

Syllabus for PHIL 201 – Introduction to Logic
Taught by Justin Kalef, Rutgers University, Spring 2019

Contact information: The easiest way to contact me outside of class is by email, at jkalef@philosophy.rutgers.edu

Extra study sessions: In addition to our scheduled lectures, I will hold office hours every week from 2:30 to 4:15 on Mondays. All students are welcome to seek assistance from me and practice together then.

Text: Readings will come from two sources:

- 1) *Essentials of Symbolic Logic, 3rd Edition* by R. L. Simpson, and
- 2) Various handouts (all available on Sakai).

The text is required and available in the bookstore. **Students who do not secure a copy of the text early on should not expect to pass the course.**

Topic and purpose of course: This course aims to provide students with a background in formal logic. Students who complete the course with a high grade will leave with greatly enhanced powers of logical reasoning, and will also find themselves in a strong position to thrive on the LSAT, in more advanced logic courses, and in advanced philosophy courses in all core areas.

Assessment: The most important thing to keep in mind is that, unlike other courses you may have taken, **this is a course that you can fail even if you attend all the classes and show up at all the exams.** Your grade will not be based on attendance or effort to any extent at all: 100% of your grade will be based on your performance on the exams.

There will be four exams in the course, each of which can be retaken one or more times. Students may only take the Level One exam after having signed off on their Statement of Understanding after submitted a perfect worksheet; to write any other exam, students must have already passed the exam of the previous level. Students who pass the level four exam will receive an A; students who pass the level three exam but not the level four exam will receive a B (or, if their score on the level three exam is perfect, a B+); students who pass the level two exam but not the level three exam will receive a C (or, if their score on the level two exam is perfect, a C+); students who pass the level one exam but not the level two exam will receive a D; and students who never pass the level one exam will receive an F.

Each exam will consist of five sections. To pass an exam, you must achieve **both** of the following: a) an average (mean) score of 75% or higher overall, **and** b) a score of 60% or

higher on each section.

You may take and submit exams for credit in any **eight** of the exam days for the course (the final counts as a single day even though you have a chance to take two exams).

Makeup Exams Policy: There are ten exam days in the course. Eight of them (whichever eight you like) are the ordinary exam days; the other two are your makeup exam days. **THERE WILL BE NO FURTHER MAKEUP EXAMS, EVER, FOR STUDENTS WHO DO MISS ANY EXAMS OTHER THAN THE FINAL, REGARDLESS OF THE REASON FOR THE STUDENT'S ABSENCE.** There are already six more opportunities to take exams than any student needs to earn a perfect (A) grade for the course. You are advised to take responsibility and plan for all contingencies, and in particular to not leave yourself in a position where some necessary absences may hurt you. The only exception to this rule is that, **for the final exam ONLY**, I will consider a note **from the dean's office** indicating that there is an adequate reason for your being away for that final exam. Please note that leaving town prior to our final exam for reasons that are not unforeseen and dire emergencies will *not* be counted as an acceptable reason for missing the final.

Conduct during Exams: Each exam is 80 minutes long. You may not converse with or distract anyone else during an exam. You may not consult any book or notes or electronic device, or have any electronic device turned on or out of your bag or pocket during an exam. You may not bring any food or drink to your desk during an exam. You may only use scrap paper that is supplied to you by the examiners during an exam.

You may leave an exam room at any time, but you may not return to the room until the exam is over. No exam that has been removed from the sight of the proctor may be turned in for credit, and no student who has been out of the sight of the proctor during the exam period may turn in an exam during that exam period. Students with a genuine medical condition that makes it impossible for them to stay in an exam room for the eighty minutes of an exam may provide me with a Letter of Accommodation documenting this condition. Those students may take their exams at the Office of Disability Services. They will be given the questions one at a time in a random order, seeing the next question only on completion of the previous question; and will be permitted to leave the exam room only after submitting a final response to the last question they have seen.

No student may enter an exam room during an exam period after *any* student has left the exam room.

Students must not do anything to distract other students during an exam. For example, students must not:

a) ask the proctor any question or make any comment about how to answer a question on the exam;

- b) say anything to the proctor, or to me, during the exam period about anything at all aside from, in very rare cases, **quietly** asking whether something on the exam is an error;
- c) making any unnecessary noise in arriving late or leaving early;
- d) talking immediately outside the doors of the classroom when the exam is still in session;
- e) loudly sniffing and snorting throughout an exam; or
- f) remaining in the classroom after completing and turning in their exam.

Appealing Exam Results: It is very unlikely that you will ever have a good reason to appeal your exam grade. Rather than dwelling on a failed exam in a negative way, trying to chisel your way to a higher grade, it is much wiser to learn what you can from your mistakes on the exam and aim for a better grade on the following exam.

However, *if* you are confident that you were graded incorrectly on an exam question, and wish to appeal your grade, I will *only* consider your appeal if you do submit to me all of the following items in an envelope with your name and section on it:

- a) your exam, without any additional markings added or removed from when it was handed back to you;
- b) A note from you clearly indicating just where you think you were graded incorrectly, the reason why you think you were graded incorrectly, and the number of extra points you think your exam deserves; and
- c) Another piece of paper containing the words, “I hereby solemnly declare, on pain of permanent expulsion from Rutgers University, that I have not altered this exam in any way from the moment it was returned to me. I also acknowledge that I will lose points on my next exam if any part of this appeal is unsuccessful.” Below that, please make sure that you sign and date that document.

If all three of these things are in your envelope, I will inspect your exam to make sure that you originally wrote it in non-erasable ink and that there are no signs of cheating. If I am satisfied on these points, I will carefully consider your enclosed appeal or appeals. If I agree that you are correct on a certain point, I will add the points indicated to the exam. **If I am *not* entirely convinced that you are correct, then I will deduct from the NEXT exam you write as many points as you hoped to gain, and from the same section(s) of the exam.**

As this should make clear, appeals of exams should only be made when you are absolutely positive that your exam was graded in error.

Cheating:

Anyone caught cheating in any way on any exam, or aiding anyone else in cheating, will receive an automatic F for the course and be referred to the appropriate

authorities for further measures to be taken. These further measures may include suspension or expulsion. They will certainly involve a permanent note on your transcript indicating to anyone who reads it that you are a cheat. Don't risk it!

Disruptive Behavior: You are welcome to do as much or as little work as you like in my course, so long as you are mindful of the consequences; but I will not permit any student to disrupt the class environment by distracting me, my Learning Assistant, or any other students from our work.

In particular, please note that none of the following disruptive activities are permitted:

- a) Engaging in private conversations during lecture components of the class;
- b) Using electronics in class; or
- c) Engaging in discussions unrelated to the course during group work time.

If you cannot adhere to this code of conduct on a particular day, please don't attend class on that day.

If you do attend class and engage in any of the above behaviors, I will publicly call you out for doing so and add your name to the list of disruptive students. The first three times you are added to the list, you will receive a warning. **Every second time thereafter, you will forfeit half a letter grade of your final score (that is, for instance, the distance from an A to a B+ or from a B+ to a B).** In other words: someone who is added to the list four times will lose half a letter grade; six times, a full letter grade; eight times, one and a half letter grades; ten times, two letter grades; twelve times, two and a half letter grades; and fourteen times, three letter grades. After the sixteenth occasion, the student will receive an automatic F for the course (though students who would otherwise earn less than an A will reach that point after fewer disruptions).

Requests for extra makeup work, special dispensation on grades or for easier grading standards

In my role of assessor, it is of great concern to me to treat all students *fairly*. Therefore, I promise that I will give no special dispensation to any students, nor will I allow my evaluation of a course to be influenced by the willingness of an entire class of students to whimper when other classes I've taught did not compromise their dignity in that way and were graded fairly by the standards outlined here.

Student Absences:

Students are expected to attend all classes. I will not lower your grade for missing classes, but absences, particularly more than one or two over the term, will likely have a harmful effect on your learning and hence on your final grade.

Please note: My policy for missed labs and missed exams is that students who miss classes are responsible for finding out **from other students** what they missed. I advise and encourage all students to exchange contact information with at least five other students in class for that purpose, and to make further contacts in the event that any of these five or more students drops the course.

Workload for the Course:

The time it will take students to master the material for this course will vary greatly from student to student. However, I expect that the **average** student will be able to achieve an “outstanding” grade (that is, an A) by putting in **three hours of home preparation for every hour of class time** (which works out to **nine hours’ focused, undistracted outside work on an average week**). However, I must be emphatic that **this is no guarantee of success**. If earning a top grade is important to you, please watch your progress carefully and be prepared to adjust your workload if you fall behind in your schedule.

Overview of all four levels

Level I

Must be completed successfully to achieve: a passing grade.

Requirement for writing this exam: A signed and completed worksheet, with all questions answered correctly.

Approximate home study time required (for an average student): 20 hours.

Level I Exam Components:

- a) Miscellaneous problems: you must be able to provide **and demonstrate** the correct answer to all the problems in the ‘Miscellaneous problems’ handout. You will be asked two of the above-mentioned questions, verbatim.
- b) Translations: On the exam, you will be given three new passages to translate from the formal language of propositional logic into English. In preparation for this component, you will need to do all the readings and try all the exercises in Simpson pp.1-30 and pp.55-65.
- c) Truth tables: You will be required to reproduce the material from Simpson, pp.31-34 in a single table.
- d) Truth trees/tableaux: You will need to reproduce the material from Simpson, p.280.
- e) Derivations: On the exam, you will need to perform two new derivations that can be completed using the six rules you have learned in Simpson, pp. 55-98.

Level II

Must be completed successfully to achieve: a C grade.

Requirement for writing this exam: A passing grade on the Level I exam.

Approximate home study time required (for an average student): 32 hours.

Level II Exam Components:

- a) Liars and truth-tellers: You will be given two *new* problems to solve. Both problems will involve liars/truth tellers (as seen in the 'Simple Liars and Truth-Tellers' handout), and will be similar to those problems. You must show your proof of the answer in both cases.
- b) Translations: On the exam, you will be given three passages to translate *into* the formal language of propositional logic. In preparation for this component, you will need to review the same material as under b) in Level I. The translations will be more complex than those in Level I.
- c) Truth tables: You will be given two new arguments in propositional logic: one valid, and one invalid. You will have to demonstrate which is which by creating one truth table for each argument. To prepare for this component, you will need to do all the readings and exercises in Simpson pp. 35-54.
- d) Truth trees: You will need to prove, again, the validity and invalidity of the two arguments from Section c) above, this time using truth trees. I will teach this material in class.
- e) Derivations: You will need to prove the validity of the valid argument from Section c) again, this time using the derivation method. Following this, you will be given a new truth-functionally true formula, which you will need to categorically derive. To prepare for this component, you will need to do all the readings and exercises in Simpson pp. 98-150. Please note: the questions on the Level II exam will not require you to perform disjunction introduction or indirect proof.

Level III

Must be completed successfully to achieve: a B grade.

Requirement for writing this exam: A passing grade on the Level II exam.

Approximate home study time required (for an average student): 20 hours.

Level III Exam Components:

- a) Liars and truth-tellers: You will be given two new problems to solve. Both will involve more complex liars and truth-tellers (as seen in the 'More Complex Liars and Truth-Tellers' handout). One of the two problems must be solved using the Nelson Goodman principle (as taught in class).

- b) Translations: This time, you will need to translate five English sentences into quantifier logic. To prepare for this component, you will need to do all the readings and exercises in Simpson, pp.158-177.
- c) Truth Tables: You will be given two new arguments in propositional logic: one valid, and one invalid. You will have to demonstrate which is which by creating one truth table for each argument. To prepare for this component, you will need to review the readings and exercises in Simpson pp. 35-54.
- d) Truth trees: You will need to prove the correctness of your answers in c), this time using two truth trees.
- e) Derivations: You will need to prove the validity of one or two arguments, one of which may be a categorical derivation. This time, you will need to be able to perform disjunction introduction and indirect proof.

Level IV

Must be completed successfully to achieve: an A grade.

Requirement for writing this exam: A passing grade on the Level III exam.

Approximate home study time required (for an average student): 40 hours.

Level IV Exam Components:

- a) Liars and truth-tellers: You will need to solve one or two new metapuzzles (or perhaps a meta-meta-puzzle or meta-meta-meta-puzzle, etc.) to solve. The puzzles will be similar to those found in the 'Metapuzzles' handout.
- b) Translations: You will need to translate five sentences into quantifier logic. These sentences will be more difficult than those in Level III. To prepare for this component, you will need to do all the readings and exercises in Simpson, pp.178-197.
- c) Interpretations: You will be given four problems, verbatim, from Simpson, pp.206-208: one each from Parts a, b, c, and d. To prepare for this component, you will need to do all the readings and exercises in Simpson, pp.198-208.
- d) Truth trees: You will be given one or two new arguments in quantifier logic: one valid, the other invalid. You will have to prove which is which by using two truth trees.
- e) Derivations: You will need to perform one or two derivations in quantifier logic. To prepare for this component, you will need to do all the readings and exercises in Simpson pp. 213-260.

A strategy for earning the grade you need:

If you need an A grade, Try to pass Level 1 at the first exam period, Level 2 at the third exam period, Level 3 at the fifth exam period, and Level 4 at the seventh exam period.

If you need a B grade, try to pass Level 1 at the second exam period, Level 2 at the fifth exam period, and Level 3 at the seventh exam period.

If you need a C grade, try to pass Level 1 at the third exam period and Level 2 at the sixth exam period.

If you need a D grade, try to pass Level 1 at the fourth exam period.

Schedule:

Tuesday, January 22nd: Introduction to the course.

Friday, January 25th: Breaking things down; beginnings in formal logic. (1)
Homework for this class: Complete your worksheet (to be submitted at the start of class).

Tuesday, January 29th: Translations, truth trees, and truth tables; finding the main operator. (1)

Friday, February 1st: Derivations in simplified propositional logic, Part I. (1)

Tuesday, February 5th: Derivations in simplified propositional logic, Part II. (1)

Friday, February 8th: FIRST EXAM PERIOD

Tuesday, February 12th: Proofs using truth tables. (2)

Friday, February 15th: SECOND EXAM PERIOD

Tuesday, February 19th: Proofs using truth trees. (2)

Friday, February 22nd: THIRD EXAM PERIOD

Tuesday, February 26th: Liars and truth-tellers; some basic paradoxes. (2)

Friday, March 1st: Techniques for derivations with scope lines. (2)

Tuesday, March 5th: Translation techniques; more paradoxes (2)

Friday, March 8th: FOURTH EXAM PERIOD

Tuesday, March 12th: A complete guide to propositional logic derivations. (3)

Friday, March 15th: FIFTH EXAM PERIOD

Tuesday, March 26th: Solving more complicated liar/truth-teller problems; translating liar/truth-teller problems into PL; the Nelson Goodman principle. (3)

Friday, March 29th: SIXTH EXAM PERIOD

Tuesday, April 2nd: Predicate and quantifier logic, introduced; translations into quantifier logic. (3)

Friday, April 5th: More advanced translations: identity. (4)

Tuesday, April 9th: Translations with quantifiers and identity. Also: interpretations. (4)

Friday, April 12th: SEVENTH EXAM PERIOD

Tuesday, April 16st: Derivations in quantifier logic. (4)

Friday, April 19th: A complete method for quantifier logic derivations. (4)

Tuesday, April 23rd: Truth tree proofs for quantifier logic; metapuzzles. (4)

Friday, April 26th: EIGHTH EXAM PERIOD

Tuesday, April 30th: An interesting knight/knave paradox; the basics of Godel's incompleteness theorem. (Looking forward)

Friday, May 3rd: NINTH EXAM PERIOD

Wednesday, May 15th, from 8am to 11am in our regular lecture hall:
TENTH EXAM PERIOD and ELEVENTH EXAM PERIOD