# Deductive Logic, PHIL 3200, Spring18

| **Instructor** | **Office Hours** | **Class / LAB Meetings** |
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| Professor Jonah Schupbach | Mondays 9-11am | M,W 11:50-1:10pm, CTIHB 109 |
| jonahschupbach.com | (or by appointment) | Labs: Fridays 1-3pm, CTIHB 406 |
| jonah.n.schupbach@utah.edu | CTIHB 417 | 1/8/2018 - 4/24/2018 |

## COURSE DESCRIPTION

This course introduces students to the study and application of standard deductive logic, up through Predicate Logic with identity. Logic is the science of good reasoning; it teaches us to distinguish arguments in which conclusions are rationally supported from those in which they aren't. In deductive logic, we focus especially on *proofs* that aim to *establish* their conclusions indefeasibly from corresponding sets of premises. Specific topics we will cover during the term include the following:

- The notions of statement and argument;
- Logical analysis of informal arguments;
- Syntax and semantics of sentential logic, predicate logic, and identity;
- Natural deduction-style proofs, with an emphasis on effective and strategic proof construction;
- Truth-trees, with an emphasis on systematic construction of counterexamples from trees.

## COURSE OBJECTIVES

By the end of this course and successful completion of course requirements, the student will be able to:

- precisely articulate and evaluate real-life arguments using the symbolic language and formal semantics of standard deductive logic,
- use standard deductive logic to test the validity of arguments and their patterns,
- construct rigorous proofs from given premises to target conclusions,
- summarize some basic metalogical issues pertaining to the particular implications, attributes, and shortcomings of standard deductive logic.

## PREREQUISITES

None, though students who desire a more basic introduction to formal logic, providing some helpful background and conceptual foundation to this class, are encouraged to take PHIL 1250 ("Reasoning and Rational Decision Making").

## MATERIALS AND RESOURCES

Carnegie Mellon University, Open Learning Initiative (OLI).

- This online interactive course will be our primary textbook for the term. All homework and exams will be administered online through this course as well.

- Students must enroll with our class through the OLI in order to get full access to the online text and credit for their work [Course Key: PHIL3200S18].
- Discounted enrollment cost for this term: $55.

CANVAS <utah.instructure.com>

- I will use this resource throughout the term to keep you updated on your grades, for course communication, and for our course calendar. Class handouts and some assigned readings will be posted here as well.

Labs and Tutoring

- Our course TA / tutor Madeleine Parkinson will be running optional "lab" sessions. These informal sessions will be devoted especially to answering student questions, reviewing or catching up on important concepts from the readings and lectures, and going over issues with the homework material. Bring your questions / challenging homework exercises to these sessions!
- Labs will be held every Friday from 1-3pm in CTIHB room 406. Lab attendance is *not* required.
- Students are also encouraged to contact Madeleine through CANVAS to set up personal tutoring sessions if needed.

## COURSE REQUIREMENTS

### Attendance / Participation

(20% of final grade)

Attendance (physical and mental) in our Monday and Wednesday class meetings is required, since it will be absolutely crucial for you to succeed in learning the course material well. By not coming to classes, students will be hurting their own final course grades in ways that stretch beyond the direct 20% hit. I will typically take attendance at the very beginning of class time, so be sure to show up on time. If you arrive after I take attendance, you will be marked late and only receive 80% attendance credit for the day. Note that attendance is NOT required for Friday lab sessions.

### OLI Assignments

(30% of final grade)

Your homework for this course consists of the 12 sets of graded "Quizzes" / "Labs" administered at the conclusion of each chapter in our OLI text (there are no lab portions for chapters 1 and 2). See the course schedule below or the OLI syllabus for assignments and due dates. OLI work must be completed and submitted by Sunday immediately following the week the work is assigned. You can complete up to two attempts at each assignment, and your overall score for each assignment is then calculated as the score of your best attempt. The assignment attempts are not timed. ***In general, I will not accept any late submissions, and I will not drop any scores at the end of the semester, so make sure that you finish all of your assignments and get them submitted on time***.

### OLI Exams

(10% for each of 3 midterms / 20% for final = 50% of final grade)

Students will take four exams, all administered through the OLI course. The final will be cumulative. Check the schedule for exam dates. As with homework assignments, ***I will generally not accept any late submissions, so be sure to submit your exams online before the due date / time.***

GRADING

Final grades will follow a standard 10-point scale: 98-100 A+, 92-98 A, 90-92 A-, 88-90 B+, 82-88 B, 80-82 B-, etc.

POLICIES, ETC.

**Missing and Late Assignments**

Students will not be allowed to submit late exams or homework assignments without a valid reason excusing them and evidence of that reason (e.g., sickness and a doctor's note).

**Electronic Devices**

Please silence your electronic devices during class. This includes your phones, tablets, computers, etc. Also, please refrain from texting, surfing the web, social networking, etc. during class time. Phones should not be used at all during class; tablets and computers should only be used for relevant readings / note-taking.

**Humanities Academic Misconduct Policy**

Academic misconduct includes cheating, plagiarizing, research misconduct, misrepresenting one's work, and inappropriately collaborating. Definitions can be found in the Student Code.

If you are suspected of academic misconduct, the process proceeds according to the rules found in the Student Code, University Policy 6-400(V). According to that policy, after meeting with you, the instructor must determine whether academic misconduct has, in fact, occurred.

- If s/he determines that no academic misconduct has occurred, s/he will document that you are not responsible for any academic misconduct.

- If s/he determines academic misconduct has occurred and this is the first instance in which you have been alleged to have committed academic misconduct, s/he will take into account whether the act was intentional or a result of negligence in determining the appropriate sanction, which can be up to failing the course. The sanction will be noted in the resolution of the case and your right of appeal is as specified in Policy 6-400(V).

- If s/he determines academic misconduct has occurred, and you have previously been sanctioned for an act of academic misconduct, and the prior instance of misconduct resulted in a sanction less than failing the course, the department will follow the process to fail you for the course. If the prior sanction was failure of the course, your new act of misconduct will result in failure of the course and the department will also follow the process to seek your dismissal from the program and the University.

**ADA Statement**

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

**Addressing Sexual Misconduct.**

Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information.  If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 581-8365, or the Office of the Dean of Students, 270 Olpin Union Building, 581-7066.  For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 581-7776.  To report to the police, contact the Department of Public Safety, 585-2677(COPS).

**General Education Statement**

This course contributes to the University of Utah's Quantitative Reasoning requirement. For such courses, academic units must identify three essential learning outcomes (ELOs) that are relevant to university general education objectives. The ELOs for this course are: Inquiry and Analysis, Quantitative Literacy, and Foundations and Skills for Lifelong Learning.

## COURSE SCHEDULE

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| **Week 1 (Jan 8,10)**<br><br>Introduction to Logic, Statements and Arguments | OLI, ch 1<br><br>Chapter 1 Quiz (all OLI work must be submitted by the following Sunday!) |
| **Week 2 (Jan 17)**<br><br>Introduction to Sentential Logic<br>Sentential Logic: Syntax and Symbolization<br><br>NO CLASS on Monday, 1/15 — MLK Jr Day | OLI, ch 2<br><br>Chapter 2 Quiz |
| **Week 3 (Jan 22,24)**<br><br>Sentential Logic: Formal Semantics | OLI, ch 3<br><br>Chapter 3 Quiz / Lab |
| **Week 4 (Jan 29,31)**<br><br>Midterm Exam #1 — Covering the formal language of Sentential Logic | Review OLI, chs 1-3<br><br>Midterm Exam #1 Quiz / 2 Problem Sets |
| **Week 5 (Feb 5,7)**<br><br>Sentential Logic: Proofs I | OLI, ch 4<br><br>Chapter 4 Quiz / Lab |
| **Week 6 (Feb 12,14)**<br><br>Sentential Logic: Proofs II | OLI, ch 5<br><br>Chapter 5 Quiz / Lab |
| **Week 7 (Feb 21)**<br><br>Sentential Logic: Proofs III<br><br>NO CLASS on Monday, 2/19 — President's Day | OLI, ch 6<br><br>Chapter 6 Quiz / Lab |

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| **Week 8 (Feb 26,28)** <br><br> Sentential Logic: Elementary Metalogic | OLI, ch 7 <br><br> Chapter 7 Quiz / Lab |
| **Week 9 (Mar 5,7)** <br><br> Midterm Exam #2 — Covering the proof system and basic metalogic of Sentential Logic | Review OLI, chs 4-7 <br><br> Midterm Exam #2 Quiz / 3 Problem Sets |
| **Week 10 (Mar 12,14)** <br><br> Predicate Logic: Syntax and Semantics I | OLI, ch 8 <br><br> Chapter 8 Quiz / Lab |
| **Week 11 (Mar 19-23)** <br><br> NO CLASS / LAB all week — Spring Break | -- |
| **Week 12 (Mar 26,28)** <br><br> Predicate Logic: Syntax and Semantics II | OLI, ch 9 <br><br> Chapter 9 Quiz / Lab |
| **Week 13 (Apr 2,4)** <br><br> Midterm Exam #3 — Covering the formal language of Predicate Logic | Review OLI, chs 8-9 <br><br> Midterm Exam #3 Quiz / 2 Problem Sets |
| **Week 14 (Apr 9,11)** <br><br> Predicate Logic: Proofs I | OLI, ch 10 <br><br> Chapter 10 Quiz / Lab |
| **Week 15 (Apr 16,18)** <br><br> Predicate Logic: Proofs II | OLI, ch 11 <br><br> Chapter 11 Quiz / Lab |
| **Week 16 (Apr 23)** <br><br> Predicate Logic: Identity and Functions <br> Final Exam (CUMULATIVE) <br><br> NO CLASS on Wednesday, 4/25 — Reading Day | OLI, ch 12 <br> Review OLI, chs 1-12 <br><br> Chapter 12 Quiz / Lab <br> Midterm Exam #4 Quiz / 2 Problem Sets — SUBMIT BY WEDNESDAY 5/2 |