlier the better. You may speak with your instructor, your teaching assistant, the undergraduate advisor (363 Savary Hall), graduate program advisor (366 Savary Hall), or the chair of the philosophy department (364 Savary Hall). In addition, you should be aware that the University has designated special people to help you. For assistance you may contact: [SafeCampus](#); [Office of the Ombud](#) (339 HUB, 206-543-6028); [Title IX Investigation Office](#) (for complaints that a University student has violated the sexual misconduct provisions of the Student Conduct Code); [University Complaint Investigation and Resolution Office](#) (for complaints concerning the behavior of University employees, including faculty, teaching assistants, and other student employees).

Integrity

The Office of Research Misconduct Proceedings (ORMP) coordinates the University's handling of allegations of research misconduct against members of the University community, in consultations and cooperation with the University's schools, colleges, and campuses.

University rules define scientific and scholarly misconduct to include the following forms of inappropriate activity: intentional misrepresentation of credentials; falsification of data; plagiarism; abuse of confidentiality; deliberate violation of regulations applicable to research.

Students can report cases of scientific or scholarly misconduct either to the ORMP, to their faculty adviser, or the department chair. The student should report such problems to whomever he or she feels most comfortable.

(Sources: [Executive Order No. 61 – Research Misconduct Policy](#); [Office of Research Misconduct Proceedings](#); minutes of Grad School Executive Staff and Division Heads meeting, 7/23/98.)

SafeCampus

Preventing violence is everyone's responsibility. SafeCampus is the University of Washington's Violence Prevention and Response Program. They support students, staff, faculty, and community members in preventing violence.

SafeCampus staff will listen to your concerns and provide support and safety plans tailored to your situation. Caring, trained professionals will talk you through options and connect you with additional resources if you want them.

If you're concerned, tell someone.

- Always call 911 if you or others may be in danger.
- Call 206-685-SAFE (7233) to report non-urgent threats of violence and for referrals to UW counseling and/or safety resources. TTY or VP callers, please call through your preferred relay service.
- Don't walk alone. Campus safety guards can walk with you on campus after dark. Call Husky NightWalk 206-685-WALK (9255).
- Stay connected in an emergency with UW Alert. Register your mobile number to receive instant notification of campus emergencies via text and voice messaging. [Sign up for UW Alert](#) online.
- For more information visit the [SafeCampus website](#).

Religious Accommodations

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at [Religious Accommodations Policy](https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/) (<https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/>). Accommodations must be requested within the first two weeks of this course using the [Religious Accommodations Request form](https://registrar.washington.edu/students/religious-accommodations-request/) (<https://registrar.washington.edu/students/religious-accommodations-request/>).

Food Insecurity and Hardship

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course, is urged to contact the UW Any Hungry Husky Program. Any Hungry Husky provides hunger relief free of judgment or stigma. Go to <https://www.washington.edu/anyhungryhusky/> for information about the food pantry and food security grants. In addition, UW offers emergency aid for students experiencing unexpected financial hardships that may disrupt their education or get in the way of completing their degree. Go to <https://www.washington.edu/emergencyaid/> for more information about how to apply.

Guidance to Students Taking Courses Outside the U.S.

Faculty members at U.S. universities – including the University of Washington – have the right to academic freedom which includes presenting and exploring topics and content that other governments may consider to be illegal and, therefore, choose to censor. Examples may include topics and content involving religion, gender and sexuality, human rights, democracy and representative government, and historic events.

If, as a UW student, you are living outside of the United States while taking courses remotely, you are subject to the laws of your local jurisdiction. Local authorities may limit your access to course material and take punitive action towards you. Unfortunately, the University of Washington has no authority over the laws in your jurisdictions or how local authorities enforce those laws.

If you are taking UW courses outside of the United States, you have reason to exercise caution when enrolling in courses that cover topics and issues censored in your jurisdiction. If you have concerns regarding a course or courses that you have registered for, please contact your academic advisor who will assist you in exploring options.

Face Coverings and Social Distancing in the Classroom during COVID

The health and safety of the University of Washington community are the institution's priorities. Until otherwise stated **face coverings are required** per [UW COVID Face Covering Policy](#): indoors where other people are present and outdoors when keeping a 6-foot distance may not be possible. **This includes all classrooms and buildings/public spaces on each of the UW campuses.**

If you physically can't wear a mask, you choose not to wear a mask, your mask isn't appropriate/sufficient, or if you aren't wearing a mask properly (*covering both your nose and mouth-diagram below*), you **CANNOT** be in the classroom and will be asked to leave.

If you have a medical condition or health risk as outlined in the [UW COVID Face Covering Policy](#), you may request an accommodation. Please contact Disability Resources for Students office **BEFORE GOING TO CLASS** at uwdrs@uw.edu (Seattle) drsuwt@uw.edu (Tacoma) uwbdrs@uw.edu (Bothell).

A face covering must:

- Fit snugly against the sides of the face
- Completely cover the nose and mouth
- Be secured with ties, ear loops, elastic bands, or other equally effective method
- Include at least one layer of cloth, although multiple layers are strongly recommended
- Allow for breathing without restriction
- Be capable of being laundered and machine dried without damage or change to shape



[CDC: How to Wear Masks](#)